applied sciences

MDPI

Review

There Is Not Only *Cupressus sempervirens* L.: A Review on the Phytochemistry and Bioactivities of the Other *Cupressus* L. Species

Claudio Frezza [1], Daniela De Vita [1,*], Fabio Sciubba [1], Chiara Toniolo [1], Lamberto Tomassini [1], Marcello Nicoletti [1], Marco Franceschin [2], Marcella Guiso [2], Armandodoriano Bianco [2], Mauro Serafini [1] and Sebastiano Foddai [1]

[1] Dipartimento di Biologia Ambientale, Università di Roma "La Sapienza", P.le Aldo Moro 5, 00185 Rome, Italy; claudio.frezza@uniroma1.it (C.F.); fabio.sciubba@uniroma1.it (F.S.); chiara.toniolo@uniroma1.it (C.T.); lamberto.tomassini@uniroma1.it (L.T.); marcello.nicoletti@uniroma1.it (M.N.); mauro.serafini@uniroma1.it (M.S.); sebastiano.foddai@uniroma1.it (S.F.)

[2] Dipartimento di Chimica, Università di Roma "La Sapienza", P.le Aldo Moro 5, 00185 Rome, Italy; marco.franceschin@uniroma1.it (M.F.); marcella.guiso@fondazione.uniroma1.it (M.G.); armandodoriano.bianco@fondazione.uniroma1.it (A.B.)

* Correspondence: daniela.devita@uniroma1.it

Abstract: This review article reports for the first time phytochemistry, ethnobotanical uses and pharmacological activities of all *Cupressus* L. species other than *Cupressus sempervirens* L. Indeed, the literature survey showed how many other *Cupressus* species are rich of important phytochemical compounds, widely used in the ethnobotanical field for several purposes and endowed with interesting biological activities, even if they are somehow neglected by the scientific community. This review aims to continue the study of these other *Cupressus* species and promote more research on them.

Keywords: *Cupressus* L. genus; phytochemistry; chemotaxonomy; ethnobotanical uses; biological activities

Citation: Frezza, C.; De Vita, D.; Sciubba, F.; Toniolo, C.; Tomassini, L.; Nicoletti, M.; Franceschin, M.; Guiso, M.; Bianco, A.; Serafini, M.; et al. There Is Not Only *Cupressus sempervirens* L.: A Review on the Phytochemistry and Bioactivities of the Other *Cupressus* L. Species. *Appl. Sci.* **2022**, *12*, 7353. http://doi.org/10.3390/app12147353

Academic Editors: Gregorio Peron, Jan Hošek and Antony C. Calokerinos

Received: 15 May 2022
Accepted: 18 July 2022
Published: 21 July 2022

1. Introduction

Cupressus L. (common name Cypress) is a genus of evergreen trees belonging to the *Cupressaceae* within the Gymnosperms. From a morphological standpoint, they are characterized by short scale-like leaves when the trees are adult, whereas they are bigger and needle-like when the trees are young (up to two years). They are arranged in opposite decussate pairs in both cases. The cones are quite long, globose or ovoid, and are mature in 18–24 months from pollination. The seeds are quite small with one narrow wing along each side (Figure 1) [1]. *Cupressus* species are native to some temperate regions of the Northern Hemisphere, including western North America, Central America, northwest Africa, the Middle East, the Himalayas, southern China and northern Vietnam, even if they also are widely cultivated [2]. The most important species of the genus is surely *Cupressus sempervirens* L., whose phytochemistry, ethnobotanical uses, and biological activities have already been widely studied and discussed in detail [3–5].

The aim of this paper is to present a detailed review on the phytochemistry, the ethnopharmacological uses and the biological activities of all the other *Cupressus* species as reported in literature. To the best of our knowledge, this represents the first study ever performed on this subject. In addition, a deep chemotaxonomic analysis of the genus is given. The data were collected from several bibliographic sources, i.e., PubChem, Scopus, Google Scholar using the following keywords alone or in combination: *Cupressus* L., phytochemistry, ethnobotany, ethnopharmacological uses, biological activities and the names of all the existing species of the genus except *C. sempervirens*, as reported in www.theworldfloraonline.org (accessed on 14 May 2022). The papers reporting studies

derived from synthetic protocols or after any contamination or interfering procedure were not included since they are not directly linked to this genus, or the final results are not natural or reliable. Generic and not fully accessible papers were also not included, since the methodologies and the results could not be adequately studied and evaluated.

Figure 1. Particulars of the morphological features of *Cupressus* species.

2. Phytochemistry

Cupressus species are known to biosynthesize both non-volatile and volatile compounds, mainly components of the essential oil. In Table 1, the compounds isolated and/or identified in the genus are presented.

Table 1. Phytochemical compounds reported in *Cupressus* species.

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
C. arizonica Greene	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, β-thujaplicinol, γ-thujaplicin	[6]
	Mexico (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin	[6]
	n.r.	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	Kenya (several populations)	Leaf wax	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[9]
	n.s. (several cultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	n.r.	Heartwood	SE, CC, $[\alpha]_D$, IR, NMR, MS	cedrol, α-cedrene, cuparene	[11]
	Australia (wild population)	Pollen	SE, CC, HPLC-FD, GC-MS, NMR	6-deoxoty-phasterol, 3-dehydro-6-deoxo-tasterone, 6-deoxo-castasterone, 3-dehydro-castasterone, 28-homo-castasterone, castasterone, typhasterol, teasterone, plus other brassinosteroids not fully characterized	[12]
	Texas (several cultivated populations)	Leaves	SD, GC-MS	tricyclene, α-pinene, α-thujene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, terpinolene, linalool, *cis*-pinene hydrate, *trans*-*p*-menth-2-en-1-ol, camphor, camphene hydrate, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, (*Z*)-4-decenal, *trans*-piperitol, citronellol, methyl carvacrol, bornyl acetate, α-terpinyl acetate, β-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, *epi*-zonarene, *cis*-calamenene, δ-cadinene, *cis*-muurol-5-en-4β-ol, cedrol, humulene epoxide II, 1,10-di-*epi*-cubenol, α-acorenol, β-acorenol, τ-cadinol, α-cadinol, *cis*-14-nor-muurol-5-en-4-one, *iso*-pimara-9(11),15-diene, *iso*-hibaene, *iso*-phyllocladene, manoyl-oxide, nezukol, phyllocladene, abietatriene, abietadiene, abietol, phyllocladnaol, *cis*-totarol, *trans*-totarol, *trans*-ferruginol	[13]
	Algeria (wild population)	Terminal branches	HD, GC, GC-MS	tricyclene, α-pinene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, limonene, 1,8-cineole, β-phellandrene, *p*-cymene, terpinolene, (*E*)-β-ocimene, fenchone, α-cubebene, α-bourbonene, β-boubenone, linalool, camphor, β-cedrene, bornyl acetate, *iso*-bornyl acetate, umbellulone, terpinen-4-ol, γ-muurolene, α-terpinyl acetate, *cis*-piperitol, *cis*-carveol, δ-cadinene, *cis*-calamenene, *trans*-calamenene, *p*-cymen-8-ol, α-calacorene, α-cadinol, caryophyllene oxide, cubenol, cedrol, thymol, cedrenol, manoyl oxide, sandaracopimaradiene, *iso*-pimaradiene, dehydroabietane	[14]
	Croatia (wild population)	Leaves	HD, EH, GC-MS	oct-3-en-1-ol, 2-methyl-phenol, α-terpineol, geraniol, benzyl alcohol, 2-phenyl-ethanol, 4-hydroxy-3-methyl-benzoic acid, 3-phenylpro*p*-2-enal, 3-phenyl-pro*p*-2-en-1-ol, *p*-cymen-8-ol, myrtenol, eugenol, carvacrol	[15]
	n.r.	Wood	n.r.	β-thujaplicin, γ-thujaplicin, β-thujaplicinol, nootkatin	[16]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Argentina (wild population)	Leaves	HD, GC-FID, GC-MS	α-pinene, α-thujene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, γ-terpinene, terpinolene, camphor, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, α-terpinyl acetate, α-cedrene, β-caryophyllene, *cis*-muurola-3,5-diene, *cis*-muurola-4(14),5-diene, *epi*-zonarene, *cis*-calamenene, δ-cadinene, spathulenol	[17]
	n.r.	Leaves	SE, HPLC-DAD, HPLC-MS, HPTLC	quercetin 3-O-rhamnoside, cupressuflavone, hinokiflavone, amentoflavone, robustaflavone plus other bioflavonoids not fully characterized	[18]
	Italy (wild population)	Leaves	HD, GC-FID, GC-MS, NMR	tricyclene, bornyl acetate, α-thujene, α-pinene, camphene, sabinene, α-cedrene, β-pinene, β-caryophyllene, myrcene, β-cedrene, α-phellandrene, α-humulene, δ-3-carene, *cis*-muurola-4(14),5-diene, α-terpinene, *p*-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, *epi*-zonarene, γ-terpinene, *cis*-sabinene hydrate, δ-cadinene, *trans*-calamenene, terpinolene, acor-4-ene-6,11-oxide, *p*-cymenene, cedrol, linalool, 1,10-di-*epi*-cubenol, *trans*-sabinene hydrate, α-acorenol, camphor, β-acorenol, α-cadinol, umbellulone, hinesol, manoyl oxide, 13-*epi*-manoyl oxide, terpinen-4-ol, abietatriene, *p*-cymen-8-ol, abietadiene, α-terpineol, methyl thymol, methyl carvacrol, *iso*-bornyl acetate	[19]
	Italy (wild population)	Branches	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-copaene, camphene, α-fenchene, sabinene, β-pinene, β-caryophyllene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-selinene, β-phellandrene, viridiflorene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, *p*-menth-2,4(8)-diene, terpinolene, *p*-cymenene, linalool, α-acorenol, camphor, *trans*-pinocamphone, borneol, umbellulone, *cis*-pinocamphone, terpinen-4-ol, α-terpineol, methyl thymol, methyl carvacrol	[19]
	Italy (wild population)	Cones	HD, GC-FID, GC-MS	tricyclene, bornyl acetate, α-thujene, α-cubebene, α-pinene, α-copaene, α-fenchene, β-cubebene, camphene, longifolene, sabinene, β-pinene, β-caryophyllene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, α-acoradiene, *p*-cymene, germacrene D, limonene, β-selinene, β-phellandrene, viridiflorene, (*E*)-β-ocimene, γ-terpinene, α-alaskene, *cis*-sabinene hydrate, *p*-menth-2,4(8)-diene, terpinolene, *p*-cymenene, linalool, α-acorenol, camphor, β-acorenol, *trans*-pinocamphone, terpinen-4-ol, α-terpineol, methyl carvacrol, *iso*-bornyl acetate	[19]
	Iran (wild population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, verbenene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, terpinolene, 2-nonanone, nonanol, *p*-mentha-1,3,8-triene, α-campholenal, *trans*-pinocarveol, *trans*-verbenol, camphor, pinocarvone, umbellulone, terpinen-4-ol, α-terpineol, myrtenal, methyl carvacrol, bornyl acetate, 1-tridecene, carvacrol, α-terpinyl acetate, α-cedrene, β-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, γ-muurolene, germacrene D, *epi*-zonarene, *cis*-calamenene, 6,11-oxido-acor-4-ene, α-calacorene, β-calacorene, spathulenol, caryophyllene oxide, α-cedrol, τ-cadinol, cadalene, *cis*-14-muurol-5-en-4-one	[20]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Iran (wild population)	Cones	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, verbenene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, (*Z*)-β-ocimene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, linalool, camphor, citronellal, borneol, terpinen-4-ol, α-terpineol, citronellol, carvone, bornyl acetate, 1-tridecene, carvacrol, α-terpinyl acetate, α-cedrene, β-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, (*E*)-β-farnesene, *cis*-muurola-4(14), 5-diene, γ-muurolene, *epi*-zonarene, α-calacorene, β-calacorene, α-cedrol, τ-cadinol, cadalene, *cis*-14-muurol-5-en-4-one	[20]
	Tunisia (cultivated population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, linalool, *cis*-*p*-menth-2-en-1-ol, α-campholenal, *trans*-*p*-menth-2-en-1-ol, α-terpineol, camphor, camphene hydrate, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, *cis*-piperitol, verbenone, *trans*-piperitol, *trans*-carveol, *cis*-sabinene hydrate, citronellol, thymol methyl ether, carvacrol methyl ether, piperitone, linalyl acetate, *iso*-bornyl acetate, thymol, terpinen-4-ol acetate, *trans*-piperitol acetate, α-terpinyl acetate, α-copaene, β-bourbonene, β-cubebene, longifolene, *trans*-caryophyllene, β-cedrene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, germacrene D, *epi*-zonarene, cubebol, *trans*-calamenene, δ-cadinene, zonarene, 10-*epi*-cubebol, italicene ether, α-copaen-11-ol, α-calacorene, *cis*-muurola-5-en-4-β-ol, elemol, *cis*-muurola-5-en-4-α-ol, germacrene D-4-ol, caryophyllene oxide, humulene epoxide II, 1-*epi*-cubenol, α-acorenol, β-acorenol, *epi*-α-cadinol, α-cadinol, cadalene, *cis*-14-nor-muurol-5-en-4-one, *iso*-pimara-9-(11),15-diene, sandaracopimara-8(14),15-diene, nezukol, abietatriene, abietadiene, phyllocladanol, 4-*epi*-abietal, sempervirol, *trans*-totarol, *trans*-ferruginol	[21]
	Tunisia (cultivated population)	Branches	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, camphor, umbellulone, terpinen-4-ol, α-terpineol, thymol methyl ether, carvacrol methyl ether, *iso*-bornyl acetate, thymol, terpinen-4-ol acetate, *trans*-piperitol acetate, α-terpinyl acetate, α-copaene, β-bourbonene, β-cubebene, longifolene, *cis*-muurola-3,5-diene, α-humulene, germacrene D, cubebol, α-copaen-11-ol, α-calacorene, *cis*-muurola-5-en-4-β-ol, elemol, cedrol, *cis*-14-nor-muurol-5-en-4-one, *iso*-pimara-9-(11),15-diene, abietadiene, nezukol, sandaracopimara-8(14),15-diene, *trans*-totarol, abietatriene	[21]
	Tunisia (cultivated population)	Cones	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, camphor, umbellulone, terpinen-4-ol, α-terpineol, thymol methyl ether, carvacrol methyl ether, *iso*-bornyl acetate, thymol, terpinen-4-ol acetate, *trans*-piperitol acetate, α-terpinyl acetate, α-copaene, β-bourbonene, β-cubebene, longifolene, *cis*-muurola-3,5-diene, α-humulene, germacrene D, cubebol, α-copaen-11-ol, α-calacorene, *cis*-muurola-5-en-4-β-ol, elemol, cedrol, *cis*-14-nor-muurol-5-en-4-one, *iso*-pimara-9-(11),15-diene, abietadiene, nezukol, sandaracopimara-8(14),15-diene, *trans*-totarol, abietatriene	[21]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Iran (cultivated population)	Cones	HD, GC-MS	α-pinene, β-pinene, sabinene, δ-3-carene, β-myrcene, limonene, α-terpinolene, α-cubebene, bornyl acetate, terpinen-4-ol, caryophyllene, α-humulene, α-terpineol, β-cubebene, δ-cadinene, α-cedrol	[22]
	Iran (cultivated population)	Cones	HD, GC-FID, GC-MS	tricyclene, α-pinene, camphene, sabinene, myrcene, α-phellandrene, δ-2-carene, α-terpinene, *p*-cymene, limonene, (*Z*)-β-ocimene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, linalool, α-campholenal, *trans*-*p*-menth-2-en-1-ol, camphor, *iso*-pulegol, *iso*-borneol, pinocamphone, borneol, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, citronellol, α-fenchyl acetate, methyl carvacrol, methyl thymol, piperitone, *iso*-bornyl acetate, carvacrol, terpinen-4-yl acetate, *trans*-carvyl acetate, α-cubebene, α-copaene, β-elemene, *iso*-italicene, longifolene, α-cedrene, β-caryophyllene, 8-hydroxy-carvotanacetone, thujopsene, β-gurjunene, α-guaiene, *cis*-muurola-3,5-diene, α-humulene, α-acoradiene, germacrene D, valencene, α-muurolene, γ-cadinene, (*Z*)-γ-bisabolene, α-cadinene, germacrene D-4-ol, cedrol, widdrol, 1,10-di-*epi*-cubenol, τ-muurolol, α-cadinol, apiole, (Z,E)- farnesyl acetate, (8S,14)-cedranediol	[23]
	Iran (cultivated population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, camphene, verbenene, sabinene, myrcene, α-phellandrene, δ-2-carene, α-terpinene, *p*-cymene, limonene, (*Z*)-β-ocimene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, linalool, *cis*-*p*-menth-2-en-1-ol, α-campholenal, camphor, *iso*-pulegol, *iso*-borneol, pinocarvone, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, *trans*-carveol, citronellol, (*Z*)-ocimenone, methyl thymol, (*E*)-ocimenone, carvone, piperitone, perillaldehyde, *iso*-bornyl acetate, carvacrol, terpinen-4-yl acetate, neo-*iso*-pulegyl acetate, *trans*-carvyl acetate, α-terpinyl acetate, citronellyl acetate, α-ylangene, α-copaene, β-bourbonene, β-elemene, longifolene, α-cedrene, β-gurjunene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, γ-muurolene, γ-curcumene, germacrene D, valencene, α-muurolene, γ-cadinene, zonarene, (*Z*)-γ-bisabolene, α-cadinene, α-calacorene, elemol, germacrene B, *cis*-muurol-5-en-4-α-ol, β-calacorene, germacrene D-4-ol, caryophyllene oxide, cedrol, humulene epoxide II, 1,10-di-*epi*-cubenol, γ-eudesmol, τ-muurolol, α-cadinol, 7-*epi*-α-eudesmol, cadalene, apiole, *epi*-α-bisabolol, *cis*-14-normuurol-5-en-4-one, oplopanone, cedryl acetate, (*Z*)-β-santalol acetate, (8S,14)-cedranediol	[23]
	Iran (wild population)	Cones	HD, GC-MS	tricyclene, α-thujene, α-pinene, camphene, sabinene, β-pinene, β-myrcene, α-phellandrene, α-terpinene, limonene, (*Z*)-β-ocimene, (*E*)-β-ocimene, δ-3-carene, γ-terpinene, terpinolene, (*E*)-sabinene hydrate, allo-ocimene, camphor, borneol, umbellulone, terpinen-4-ol, α-terpineol, citronellol, bornyl acetate, α-cubebene, α-copaene, *iso*-longifolene, italicene, α-cedrene, (*E*)-caryophyllene, γ-elemene, α-humulene, γ-curcumene, germacrene D, α-muurolene, δ-cadinene, myristicin, δ-cadinene, (*Z*)-nerolidol, caryophyllene oxide, cedrol, α-cadinol, juniper camphor	[24]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Iran (wild population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, camphene, verbenene, sabinene, β-pinene, β-myrcene, α-phellandrene, δ-2-carene, α-terpinene, *p*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, linalool, 1-terpineol, camphor, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *cis*-piperitol, thymol methyl ether, phellandral, bornyl acetate, thymol, *trans*- carvyl acetate, α-terpinyl acetate, α-cedrene, β-funebrene, *trans*-caryophyllene, *cis*-muurola-4(14),5-diene, *epi*-zonarene, *trans*-calamenene, δ-cadinene, α-calacorene, caryophyllene oxide, cedrol, β-acorenol, α-cadinol, *cis*-14-nor-muurol-5-en-4-one	[25]
	Mississippi (wild population)	Needles	HD, GC-MS	(−)-β-pinene, myrcene, limonene, (−)-bornyl acetate	[26]
	Greece (wild population)	Aerial parts	HD, GC-FID, GC-MS	α-thujene, α-pinene, camphene, sabinene, β-pinene, myrcene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, linalool, n-nonanal, 1,3,8-*p*-menthatriene, *trans*-thujone, *cis*-*p*-menth-2-en-1-ol, camphor, pinocarvone, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *trans*-carveol, thymol methyl ether, piperitone, bornyl acetate, thymol, α-terpinyl acetate, *cis*-muurola-3,5-diene, *trans*-muurola-3,5-diene, α-humulene, α-muurolene, *trans*-calamene, δ-cadinene, α-calacorene, *cis*-muurol-5-en-4-β-ol, *cis*-muurol-5-en-4-α-ol, β-calacorene, spathulenol, cedrol, β-oplopenone, α-acorenol, β-acorenol, *epi*-α-cadinol, *epi*-α-muurolol, α-cadinol, *cis*-14-nor-muurol-5-en-4-one, manool oxide, abietatriene, abietadiene	[27]
	Tunisa (obtained from a botanical garden)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, β-myrcene, δ-2-carene, α-phellandrene, δ-3-carene, *p*-cymene, limonene, δ-terpinene, terpinolene, *p*-mentha-1,4,8-triene, 2-nonanone, linalool, β-fenchol, allo-ocimene, 1-terpineol, camphor, umbellulone, terpinen-4-ol, borneol, α-terpineol, (*E*)-piperitol, β-citronellol, thymyl ethyl ether, geraniol, *iso*-bornyl acetate, thymol, (*E*)-α-ionol, β-cubebene, β-bourbonene, β-elemene, α-cedrene, aromadendrene, α-humulene, dehydro-aromadendrene, δ-muurolene, *ar*-curcumene, germacrene D, β-selinene, α-farnesene, (*E*)-calamanene, α-calacorene, spathulenol, allo-aromadendrene epoxide, α-cedrol, β-oplopenone, τ-cadinol, α-cadinol, β-acorenone, 14-nor-cadin-5-en-4-ol, hydroxy-cinnamaldehyde, guaiazulene, kaur-15-ene, manoyl oxide, abietatriene, nezukol, (*Z*)-totarol	[28]
	Tunisa (obtained from a botanical garden)	Cones	HD, GC-FID, GC-MS	tricyclene, α-pinene, sabinene, β-pinene, β-myrcene, δ-3-carene, limonene, δ-terpinene, terpinolene, *p*-mentha-1,4,8-triene, 1-terpineol, terpinen-4-ol, α-terpineol, α-cedrene, α-humulene, germacrene D, β-selinene, α-farnesene, α-cedrol, β-acorenone, manoyl oxide	[28]
	Tunisa (obtained from a botanical garden)	Stems	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, camphene, β-pinene, δ-3-carene, *p*-cymene, limonene, terpinolene, 2-nonanone, linalool, camphor, terpinen-4-ol, thymyl ethyl ether, *iso*-bornyl acetate, β-elemene, α-cedrene, aromadendrene, δ-muurolene, *ar*-curcumene, (*E*)-calamanene, α-cedrol, β-acorenone, (*Z*)-totarol	[28]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Tunisia (wild population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, camphene, sabinene, β-pinene, β-myrcene, δ-4-carene, δ-3-carene, α-terpinene, *p*-cymene, *p*-cymen-8-ol, limonene, δ-terpinene, α- terpinolene, linalool, β-fenchol, α-campholenal, (*Z*)-pinocarveol, *p*-menth-2-en-1-ol, camphor, camphene hydrate, pinocarvone, borneol, umbellulone, terpinen-4-ol, myrtenal, (*E*)-carveol, β-citronellol, thymol methyl ether, piperitone, bornyl acetate, thymol, ionole, β-cubebene, α-cedrene, aromadendrene, δ-muurolene, germacrene B, β-sesquiphellandrene, δ-cadinene, calamenene, β-caryophyllene epoxide, cedrol, α-cadinol, 14-norcadin-5-en-4-one, *epi*-manoyl oxide, labd-(13*E*)-8,15-diol	[29]
	India (wild population)	Branchlets	HD, GC-FID, GC-MS	α-thujene, α-pinene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, γ-terpinene, α-terpinolene, linalool, *cis*-*p*-menth-2-en-1-ol, α-campholenal, *trans*-*p*-menth-2-en-1-ol, camphor, pinocarvone, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *p*-mentha-1(7),8-dien-2-ol, *cis*-piperitol, *trans*-piperitol, *trans*-carveol, methyl thymol, carvone, piperitone, bornyl acetate, α-terpinyl acetate, *cis*-muurola-4(14),5-diene	[30]
	India (wild population)	Branchlets	HD, GC-FID, GC-MS	α-thujene, α-pinene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, γ-terpinene, α-terpinolene, linalool, *cis*-*p*-menth-2-en-1-ol, *trans*-*p*-menth-2-en-1-ol, camphor, pinocarvone, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *trans*-piperitol, *trans*-carveol, methyl thymol, carvone, piperitone, bornyl acetate, α-terpinyl acetate, *cis*-muurola-4(14),5-diene, 2-heptyl acetate, 2-nonanone, α-gurjunene	[30]
	Iran (cultivated population)	Leaves	HD, GC-FID, GC-MS	α-pinene, elemicin, sabinene, cedrol, β-myrcene, cubenol, o-cymene, α-acorenol, limonene, camphor, α-cadinol, eudesm-7(11)-en-4-ol, umbellulone, eicosane, terpeinen-4-ol, α-terpineol, tetratriacontane, nonacosane, allo-aromadedrene, *cis*-calamenene, dotriacontane, 17-pentatriacontene, *cis*-candina-1(2),4-diene	[31]
	Iran (obtained from a botanical garden)	Leaves and cones	HD, GC	α-pinene, umbellulone, limonene, sabinene, terpinene-4-ol (only major compounds reported)	[32]
	Iran (cultivated population)	Wood knots	SE, TLC, GC-MS	*p*-coumaroyl alcohol, ferulic acid, dinosterol, nor-metanephrine, homo-vanillyl alcohol, matairesinol, diarylheptanoid curcumin, plus other fatty acids, waxes, terpenoids, steroids, alkaloids, phenolics, quinones not specified	[33]
	Morocco (wild population)	Leaves	HD, GC-FID	α-pinene, sabinene, β-pinene, myrcene, δ-3-carene, 1,4-cineole, *p*-cymene, limonene, γ-terpinene, m-cymenene, *p*-cymenene, 6-camphenol, *trans*-sabinol, *cis*-pinene hydrate, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, *cis*-sabinene hydrate acetate, citronellol, Z-ocimenone, *trans*-sabinene hydrate acetate, α-terpinene-7-ol, δ-terpinene-7-ol, α-terpinyl acetate, (*E*)-caryophyllene, *cis*-muurola-3,5-diene, β-copaene, *cis*-muurola-4(14),5-diene, α-muurolene, β-curcumene, β-calacorene, δ-cadinene, α-cadinene, elimol, germacrene B, thujopsan-2 α-ol, 1,10-di-*epi*-cubenol, α-acorenol, *epi*-α-muurolol, α-cadinol, (*E*)-bisabolol-11-ol, α-bisabolol, caryophyllene acetate, curcumenol, 2,7(14)-bisaboladien-12-ol	[34]
	France (wild population)	Leaves	HD, GC-MS	α-pinene, β-pinene, δ-3-carene, limonene, sabinene hydrate, terpinen-4-ol, α-acorenol, α-muurolene, aromadendrene, *cis*-cadina-1(6)-4-diene, cadinol, calamene, cedrol, 10-*epi*-cubenol, *cis*-muurol-e-en-4-one, *cis*-muurol-5-en-β-ol, *trans*-abietadiene, 4-*epi*-abietal, abietol, *trans*-ferruginol, nezukol, sempervirol, *trans*-totarol	[35]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Iran (wild population)	Aerial parts	HD, GC-MS	α-thujene, α-pinene, camphene, sabinene, β-pinene, α-terpinene, myrcene, δ-2-carene, *p*-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, γ-terpinene, terpinolene, camphor, umbellulone, terpinen-4-ol, α-terpineo1, citronellol, thymol methyl ether, methyl carvacrol methyl ether, dec-9-en-1-ol, 3-thujyl acetate, α-cubebene, longifolene, (*E*)-caryophyllene, *cis*-murola-3,5-diene, δ-cadinene, *epi*-bicyclosesquiphellandrene, *epi*-zonarene, *trans*-calamenene, (*E*)-nerolidol, *epi*-cedrol	[36]
	Iran (wild population)	Cones	HD, GC-MS	tricyclene, α-pinene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, limonene, (*E*)-β-ocimene, γ-terpinene, terpinolene, linalool, camphor, umbellulone, terpinen-4-ol, α-terpineo1, citronellol, methyl carvacrol, bornyl acetate, α-cubebene, *trans*-caryophyllene, δ-cadinene	[37]
C. arizonica var. *glabra* (Sudw.) Little	Arizona (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, β-thujaplicinol, γ-thujaplicin	[6]
	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin	[6]
	n.s. (several cultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	Russia (wild population)	Stems and leaves	SE, SR, IR, NMR	lipids, phospholipids. phosphatidylcholines, phosphatidyletanolamines, phosphatidylglycerols (exact compounds not specified)	[38]
	n.r.	Leaves	SE, HPLC-DAD, HPLC-MS, HPTLC	quercetin 3-*O*-rhamnoside, cupressuflavone, amentoflavone, robustaflavone, plus other bioflavonoids not fully characterized	[18]
	Algeria (wild population)	Terminal branches	HD, GC, GC-MS	tricyclene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, limonene, 1,8-cineole, β-phellandrene, γ-terpinene, *p*-cymene, terpinolene, (*E*)-β-ocimene, α-bourbonene, β-boubenone, linalool, camphor, bornyl acetate, umbellulone, terpinen-4-ol, α-terpineol, γ-muurolene, borneol, α-terpinyl acetate, *cis*-piperitol, *trans*-carveol, δ-cadinene, myrtenol, cuparene, *cis*-calamenene, *p*-cymen-8-ol, α-calacorene, cubenol, τ-cadinol, α-cadinol, cedrol, thymol, cedrenol eugenyl acetate, manoyl oxide, dehydroabietane	[38]
	South Carolina (wild population)	Female cones	HD, GC-FID, GC-MS	α-pinene, α-thujene, α-fenchene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, β-phellandrene, γ-terpinene, (*E*)-β-ocimene, *p*-cymene, terpinolene, α-campholene aldehyde, camphor, linalool, *trans*-*p*-menth-2-en-1-ol, terpinen-4-ol, β-caryophyllene, 4-terpinenyl acetate, cadina-3,5-diene, umbellulone, *trans*-pinocarveol, *epi*-zonarene, α-terpineol, α-terpinyl acetate, zonarene, α-alaskene, citronellol, δ-cadinene, *ar*-curcumene, calamenene, (*E*)-nerolidol, α-cedrol, α-acorenol, β-acorenol, τ-cadinol, τ-muurolol, carvacrol, α-cadinol, 8,13-abietadiene, (*Z*)-β-curcumen-12-ol, (*Z*)-nuciferol	[39]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	South Carolina (wild population)	Male cones	HD, GC-FID, GC-MS	α-pinene, α-thujene, α-fenchene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, β-phellandrene, γ-terpinene, (*E*)-β-ocimene, *p*-cymene, terpinolene, camphor, linalool, thymol methyl ether, terpinen-4-ol, β-caryophyllene, 4-terpinenyl acetate, cadina-3,5-diene, umbellulone, *epi*-zonarene, α-terpineol, α-terpinyl acetate, zonarene, α-muurolene, α-alaskene, citronellol, δ-cadinene, γ-cadinene, *ar*-curcumene, calamenene, 1,10-di-*epi*-cubenol, α-cedrol, α-acorenol, β-acorenol, τ-cadinol, τ-muurolol, δ-cadinol, carvacrol, α-cadinol, *iso*-phyllocladene, 8,13-abietadiene, (*Z*)-β-curcumen-12-ol, (*Z*)-nuciferol, nezukol	[39]
	South Carolina (wild population)	Needle twigs	HD, GC-FID, GC-MS	α-pinene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, β-phellandrene, γ-terpinene, *p*-cymene, terpinolene, camphor, linalool, terpinen-4-ol, β-caryophyllene, 4-terpinenyl acetate, cadina-3,5-diene, umbellulone, *epi*-zonarene, α-terpineol, α-terpinyl acetate, zonarene, α-alaskene, citronellol, δ-cadinene, *ar*-curcumene, calamenene, 1,10-di-*epi*-cubenol, α-cedrol, α-acorenol, β-acorenol, τ-cadinol, τ-muurolol, α-cadinol, *iso*-phyllocladene, 8,13-abietadiene, (*Z*)-β-curcumen-12-ol, (*Z*)-nuciferol, nezukol	[39]
	South Carolina (wild population)	Wood barks	HD, GC-FID, GC-MS	α-pinene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, β-phellandrene, γ-terpinene, (*E*)-β-ocimene, *p*-cymene, terpinolene, β-thujone, α-campholene aldehyde, camphor, linalool, *trans*-*p*-menth-2-en-1-ol, longifolene, thymol methyl ether, terpinen-4-ol, 4-terpinenyl acetate, cadina-3,5-diene, myrtenal, umbellulone, *trans*-pinocarveol, *epi*-zonarene, α-terpineol, α-terpinyl acetate, verbenone, zonarene, α-muurolene, β-selinene, α-selinene, δ-cadinene, γ-cadinene, myrtenol, calamenene, (*E*)-nerolidol, 1-*epi*-cubenol, α-cedrol, α-acorenol, 6-*epi*-cubenol τ-cadinol, τ-muurolol, δ-cadinol, carvacrol, α-cadinol, selin-11-en-4α-ol, *iso*-phyllocladene, nezukol	[39]
	Tunisia (wild population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, camphene, sabinene, β-pinene, β-myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, *p*-cymen-8-ol, limonene, δ-terpinene, α- terpinolene, linalool, β-fenchol, α-campholenal, (*Z*)-pinocarveol, camphor, camphene hydrate, umbellulone, terpinen-4-ol, β-citronellol, thymol methyl ether, bornyl acetate, thymol, α-terpinyl acetate, ionole, β-cubebene, α-cedrene, aromadendrene, δ-muurolene, δ-curcumene, β-sesquiphellandrene, calamenene, (*Z*)-cadina-1,4-diene, α-calacorene, (*E*)-nerolidol, cedrol, α-cadinol, cadalene, 14-norcadin-5-en-4-one, *epi*-manoyl oxide, labd-(13*E*)-8,15-diol	[29]
C. arizonica var. *nevadensis* (Abrams) Little	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, hydro-nootkatinol	[6]
	n.s. (severalcultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
C. arizonica var. *stephensonii* (C.B.Wolf) Little	n.s.	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	California (wild population)	Heratwood	SE, PC, GLC, UV, IR, NMR, MS	carvacrol, β-thujaplicin, nootkatin, γ-thujaplicin, α-pinene, 4-terpinenol, methyl 4-*trans*-dehydrogeranate	[40]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
C. bakeri Jeps.	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin	[6]
	n.s. (several wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	California (several populations)	Seeds	HD, GC-FID, GC-MS	palmitic acid, stearic acid, arachidic acid, oleic acid, linoleic acid, linolenic acid, eicosenoic acid, eicosadienoic acid, eicosatrienoic acid, eicosatetranoic acid	[41]
	California (several populations)	Foliage	HD, GC-FID, GC-MS	tricyclene, thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, terpinolene, *trans*-*p*-menth-2-ene-1-ol, camphor, terpinene-4-ol, *p*-cymen-8-ol, α-terpineol, bornyl acetate, α-cedrene, β-cedrene, thujopsene, α-curcumene, cuparene, calamenene, cedrol, α-acorenol, β-acorenol, α-cadinol, cadalene	[42]
	California (wild population)	Foliage	HD, CC, GC-MS, $\alpha_{[D]}$, IR, NMR,	bakerol, (−)-(1*R*,7*S*,10*S*)-muurola-4(15),5-diene, (−)-(1*R*,10*S*)-muurola-4,6-diene, (−)-6,12-oxido-acor-4-ene, (1*R*,4*S*,7*S*,10*S*)-4β-hydroxy-muurol-5-ene, α-acorenol, (1*R*,4*S*,7*S*,10*S*)-4α-hydroxy-muurol-5-ene, (1*R*,7*S*,10*S*)-15-nor-muurol-5-en-4-one, cedryl acetate, α-cedrene β-cedrene, cuparene, *cis*-calamenene, cedrol, β-acorenol, α-cadinol, β-cadalene	[43]
	California (wild population)	Foliage	HD, LC, GC-MS, $\alpha_{[D]}$, NMR, IR	α-acorenol, β-acorenol, italicene, bakerol	[44]
	California (several populations)	Foliage	HD, GC-MS	tricyclene, thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, *cis*-*p*-menth-2-ene, terpinolene, *trans*-*p*-menth-2-ene-l-ol, camphor, terpinen-4-ol, bornyl acetate, α-cedrene, β-cedrene, thujopsene, α-acoradiene, α-curcumene, cuparene, calamanene, α-acorenol, β-acorenol, α-cadinol, τ-cadinol, cadalene	[45]
	California (wild population)	Foliage	HD, CC, GC-MS, $\alpha_{[D]}$, NMR, IR	cis-calamenene, 10-*epi*-zonarene, *cis*-muurol-5-en-4β-ol, *cis*-muurol-5-en-4α-ol, *epi*-bicyclosesquiphellandrene, nor-muurolenone, *cis*-muurola-3,5-diene, *cis*-muurola-4(14),5-diene), *cis*-14-nor-muurol-5-en-4-one	[46]
	California (wild population)	Foliage	HD, SE, CC, GC-MS, HPLC-UV, $[\alpha]_D$, IR, NMR,	thujopsadiene, thujopsan-2α-ol, mayurone, mayurone epoxide, thujopsenol epoxide, 2-methyl-isomenthone, indipone	[47]
	n.r.	Wood	n.r.	nootkatin	[16]
	France (several populations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
	France (several populations obtained from a botanical garden)	Leaves	SE, TLC, UV	galactolipids with saturated, unsaturated fatty and poly-unsaturated fatty acids (from C14 to C22)	[48]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
C. cashmeriana Royle ex Carrière	n.r.	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	n.s. (several cultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	India (wild population)	Leaves	SE, CC, UV, IR, NMR	quercetin-3-O-(6″-O-α-L-rhamnopyranosyl)-β-D-glucopyranoside, amentoflavone, 7-O-methyl amentoflavone, isocryptomerin, cupressuflavone, hinokiflavone	[49]
	China (wild population)	Foliage	HD, GC-FID, GC-MS	thujene, (−)-α-pinene, α-pinene, (−)-α-fenchene, (−)-sabinene, sabinene, (−)-β-pinene, β-pinene, myrcene, 3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, *cis*-sabinene hydrate, (−)-cis-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, (−)-*trans*-sabinene hydrate, linalool, *trans*-verbenol, umbellulone, terpinen-4-ol, (−)-terpinen-4-ol, *p*-cymen-8-ol, sylveterpineol, α-terpineol, *cis*-sabinene hydrate acetate, *trans*-sabinene hydrate acetate, bornyl acetate, sylveterpinyl acetate, α-terpinyl acetate, α-copaene, β-elemene, caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, germacrene D, 4-*epi*-cubebol, *epi*-zonarene, α-muurolene, germacrene A, cubebol, γ-cadinene, δ-cadinene, *cis*-calamenene, 10-*epi*-cubebol, *cis*-muurol-5-en-4b-ol, *cis*-muurol-5-en-4α-ol, 4-hydroxy-germacra-1(10),5-diene, caryophyllene epoxide, *trans*-muurol-5-en-4α-β-ol, cedrol, 10-*epi*-cubenol, τ-cadinol, τ-muurolol, α-cadinol, oplopanone, manoyl oxide, sandaricopimara-8(14),15-diene, *iso*-kaurene, abietatriene, abetadiene, nezukol, phyllocladanol, sempervirol, totarol, ferruginol	[50]
	France (cultivated population)	Leaves	HD, GC-MS	tricyclene, α-thujene, α-pinene, camphene, α-fenchene, sabinene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, fenchone, *p*-cymenene, terpinolene, isoamyl isovalerate, *cis*-sabinene hydrate, campholene aldehyde, camphor, camphene hydrate, pinocarvone, borneol, *trans*-*p*-menth-2-en-1-ol, umbellulone, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, β-cyclocitral, α-fenchyl acetate, methyl thymol, bornyl acetate, thymol, methyl eugenol, karahaenyl acetate, carvacrol, α-terpinyl acetate, α-copaene, β-elemene, β-caryophyllene, thujopsene, α-humulene, *cis*-mmurola-4(14),5-diene, γ-cadinene, *cis*-calamenene, δ-cadinene, α-calacorene, elemol, caryophyllene oxide, α-cadinol, kaur-16-ene, sandaracopimaradiene, manoyl oxide, 13-(16),14,labdien-8-ol, *cis*-totarol	[51]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
C. chengiana S.Y. Hu	China (wild population)	Foliage	HD, GC-FID, GC-MS	thujene, (−)-α-pinene, α-pinene, (−)-sabinene, sabinene, (−)-β-pinene, β-pinene, myrcene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, *cis*-sabinene hydrate, (−)-cis-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, (−)-*trans*-sabinene hydrate, linalool, umbellulone, karahanaenol, terpinen-4-ol, (−)-terpinen-4-ol, α-terpineol, *cis*-sabinene hydrate acetate, *trans*-sabinene hydrate acetate, linalyl acetate, bornyl acetate, α-terpinyl acetate, α-cubebene, α-copaene, β-elemene, caryophyllene, thujopsene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, germacrene D, *epi*-zonarene, cubebol, γ-cadinene, δ-cadinene, *cis*-calamenene, 10-*epi*-cubebol, hedycaryol, *cis*-muurol-5-en-4b-ol, elemol, cedrol, *cis*-muurol-5-en-4α-ol, 4-hydroxy-germacra-1(10),5-diene, *iso*-kaurene, thujopsan-2α-ol, nezukol, β-eudesmol, α-eudesmol, manoyl oxide, abietatriene, abetadiene, methyl-totarol, methyl-ferruginol, totarol, sempervirol, ferruginol plus other not identified	[50]
	France (cultivated population)	Leaves	HD, GC-MS	α-thujene, α-pinene, camphene, α-fenchene, sabinene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, fenchone, *p*-cymenene, terpinolene, *cis*-*p*-menth-2-en-1-ol, camphor, umbellulone, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, β-cyclocitral, α-fenchyl acetate, methyl thymol, piperitone, linalyl acetate, bornyl acetate, carvacrol, terpinene-4-yl acetate, α-terpinyl acetate, α-cubebene, neryl acetate, β-elemene, β-caryophyllene, thujopsene, germacrene D, α-muurolene, γ-cadinene, δ-cadinene, elemol, β-opoplenone, γ-eudesmol, τ-muurolol, β-eudesmol, α-cadinol, manoyl oxide, sandaracopimaradiene, abietratriene, *trans*-totarol	[51]
	China (wild population)	n.r.	SE, CC, IR, NMR	β-daucosteol, quercitrin, luteolin, cupressuflavone, amentoflavone, neo-cryptomerin, hemiarin	[52]
	China (wild population)	Branches and leaves	SE, CC, LC, $\alpha_{[D]}$, UV, IR, NMR, MS	cupressusoside, 10-*O*-β-D-glucopyranoside-oplopanone, pimaric acid, 13*S*-15-hydroxylabd-8(17)-en-18-oic acid, 13*S*-15-acetoxylabd-8(17)-en-18-oic acid, 15-methyl imbricatolate	[53]
C. duclouxiana Hickel	n.s. (severalcultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	China (wild population)	Foliage	HD, GC-FID, GC-MS	thujene, (−)-α-pinene, α-pinene, (−)-α-fenchene, (−)-sabinene, sabinene, (−)-β-pinene, β-pinene, myrcene, 3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, *trans*-verbenol, umbellulone, terpinen-4-ol, (−)-terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, bornyl acetate, α-terpinyl acetate, α-copaene, β-elemene, caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, germacrene D, 4-*epi*-cubebol, *epi*-zonarene, α-muurolene, *trans*-muurola-4(14),5-diene, germacrene A, cubebol, γ-cadinene, δ-cadinene, *cis*-calamenene, zonarene, 10-*epi*-cubebol, *cis*-muurol-5-en-4b-ol, *cis*-muurol-5-en-4α-ol, 4-hydroxy-germacra-1(10),5-diene, caryophyllene epoxide, *trans*-muurol-5-en-4α-β-ol, cedrol, 10-*epi*-cubenol, τ-cadinol, τ-muurolol, α-cadinol, oplopanone, manoyl oxide, sandaricopimara-8(14),15-diene, abietatriene, abetadiene, nezukol, sempervirol, totarol, ferruginol	[50]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	France (cultivated population)	Leaves	HD, GC-MS	tricyclene, α-thujene, α-pinene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, limonene, (*E*)-β-ocimene, *p*-cymenene, terpinolene, linalool, 1-octen-3-yl acetate, campholene aldehyde, camphor, camphene hydrate, umbellulone, terpinen-4-ol, dihydro-carveol, α-terpineol, *trans*-piperitol, *cis*-carveol, α-fenchyl acetate, methyl thymol, (*E*)-anethole, bornyl acetate, terpinene-4-yl acetate, *trans*-carvyl acetate, α-terpinyl acetate, α-cubebene, neryl acetate, β-elemene, β-caryophyllene, α-humulene, *cis*-muurola-4(14),5-diene, α-muurolene, δ-cadinene, nerolidol, β-opoplenone, 10-*epi*-γ-eudesmol, τ-muurolol, α-cadinol, nor-14-cadin-5-en-4-one, *epi*-13-manool, manoyl oxide, sandaracopimaradiene, abietratriene, *cis*-totarol, *trans*-totarol, ferruginol	[51]
	China (wild population)	Branches and leaves	SE, CC, $\alpha_{[D]}$, IR, UV, NMR, MS	cupressoside A, cupressoside B, matairesinoside, dihydrodehydrodiconiferyl alcohol, dihydrodehydrodiconiferyl alcohol-9-*O*-α-L-rhamnopyranoside, dihydrodehydrodiconiferyl alcohol-4-*O*-α-L-rhamnopyranoside, (−)-isolariciresinol, (−)-isolariciresinol-9-*O*-β-D-xylopyranoside	[54]
C. dupreziana A. Camus	Algeria (wild population)	Heartwood	SE, CC, $[\alpha]_D$, IR, NMR, MS	cedrol, α-cedrene, carvacrol methyl ether, cuparene, β-cedrene, calamenene, β-elemene, acoradiene, α-curcumene, α-selinene, β-selinene, prezizaene, 1,7-di-*epi*-α-cedrene, 1,7-di-*epi*-β-cedrene	[11]
	Algeria (wild population)	Wood	SE, CC, GLC, $[\alpha]_D$, IR, NMR, MS	cedrol, carvacrol methyl ether, α-cedrene, β-cedrene, β-elemene, α-selinene, β-selinene, α-acoradiene, β-acoradiene, γ-acoradiene, α-curcumene, cuparene, prezizaene, calamenene 1,7-di-*epi*-α-cedrene, 1,7-di-*epi*-β-cedrene	[11]
	Algeria (wild population)	Heartwood	SE, CC, GLC, $[\alpha]_D$, IR, UV, NMR, MS	manool, sandaracopimara-8(14),15-diene-3β-ol, torulosal, pimarinol, torulosol, torulosyl monoacetate, hinokione, totarolone, hinokiol	[55]
	France (wild population)	Wood	SE, CC, IR, NMR, MS	α-terpineol, borneol, cedrol, 4-β-selinene-11-ol, di-*epi*-1,7-cedrene-8-ol, 8β-di-*epi*-1,7-cedran-15-ol, 4,11-alaskadien-14-ol, costol, 3,11-alaskadien-14-ol, 4,7(11)-alaskadien-14-ol, β-costol	[56]
	Algeria (wild population)	Wood	HD, SE, GLC-FID, GC-MS, IR, MS	α-pinene, α-thujene, camphene, δ-3-carene, limonene, β-phellandrene, β-ocimene, γ-terpinene, *p*-cymene, α-terpinolene, *p*-cymenene, α-copaene, β-cubebene, α-cedrene, β-elemene, β-cedrene, thujopsene, carvacrol methyl ether, longifolene, borneo1, β-selinene, α-selinene, γ-acoradiene, ε-cadinene, cuparene, cedrol	[57]
	Algeria (wild population)	Wood	HD, SE, GLC-FID, GC-MS, IR, MS	1,7-di-*epi*-α-cedrene, α-cedrene, 1,7-di-*epi*-β-cedrene, β-cedrene, β-elemene, carvacrol methyl ether, preizizaene, α-acoradiene, β-acoradiene, β-selinene, α-selinene, α-acoradine, α-curcumene, cuparene, calamenene, cedrol	[57]
	Algeria (wild population)	Leaves	SD, CC, GC-FID, GC-MS, IR, MS	α-pinene, α-fenchene, α-thujene, camphene, β-pinene, β-myrcene, δ-3-carene, α-terpinene, limonene, β-phellandrene, γ-terpinene, *p*-cymene, terpinolene, α-copaene, α-cubebene, α-humulene, β-caryophyllene, α-humulene, γ-muurolene, α-muurolene, germacrene D, δ-cadinene, γ-cadinene, ε-cadinene, calamene	[58]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Algeria (wild population)	Terminal branches	HD, GC, GC-MS	α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, limonene, 1,8-cineole, β-phellandrene, γ-terpinene, terpinolene, (*E*)-β-ocimene, tridecane, α-cubebene, α-copaene, α-bourbonene, β-boubenone, linalool, benzaldehyde, α-cedrene, benzyl alcohol, β-caryophyllene, β-cedrene, linalyl acetate, bornyl acetate, *iso*-bornyl acetate, umbellulone, terpinen-4-ol, α-terpineol, α-humulene, α-muurolene, α-terpinyl acetate, *cis*-carveol, δ-cadinene, γ-cadinene, *ar*-curcumene, cuparene, *cis*-calamenene, *trans*-calamenene, *p*-cymen-8-ol, α-calacorene, caryophyllene oxide, α-cadinol, δ-cadinol, cedrol, cedrenol sandaracopimaradiene, *iso*-pimaradiene, manoyl oxide, dehydroabietane	[14]
	France (severalpopulations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
	France (severalpopulations obtained from a botanical garden)	Leaves	SE, TLC, UV	galactolipids with saturated, unsaturated fatty and poly-unsaturated fatty acids (from C14 to C22)	[48]
	Algeria (wild population)	Green branchlets	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, *p*-cymene, limonene, *trans*-β-ocimene, γ-terpinene, terpinene-4-ol, terpinolene, linalool, methyl thymol, linalyl acetate, bornyl acetate, β-cubebene, α-copaene, β-bourbonene, β-copaene, β-funebrene, β-caryophyllene, α-humulene, γ-muurolene, germacrene D, γ-amorphene, α-muurolene, γ-cadinene, δ-amorphene, δ-cadinene, 4α-hydroxy-germacradiene, caryophyllene epoxide, cedrol, δ-cadinol	[59]
	Algeria (several populations)	Aerial parts	HD, GC-MS	tricyclene, α-thujene, α-pinene, fenchene, sabinene, β-pinene, myrcene, phellandrene, δ-3-carene, *p*-cymene, *trans*-β-ocimene, γ-terpinene, terpinen-4-ol, terpinolene, β-bourberene, β-funebrene, α-copaene, γ-elemene, caryophyllene, β-copaene, α-humulene, γ-muurolene, germacrene D, γ-amorphene, γ-cadinene, α-muurolene, τ-amorphene, τ-cadinene, 4α-hydroxy-germacrene, caryophyllene epoxide, cedrol, τ-cadinol	[60]
	Algeria (several populations)	Aerial parts	HD, GC-MS	α-pinene, fenchene, sabinene, β-pinene, myrcene, δ-3-carene, *p*-cymene, limonene, β-phellandrene, terpinolene, terpinen-4-ol, α-terpineol, terpinen-4-yl acetate, α-terpenyl acetate, β-caryophyllene, α-humulene, γ-muurolene, germacrene D, α-muurolene, γ-cadinene, δ-cadinene, caryophyllene oxide, *epi*-cedrol, torrilenol, β-acorenol, *epi*-α-cadinol, *epi*-α-muurolol, α-cadinol, eudesma-4(15),7-dien-3-β-ol, eudesma-4(15),7-dien-1-β-ol, ent-pima-8(14),15-diene, manoyl oxide, *iso*-pimaradiene, 13-*epi*-manoyl oxide, *ar*-abietatriene, 2-hydroxy-12-methoxy-19-norpodocarpa-4,8,11,13-tetra-3-one, totarol, ferruginol	[61]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Tunisia (several samples from the same population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-pinene, α-fenchene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, γ-terpinene, *p*-cymene, terpinolene, terpinen-4-ol, carvacrol methyl ether, *trans*-caryophyllene, *allo*-aromadendrene, α-humulene, α-terpineol, α-terpinyl acetate, α-amorphene, germacrene D, cedrol, thymol, τ-muurolol, manoyl oxide, *trans*-totarol, *trans*-ferruginol, abietatriene, myristic acid, palmitic acid	[62]
	Tunisia (several samples from the same population)	Wood	HD, GC-FID, GC-MS	tricyclene, α-pinene, α-fenchene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, γ-terpinene, *p*-cymene, terpinolene, terpinen-4-ol, carvacrol methyl ether, *trans*-caryophyllene, *allo*-aromadendrene, α-humulene, α-terpineol, α-terpinyl acetate, α-amorphene, germacrene D, cedrol, thymol, τ-muurolol, manoyl oxide, *trans*-totarol, *trans*-ferruginol, abietatriene, myristic acid, palmitic acid	[62]
	Tunisia (several samples from the same population)	Cones	HD, GC-FID, GC-MS	tricyclene, α-pinene, α-fenchene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, γ-terpinene, *p*-cymene, terpinolene, terpinen-4-ol, carvacrol methyl ether, *trans*-caryophyllene, *allo*-aromadendrene, α-humulene, α-terpineol, α-terpinyl acetate, α-amorphene, germacrene D, cedrol, thymol, τ-muurolol, manoyl oxide, *trans*-totarol, *trans*-ferruginol, abietatriene, myristic acid, palmitic acid	[62]
C. dupreziana var. *atlantica* (Gaussen) Silba	France (cultivated population)	Leaves	HD, GC-MS	α-pinene, α-fenchene, sabinene, β-pinene, myrcene, δ-3-carene, *p*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, furanoid, terpinolene, linalool, *cis*-*p*-menth-2-en-1-ol, camphor, *cis*-limonene oxide, camphene hydrate, pinocarvone, borneol, *p*-cymen-8-ol, terpinen-4-ol, myrtenal, α-terpineol, carvone, methyl thymol, (*E*)-anethole, bornyl acetate, carvacrol, terpinene-4-yl acetate, α-terpinyl acetate, β-bourbonene, β-caryophyllene, α-humulene, *cis*-mmurola-4(14),5-diene, *ar*-curcumene, germacrene D, α-muurolene, caryophyllene oxide, cedrol, α-cadinol, manoyl oxide, sandaracopimaradiene, abietratriene, 13-(16),14,labdien-8-ol	[51]
	Morocco (wild population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, thuja-2,4(10)-diene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, *p*-cymene, limonene, β-phellandrene, *cis*-β-ocimene, γ-terpinene, terpinolene, linalool, *trans*-sabinene hydrate, piperitone, α-cubebene, α-copaene, α-ylangene, β-bourbonene, β-cubebene, longifolene, β-cedrene, β-caryophyllene, *cis*-muurola-4(14),5-diene, γ-muurolene, germacrene D, *trans*-muurola-4(14),5-diene, α-muurolene, γ-cadinene, δ-cadinene, zomarene, *trans*-cadina-1(2),4-diene, 10-*epi*-cubebol, italicene ether, *cis*-calamenene, elemol, *cis*-muurola-5-en-α-ol, germacrene D-4-ol, cedrol, 1-*epi*-cubenol, *epi*-α-cadinol, α-cadinol, 14-hydroxy-α-muurolene, 14-hydroxy-δ-cadinene, sandaracopimara-8(14),15-diene, 13-*epi*-manoyl-oxide, manool, abietatriene, abietadiene, *trans*-totarol	[63]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Morocco (wild population)	Branches	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, *trans*-pinane, β-pinene, myrcene, α-phellandrene, α-terpinene, *o*-cymene, *p*-cymene, γ-terpinene, terpinolene, *endo*-fanchol, *trans*-dinocarveol, β-cedrene, β-humulene, α-humulene, *cis*-muurola-4(14),5-diene, γ-muurolene, germacrene D, α-muurolene, germacrene A, γ-cadinene, δ-cadinene, cedrol, *epi*-cedrol, *epi*-α-cadinol, *epi*-α-muurolol, α-cadinol	[64]
	Morocco (wild population)	Cones	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, α-fenchene, camphene, *trans*-pinane, β-pinene, myrcene, δ-2-carene, α-phellandrene, α-terpinene, *o*-cymene, *p*-cymène, γ-terpinene, terpinolene, 6-comphenol, *cis*-*p*-menth-2-en-1-ol, 1-terpineol, *trans*-sabinol, *cis*-β-terpineol, *trans*-β-terpineol, 4-terpineol, α-terpineol, α-terpinen-7-al, δ-elemene, α-terpinyl acetate, longicyclene, longifolene, β-longipinene, α-cedrene, β-cedrene, β-humulene, α-humulene, *cis*-muurola-4(14),5-diene, γ-muurolene, germacrene D, α-muurolene, γ-cadinene, δ-cadinene, cedrol, *epi*-α-cadinol, α-cadinol	[64]
	Morocco (wild population)	Sawdust	HD, GC-FID, GC-MS	tricyclene, α-thujene, α-pinene, camphene, verbinene, *trans*-pinane, β-pinene, myrcene, α-phellandrene, α-terpinene, o-cymene, *p*-cymène, (*Z*)-β-ocimene, γ-terpinene, terpinolene, *cis*-*p*-menth-2-en-1-ol, α-terpineol, *trans*-dinocarveol, α-terpinen-7-al, 2-cis-dihydro-terpinyl acetate, α-terpinyl acetate, longicyclene, longifolene, β-longipinene, β-cedrene, α-humulene, γ-muurolene, germacrene D, germacrene A, γ-cadinene, δ-cadinene, β-germacrene, cedrol, *epi*-α-cadinol, α-cadinol	[64]
	Morocco (several wild populations)	Leaves	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, sabinene, β-pinene, β-myrcene, δ-3-carene, α-terpinene, *p*-cymene, D-limonene, γ-terpinene, terpinolene, terpinen-4-ol, α-terpineol, methyl undecanoate, γ-muurolene, germacrene D, α-muurolene, γ-cadinene, δ-cadinene, cadina-1,4-diene, *cis*-arteannuic alcohol, *epi*-cedrol, 10-*epi*-γ-eudesmol, *epi*-cubenol, α-muurolol, bulnesol, α-bisabolol, zizanal, β-sinensal, manoyl oxide, 13-*epi*-manoyl oxide, abietatriene, abietadiene, nezukol, incensol, *trans*-ferruginol	[65]
	Morocco (several wild populations)	Twigs	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, sabinene, β-pinene, β-myrcene, δ-3-carene, α-terpinene, *p*-cymene, D-limonene, γ-terpinene, terpinolene, borneol, thymol, 6-hydroxy-carvotanacetone, citronellyl acetate, β-copaene, α-cedrene, methyl undecanoate, γ-muurolene, germacrene D, α-muurolene, γ-cadinene, δ-cadinene, *epi*-cedrol, 10-*epi*-γ-eudesmol, *epi*-cubenol, bulnesol, α-bisabolol, zizanal, β-sinensal, manoyl oxide, 13-*epi*-manoyl oxide, abietatriene, abietadiene, nezukol, incensol, incensol acetate, phyllocladanol, 7α-hydroxy-manool, *trans*-ferruginol	[65]
	Morocco (several wild populations)	Cones	HD, GC-FID, GC-MS	α-thujene, α-pinene, β-pinene, β-myrcene, δ-3-carene, *p*-cymene, D-limonene, γ-terpinene, terpinolene, *trans*-rose oxide, terpinen-4-ol, α-terpineol, β-elemene, β-copaene, cedrol, (*E*)-caryophyllene, methyl undecanoate, n-dodecanol, germacrene D, δ-cadinene, δ-cadinol, thunbergol	[65]
	Morocco (several wild populations)	Heartwood	HD, GC-FID, GC-MS	α-thujene, α-pinene, β-myrcene, δ-3-carene, *p*-cymene, D-limonene, γ-terpinene, terpinolene, borneol, terpinen-4-ol, α-terpineol, geraniol, thymol, (*E*)-cinnamyl alcohol, longifolene, α-cedrene, n-dodecanol, germacrene D, *iso*-menthyl lactate, viridiflorene, cuparene, β-bisalobene, γ-cadinene, δ-cadinene, *cis*-aerteannuic alcohol, *epi*-cedrol, manoyl oxide, manool, 10-*epi*-γ-eudesmol, *epi*-cubenol, β-acorenol, α-muurolol, bulnesol, α-bisabolol, zizanal	[65]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Morocco (several wild populations)	Sapwood	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, β-myrcene, δ-3-carene, *p*-cymene, D-limonene, γ-terpinene, terpinolene, borneol, terpinen-4-ol, α-terpineol, geraniol, thymol, longifolene, α-cedrene, β-humulene, n-dodecanol, germacrene D, *iso*-menthyl lactate, viridiflorene, cuparene, β-bisalobene, γ-cadinene, δ-cadinene, cadina-1,4-diene, elemicin, *cis*-aerteannuic alcohol, cedrol, *epi*-cedrol, 10-*epi*-γ-eudesmol, *epi*-cubenol, β-acorenol, α-muurolol, bulnesol, 5-neo-cedranol, α-bisabolol, zizanal, cedroxide, manoyl oxide, hexadecyl acetate, manool, nezukol, incensol, incensol acetate, 7α-hydroxy-manool, *trans*-ferruginol	[65]
C. funebris Endl.	India (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin	[6]
	n.r.	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	India (wild population)	Leaves	SE, CC, TLC, MP, IR	amentoflavone, isocryptomerin, cupressuflavone, hinokiflavone	[66]
	n.s. (severalcultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	n.r.	Heartwood	SE, CC, $[\alpha]_D$, IR, NMR, MS	α-cedrene, cuparene, β-cedrene, 1,7-di-*epi*-α-cedrene	[11]
	England (obtained from a botanical garden)	Leaves	SE, TLC, UV	amentoflavone, cupressuflavone, hinokiflavone, 7″-*O*-methyl-hinokiflavone	[67]
	n.r.	Leaves	SE, CC, MP, NMR, HR-MS	pheophytin a, 10S-hydroxy-pheophytin a, 10R-hydroxy-pheophytin a, methyl-pheophorbide a, 15-nor-labda-8(20),12E-diene-14-carboxaldehyde-19-oic acid	[68]
	China (wild population)	Foliage	HD, GC-FID, GC-MS	thujene, (−)-α-pinene, α-pinene, (−)-α-fenchene, sabinene, (−)-β-pinene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, *trans*-verbenol, terpinen-4-ol, (−)-terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, bornyl acetate, sylveterpinyl acetate, α-terpinyl acetate, α-cubebene, α-copaene, β-elemene, caryophyllene, thujopsene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, 4-*epi*-cubebol, germacrene D, *epi*-zonarene, α-muurolene, germacrene A, cubebol, γ-cadinene, δ-cadinene, *cis*-calamenene, 10-*epi*-cubebol, *cis*-muurol-5-en-4b-ol, *cis*-muurol-5-en-4α-ol, 4-hydroxy-germacra-1(10),5-diene, caryophyllene epoxide, τ-cadinol, τ-muurolol, α-cadinol, oplopanone, manoyl oxide, sandaricopimara-8(14),15-diene, abietatriene, abetadiene, nezukol, methyl-totarol, methyl-ferruginol, totarol, sempervirol, ferruginol plus other not identified	[50]
	France (severalpopulations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
	n.r.	Leaves	SE, HPLC-DAD, HPLC-MS, HPTLC	rutin, quercetin 3-*O*-glucoside, quercetin 3-*O*-rhamnoside, kaempferol 3-*O*-rhamnoside, cupressuflavone, amentoflavone, hinokiflavone, robustaflavone plus other bioflavonoids not fully characterized	[18]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	France (cultivated population)	Leaves	HD, GC-MS	tricyclene, α-thujene, α-pinene, camphene, sabinene, α-fenchene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, furanoid, fenchone, *p*-cymenene, terpinolene, linalool, α-fenchol, *cis*-sabinene hydrate, campholene aldehyde, camphor, ocimenol, camphene hydrate, pinocarvone, *trans*-*p*-menth-2-en-1,8-diol, borneol, terpinen-4-ol, α-terpineol, *trans*-piperitol, *cis*-carveol, β-cyclocitral, α-fenchyl acetate, (*E*)-anethole, bornyl acetate, α-terpinyl acetate, α-copaene, α-cedrene, γ-elemene, β-caryophyllene, α-guaiene, *cis*-muurola-4(14),5-diene, γ-muurolene, germacrene D, *cis*-calamenene, elemol, nerolidol, cedrol, β-eudesmol, α-cadinol, 13-(16),14-labdien-8-ol, *cis*-totarol, manoyl oxide, sandaracopimaradiene, kaur-16-ene, *iso*-pimaradiene	[50]
	China	Commercial oil	SE, GC-FID, GC-MS, NMR	α-pinene, δ-3-carene, limonene, 1,8-cineole, fenchol, *allo*-ocimene, camphor, borneol, terpinen-4-ol, α-terpineol, carvacrol methyl ether, bornyl acetate, α-terpinyl acetate, cyclosativene, daucene, α-funebrene, β-elemene, italicene, α-gurjunene, α-cedrene, (*E*)-β -caryophyllene, β-cedrene, β-ylangene, thujopsene, prezizaene, *allo*-aromadendrene, α-curcumene, γ-muurolene, β-selinene, α-selinene, γ-cadinene, α-muurolene, cuparene, *trans*-calamenene, *cis*-calamenene, δ-cadinene, γ-cuprenene, α-calacorene, palustrol, caryophyllene oxide, juniper cedrol, β-biotol, cedrol, sesquithuriferol, α-acorenol, τ-muurolol, *epi*-cubenol, α-cadinol, prezizaan-15-al, khusian-2-ol, α-bisabolol, manoyl oxide, *iso*-abienol	[69]
	China	Wood (purchased from a company)	GC-FID, GC-MS	pentadecane, α-funebrene, *trans*-α-bergamotene, α-cedrene, β-funebrene, β-elemene, β-caryophyllene, β-cedrene, *allo*-aromadendrene, α- humulene, selina-4,11-diene, α-acoradiene, β-acoradiene, γ-muurolene, β-alaskene, β-chamigrene, zonarene, α-muurolene, β-selinene, α-selinene, α-alaskene, α-cuprenene, α-chamigrene, γ-bisabolene, δ-cadinene, γ-cadinene, *ar*-curcumene, β-cuprenene, α-cadinene, cuparene, calamenene, β-calacorene, α-calacorene, (*E*)-nerolidol, gleenol, cubenol, junenol, 1-*epi*-cubenol, cedrol, widdrol, γ-eudesmol, τ-muurolol, α-cedrenal, α-bisabolol, α-eudesmol, cadalene	[70]
	n.r.	Smoke from the branches	DHS, GC-FID, GC-MS	α-pinene, sabinene, α-phellandrene, limonene, guaiacol, ocimene, umbellunone, naphthalene dodecane, ethyl-guaiacol, tridecane, vinyl-guaiacol, eugenol, tetradecane, β-caryophyllene, *iso*-eugenol α-caryophyllene, UPAH, pentadecene, γ-cadinene, δ-cadinene, cedrol, tetradecanoic acid, hexadecanoic acid	[71]
		Smoke from the wood	DHS, GC-FID, GC-MS	phenyl-acetaldehyde, naphthalene vinyl-guaiacol, eugenol, *iso*-eugenol, β-bisalobene	[71]
	China (wild population)	Leaves	SE, CC, CD, UV, NMR, MS	(−)-(7S,8R)-3-methoxy-4′,7-epoxy-8,5′-neo-lignan-5,9,3′,9′-tetraol, 1,2-epoxy-1-(3′,4′-dihydroxyphenyl-)-3-(2″,3″,5″-trihydroxy-phenyl)-propane, katsumadin, icariside E4, junipercomnoside A,*erythro*-(7*S*,8*R*)-3-methoxy-8-4′-oxy-*neo*-lignan-3′,4,7,9,9′-pentol, (7*S*,8*S*)-3′,4,7,9-tetrahydroxy-3-methoxy-8-*O*-4′-*neo*-lignan-9′-*O*-α-L-rhamnopyranoside, (−)-isolariciresinol 9-*O*- α-L- xylopyranoside, (+)-cycloolivil, (+)-cyclicoolive 4′-*O*-β-D-glucopyranoside	[72]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
C. gigantea W.C.Cheng & L.K.Fu	Tibet (wild population)	Foliage	HD, GC-FID, GC-MS	thujene, (−)-α-pinene, α-pinene, (−)-sabinene, sabinene, myrcene, limonene, γ-terpinene, *cis*-sabinene hydrate, *trans*-sabinene hydrate, linalool, (−)-terpinen-4-ol, *trans*-sabinene hydrate acetate, α-terpinyl acetate, α-cubebene, α-copaene, β-elemene, caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, α-curcumene, germacrene D, α-muurolene, β-curcumene, cubebol, γ-cadinene, δ-cadinene, elemol, 4-hydroxy-germacra-1(10),5-diene, τ-cadinol, τ-muurolol, α-cadinol, oplopanone, sandaricopimara-8(14),15-diene, manoyl oxide, abietatriene, abetadiene, phyllocladanol, totarol, sempervirol, ferruginol plus other not identified	[50]
	Tibet (wild population)	Stems and leaves	SE, SP, CC, LC, NMR, MS	15-methoxy-18-hydroxy-labda-8(17),13-diene, 13-epitoruolsol, labd-8(17),14-dien-13-ol, 13-epicupressic acid, *cis*-communic acid, *trans*-communic acid, labd-15-aceoxy-8(17),13*E*-dien, labd-8(17), 13*E*-dien-15-ol, isocupressic acid, acetyl-isocupressic acid, isoabienol, 13-oxo-14,15-di*nor*-labd-8(17)-en-19-oic acid, pimarenic acid, sandaracopimaric acid, pimarol, *ent*-oplopanone, (+)-T-cadinol	[73]
C. goveniana Gordon	n.s. (severalwild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	India (wild population)	Leaves	SE, CC, TLC, MP, IR	amentoflavone, cupressuflavone, hinokiflavone	[66]
	California (several populations)	Leaves	GLC	tricyclene, α-pinene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-phellandrene, α-terpinene, limonene, β-phellandrene, *cis*-ocimene, *trans*-ocimene, γ-terpinene, terpinolene, *p*-cymene	[74]
	n.r.	Wood	n.r.	β-thujaplicin, β-dolabrine, α-thujaplicinol, pygmaein, α-dolabrinol, nootkatin	[16]
	Russia (wild population)	Stems and leaves	SE, SR, IR, NMR	lipids, phospholipids, phosphatidylcholines, phosphatidyletanolamines, phosphatidylglycerols (exact compounds not specified)	[38]
	France (several samples of the same population obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
	n.r.	Leaves	SE, HPLC-DAD, HPLC-MS, HPTLC	rutin, quercetin 3-*O*-glucoside, quercetin 3-*O*-rhamnoside, amentoflavone, cupressuflavone, robustaflavone, plus other bioflavonoids not fully characterized	[18]
C. goveniana var. *abramsiana* (C.B.Wolf) Little	California (several populations)	Heartwood	SE, PC	β-thujaplicin, nootkatin, β-dolabrin, β-thujaplicinol, α-thujaplicinol, α-dolabrinol, pygmaein	[6]
	n.s. (several cultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	California (several populations)	Leaves	GLC	tricyclene, α-pinene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-phellandrene, α-terpinene, limonene, β-phellandrene, *cis*-ocimene, *trans*-ocimene, γ-terpinene, terpinolene, *p*-cymene	[74]
	n.r.	Wood	n.r.	β-thujaplicin, β-dolabrine, α-thujaplicinol, pygmaeine, α-dolabrinol, nootkatin	[16]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	India (wild population)	Leaves	SE, PP, TLC, UV, MP	apigenin 7-*O*-rhamnoside	[75]
C. guadalupensis S.Watson	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, β-thujaplicinol, γ-thujaplicin	[6]
	Mexico (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, γ-thujaplicin	[6]
	n.s. (severalcultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	France (cultivated population)	Leaves	HD, GC-MS	tricyclene, α-thujene, α-pinene, camphene, sabinene, α-fenchene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, β-phellandrene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, *p*-cymenene, terpinolene, linalool, *p*-mentha-1,3,8-triene, *cis*-sabinene hydrate, campholene aldehyde, camphor, camphene hydrate, *trans*-*p*-menth-2-en-1,8-diol, umbellulone, borneol, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, citronellol, methyl thymol, bornyl acetate, thymol, carvacrol, terpinen-4-yl acetate, *trans*-carvyl acetate, α-terpinyl acetate, β-elemene, α-muurolene, δ-cadinene, elemol, nerolidol, germacrene B, 10-*epi*-γ-eudesmol, γ-eudesmol, τ-muurolol, β-eudesmol, α-eudesmol, oplapanoyl acetate, α-cadinol, rimuene, pimara-8,15-diene, *epi*-13-manool, kaur-15-ene, manoyl oxide, sandaracopimaradiene, 13-(16),14-labdien-8-ol, kaur-16-ene, *epi*-13-manoyl oxide, abietratriene, *cis*-totarol, *trans*-totarol, ferruginol, 8-β-hydorxy-sandaracopimarene	[51]
C. guadalupensis var. *forbesii* (Jeps.) Little	California (wild population)	Heartwood	SE, PC	β β-thujaplicin, nootkatin, β-thujaplicinol, γ-thujaplicin	[6]
	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, γ-thujaplicin	[6]
	Kenya (several wildpopulations)	Leaf wax	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[9]
	n.s. (severalcultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
C. × *leylandii* A.B.Jacks. & Dallim.	n.s.	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	England (wild population)	Cork layers	SE, GC	alkane derivatives (from C-16 to C-26)	[76]
	Poland (wild population)	Leaves	SE, CC, LC, HPLC-UV, UV, NMR, MS	cupressuflavone, 4′-*O*-methyl-amentoflavone, amentoflavone, 7-*O*-methyl-amentoflavone, 4″-*O*-methyl-amentoflavone, hinokiflavone, 4′-*O*-methyl-cupressuflavone	[77]
	California (wild population)	Foliage	HD, GC-MS, LC, FTIR, NMR, HR-MS	(+)-dauca-5,8-diene, (−)-dauca-4,8-diene, (−)-dauca-8,11-diene, (−)-acora-3,7(14)-diene, 1S-dauca-4(11),8-diene	[78]
	n.r.	Leaves	SE, GC-MS	α-pinene, sabinene, β-myrcene, δ-3-carene, D-limonene, γ-terpinene, sabinene hydrate, α-terpinolene, γ-terpineol, β-elemene, germacrene D, α-bisabolol, abieta-8,11,13-riene, manoyl oxide, *cis*-totarol, communic acid, kaur-16-en-18-al, agathadiol	[79]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	n.r.	Leaves	SE, UHPLC-MS	succinic acid, benzoic acid, shikimic acid, quinic acid, coumaric acid, catechin, communic acid, cupressic acid, cupressuflavone plus others not fully characterized	[79]
	France (wild population)	Leaves	HD, GC-MS	α-pinene, α-thujene, β-pinene, δ-3-carene, fenchene, γ-terpinene, limonene, terpinolene, sabinene hydrate, myrcene, terpinen-4-ol, *cis*-cadina-1(6)-4-diene, α-muurolene, α-bisabolol, β-elemene, β-caryophyllene, cedrol, copaene, (*Z*)-β-curcumen-12-ol, elemol, γ-elemene, *nerodiol*, 4-*epi*-abietal, abietatriene, cembrene, cembrene A, *trans*-ferruginol, 13-*epi*-manool oxide, *iso*-phyllocladene, *iso*-pimara-9(11)-15-diene, manool oxide, nezukol, sempervirol, *trans*-totarol	[35]
C. lusitanica Mill.	Portugal (wild population)	Heartwood	SE, PC	nootkatin, β-thujaplicinol, γ-thujaplicin, hydro-nootkatinol	[6]
	India (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, β-thujaplicinol, γ-thujaplicin, hydro-nootkatinol	[6]
	Mexico (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, hydro-nootkatinol	[6]
	Kenya (wild population)	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	India (wild population)	Leaves	SE, CC, TLC, MP, IR	amentoflavone, cupressuflavone, hinokiflavone	[66]
	n.s. (several cultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	Australia (obtained from a botanical garden)	Leaves	SE, TLC, UV, R*p*-HPLC-UV	amentoflavone, 4‴-*O*-mehtyl-amentoflavone, cupressuflavone	[80]
	Mexico (severalsamples of the same population)	Leaves	SD, GC-MS	tricyclene, α-pinene, α-thujene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, terpinolene, linalool, *cis*-*p*-menth-2-en-1-ol, *p*-cymen-8-ol, *trans*-*p*-menth-2-en-1-ol, camphor, camphene hydrate, umbellulone, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, bornyl acetate, α-terpinyl acetate, β-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, α-muurolene, γ-cadinene, δ-cadinene, *cis*-muurol-5-en-4β-ol, elemol, cedrol, β-oplopenone, α-acorenol, β-acorenol, τ-cadinol, α-muurolol, α-cadinol, oplopanonyl acetate, manoyl oxide, abietatriene, abietadiene, nezukol, *cis*-totarol, *trans*-totarol, *trans*-ferruginol	[13]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Portugal (several samples of the same population)	Leaves	SD, GC-MS	tricyclene, α-pinene, α-thujene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, 1,8-cineole, γ-terpinene, heptyl acetate, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, linalool, 2-nonanol, *cis*-*p*-menth-2-en-1-ol, *trans*-*p*-menth-2-en-1-ol, α-campholenal, camphene hydrate, *p*-mentha-1,5-dien-8-ol, *p*-cymen-8-ol, umbellulone, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, citronellol, bornyl acetate, thymol, α-terpinyl acetate, longifolene, β-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, α-muurolene, γ-cadinene, *cis*-muurola-4(14),5-diene, *epi*-zonarene, δ-cadinene, *cis*-muurol-5-en-4β-ol, *cis*-muurol-5-en-4α-ol, cedrol, caryophyllene oxide, humulene epoxide II, α-acorenol, β-acorenol, τ-muurolol, α-cadinol, manoyl oxide, 13-*epi*-manoyl oxide, abieta-8,12-diene, abietatriene, abietadiene, nezukol, abieta-8(14),13(15)-diene, *cis*-totarol, *trans*-totarol, *trans*-ferruginol	[13]
	n.r.	Wood	n.r.	nootkatinol	[16]
	Russia (wild population)	Stems and leaves	SE, SR, IR, NMR	lipids, phospholipids, phosphatidylcholines, phosphatidyletanolamines, phosphatidylglycerols (exact compounds not specified)	[38]
	France (several populations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
	n.r.	Leaves	SE, HPLC-DAD, HPLC-MS, HPTLC	quercetin 3-*O*-glucoside, quercetin 3-*O*-rhamnoside, kaempferol 3-*O*-rhamnoside cupressuflavone, amentoflavone, robustaflavone plus other biflavonoids not fully characterized	[18]
	Cameroon (wild population)	Leaves before producing cones	HD, GC-FID, GC-MS	α-pinene, α-thujene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, γ-terpinene, terpinolene, 1,8-cineole, *cis*-linalool-oxide, furanoid, linalool, umbellulone, cryptone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, thymol, bornyl acetate, *cis*-acetoxy-linalool oxide, terpin-4-yl acetate, α-terpinyl acetate, 2-heptyl acetate, heptyl propanoate, hexyl butanoate, 2-heptyl butyrate, α-copaene, α-cedrene, β-elemene, β-caryophyllene, β-copaene, *cis*-muurola-3,5-diene, α-humulene, α-acoradiene, germacrene D, γ-amorphene, alaskene, *epi*-zonarene, α-muurolene byciclogermacrene, cuparene, β-bisabolene, β-curcumene, γ-cadinene, *trans*-calamenene, δ-cadinene, *cis*-calamenene, α-calacorene, β-calacorene, β-acoradiene, cedrol, *epi*-α-cubenol, α-acorenol, β-acorenol, *epi*-α-cadinol, *epi*-α-muurolol, α-muurolol, α-cadinol, *cis*-14-nor-muural-5-en-4-one, (*Z*)-nuciferol, γ-curcumene	[81]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Cameroon (wild population)	Leaves at producing cones stage	HD, GC-FID, GC-MS	α-pinene, α-thujene, α-fenchene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, γ-terpinene, terpinolene, 1,8-cineole, *cis*-linalool-oxide, furanoid, linalool, umbellulone, cryptone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, linalyl acetate, *iso*-bornyl acetate, thymol, bornyl acetate, *cis*-acetoxy-linalool oxide, terpin-4-yl acetate, α-terpinyl acetate, 2-heptyl acetate, 2-heptyl butyrate, α-copaene, α-cedrene, β-caryophyllene, β-cedrene, β-copaene, *cis*-muurola-3,5-diene, α-humulene, α-curcumene, germacrene D, γ-curcumene, γ-amorphene, alaskene, *epi*-zonarene, α-muurolene, cuparene, β-curcumene, γ-cadinene, δ-cadinene, byciclogermacrene, *trans*-calamenene, *cis*-calamenene, α-calacorene, β-calacorene, cadalene, β-acoradiene, spathulenol, caryophyllene oxide, cedrol, humulene oxide II, *epi*-α-cubenol, α-acorenol, α-cubenol, β-acorenol, *epi*-α-cadinol, *epi*-α-muurolol, α-muurolol, α-cadinol, (*Z*)-nuciferol	[81]
	Cameroon (wild population)	Cones	HD, GC-FID, GC-MS	tricyclene, α-pinene, α-fenchene, β-pinene, δ-3-carene, *p*-cymene, limonene, (*Z*)-β-ocimene, γ-terpinene, terpinolene, linalool, borneol, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, linalyl acetate, thymol, 2,5-dimethoxy-*p*-cymene, 3-octanol, octen-3-ol, hexyl butanoate, α-cubebene, α-copaene, β-bourbonene, β-elemene, β-caryophyllene, β-copaene, α-humulene, α-curcumene, germacrene D, β-selinene, α-selinene, α-muurolene β-bisalobene, *trans*-calamenene, α-xadinene, geranyl acetone, (*E*)-nerolidol, spathulenol, caryophyllene oxide, cedrol, humulene oxide II, *epi*-α-cubenol, α-acorenol, α-cubenol, β-acorenol, α-muurolol, α-cadinol	[81]
	Cameroon (wild population)	Seeds	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, (*Z*)-β-ocimene, furanoid, linalool, umbellulol, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, bornyl acetate, thymol, α-terpinyl acetate, 2-heptyl acetate, 2-heptyl butyrate, β-cedrene, α-humulene, α-curcumene, germacrene D, *trans*-calamenene, δ-cadinene, caryophyllene oxide, cedrol, humulene oxide II	[81]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Cameroon (wild population)	Leaves	SE, FC, GC-FID, GC-MS	α-pinene, β-pinene, sabinene, myrcene, δ-3-carene, *p*-cymene, limonene, α-fenchene, camphene, γ-terpinene, terpinolene, 1,8-cineole, *cis*-*p*-menth-2-en-l-ol, *cis*-pinene hydrate, α-campholenal, camphene hydrate, thymol methyl ester, linalyl acetate, bornyl acetate, α-terpinyl acetate, α-copaene, farnesene, α-cubebene, α-bergamotene, α-cedrene,α-longipiene, β-caryophyllene, *cis*-muurola-3,5-diene, γ-muurolene, α-humulene, *epi*-bicyclosesquiphellandrene, δ-cadinene, α-amorphene, *ar*-curcumene, cadina-1,4-diene, aromadendrene, *epi*-zonarene *allo*-aromadendrene, γ-curcumene, β-himachalene, α-amorphene, *cis*-calamenene, cadina-1,5,3-triene, α-cadienene, α-colacorene, valencene, caryophyllene oxide, cedrol, β-oplopenone, 1,10-di-*epi*-cubenol, β-ionone, 1-*epi*-cubenol, di-*epi*-α-cedrene, *epi*-α-cadinol, *epi*-α-muurolol, α-muurolol, α-cadinol, cadalin, *cis*-14-nor-muurol-5-en-4-one, 14-nor-cadin-5-en-4-one, oplopanonyl acetate, cinnamyl cinnamate, methyl hexadecanoate, hexadecanoic acid, 9,12-pentadecadienoic acid (*Z*,*Z*) methyl ester, 9,12,15-octadecatrienoic acid (*Z*,*Z*,*Z*) methyl ester, octadecanoic acid methyl ester, *ent*-pimara-8(14),15-diene, kaur-15-ene, 1,3-*epi*-manoyl oxide, manoyl oxide, 13- *epi*-manoyl oxide, phyllocladene, dehydro-abietadiene, abietatriene, *iso*-pimaradien-3-one, 8-hydroxy-sandaracopimarane, nezukol, 4,4-dimethyl-13α-androst-5-ene, *neo*-phytadiene, *cis*-totarol, *trans*-totarol, ferruginol, pimaric acid, kaurenoic acid, 5,8-epoxy-5,8-dihydro-etinoic acid, decane, hexadecane, hexatricontane, eicosane, octacosane, nonacosane, triacontane, dotriacontane, tricosane, henlriacontane, pentacosane, tetratricontane, dotricontane, heptacosane	[82]
	Portugal (wild population)	Leaves	SE, HPLC-UV, HPLC-RID, GC-FID	α-tocopherol, β-tocopherol, γ-tocopherol, fructose, sucrose, glucose, raffinose plus several fatty acids	[83]
	Costa Rica (wild population)	Leaves	HD, GC-MS	(3*Z*)-hexenol, α-pinene, camphene, sabinene, β-pinene, myrcene, α-terpinene, limonene, 1,8-cineole, γ-terpinene, terpinolene, *iso*-borneol, borneol, umbellulone, terpinen-4-ol, α-terpineol, *iso*-bornyl acetate, α-terpinyl acetate, (*E*)-caryophyllene, *cis*-muurola-3,5-diene, *cis*-muurola-4(14),5-diene, *epi*-zonarene, α-alaskene, β-curcumene, β-acorenol, caryophyllene oxide, α-acorenol	[84]
	Costa Rica (wild population)	Leaves	HD, GC-MS	(3*Z*)-hexenol, α-pinene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, α-terpinene, limonene, 1,8-cineole, 2-heptyl acetate, (*E*)-β-ocimene, γ-terpinene, terpinolene, 2-nonanone, camphor, *iso*-pulegol, *iso*- borneol, borneol, umbellulone, terpinen-4-ol, α-terpineol, *iso*-bornyl acetate, α-terpinyl acetate, β-elemene, (*E*)-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, germacrene D, *epi*-zonarene, β-curcumene, *trans*-calamenene, δ-cadinene, zonarene, *cis*-muurol-5-en-4β-ol, *cis*-muurol-5-en-4α-ol, caryophyllene oxide, 1,10-di-*epi*-cubenol, α-acorenol, β-acorenol, τ-cadinol, α-cadinol, manool oxide, nezukol, *trans*-totarol	[84]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Costa Rica (wild population)	Leaves	HD, GC-MS	(3*Z*)-hexenol, α-pinene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, limonene, 1,8-cineole, 2-heptyl acetate, (*E*)-β-ocimene, γ-terpinene, terpinolene, 2-nonanone, umbellulone, terpinen-4-ol, α-terpineol, *iso*-bornyl acetate, α-terpinyl acetate, β-elemene, (*E*)-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, germacrene D, *epi*-zonarene, β-curcumene, *trans*-calamenene, δ-cadinene, zonarene, *cis*-muurol-5-en-4β-ol, *cis*-muurol-5-en-4α-ol, 1,10-di-*epi*-cubenol, α-acorenol, β-acorenol, τ-cadinol, α-cadinol, nezukol, *cis*-totarol, *trans*-totarol	[84]
	Cameroon (wild population)	Leaves	SE, PS	phenolics, flavonoids, tannins, saponins, teprenoids	[85]
	Cameroon (wild population)	Bark	SE, PS	phenolics, tannins, saponins, teprenoids	[85]
	Cameroon (wild population)	Roots	SE, PS	phenolics, saponins, teprenoids	[85]
	Brazil (wild population)	Leaves	HD, GC-MS	β–pinene, β-(*Z*)-ocimene, *p*-mentha-3,8-diene, p–mentha-2,4(8)-diene, terpinolene, *endo*-fenchol, *neo-allo*–ocimene, *iso*-isopulegol, *iso*-verbanol, dihydro-carveol, dihydro- carvone, *trans*-pulegol, *iso*-dihydro-carveol, *trans*-carveol, *cis*-carveol, *neo-iso*-dihydro-carveol, α–terpinen-7-al, pulegone, geranial, perilla aldehyde, *p*-menth-1-en-9-ol, m-acetanisole, dehydro-elshotzia ketone, 4-hydroxy-cryptone, phenyl- ethyl oxyacetaldehyde, (*Z*)-hasmigone, *neo-iso*-dihydro-carveol acetate, piperitone oxide, ethyl 2-nonynoate, 4α,7α,7β–nepetalactone, methyl- antranilate, (*Z*)-trimenal, *cis*-threo-davanafuran, β-(*Z*)-farnesene, nopyl acetate, cabreuva oxide A, sesqui-sabinene, α-acoradiene, α-amorphene, *trans*–muurola-4(14),5-diene, γ-amorphene, cuparene, 7α-*epi*-selinene, italicene ether, *trans*-cadina-1(2),4-diene, α-cadinene, *cis*-dracunculifol, dimethyl-ionone, caryophyllenyl alcohol, caryolan-8-ol, hexyl-benzoate, turmerol, thujopsan-2α-ol, guaiol, 5-*epi*-7-*epi*-α–eudesmol, *trans*-arteannuic alcohol, 1,10-di-*epi*-ubenol, 10γ-*epi*-eudesmol, 5-cedranone, 3-*iso*-thujopsanone, cubenol, α-eudesmol, khusinol, acorone, khusinol acetate, laurenene, rimuene, tetrahydro-rimuene, rosa-5(E),15(*E*)-diene, abietatriene, abietadiene, abieta-8(14),13(15)-diene, *trans*-totarol, 13-isopropyl-podocarpa-8,13-diene, *trans*-ferruginol, dehydro-abietol, *cis*-ferruginol acetate	[86]
	Cameroon (wild population)	Leaves	HD, CC, GC-MS	tricyclene, α-pinene, sabinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, γ-terpinene, *cis*-linalool-oxide, α-terpinolene, linalool, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, *p*-menth-2-en-1-ol, linalyl acetate, thymol, α-cubebene, citronellol, α-copaene, α-cedrene, β-cedrene, α-humulene, zingiberene, β-caryophyllene, α-curcumene, germacrene D, α-amorphene, *epi*-zonarene, α-muurolene, cuparene, β-bisabolene, α-cadinene, γ-cadinene, *cis*-calamenene, α-calacorene, spathulenol, caryophyllene oxide, cedrol, di-*epi*-α-cedrene, 14-norcadin-5-en-4-one, *trans*-nuciferol, naphthalene, kaur-15-ene, *cis*-totarol, ferruginol	[87]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Kenya (wild population)	Leaves	HD, GC-FID, GC-MS	tricyclene, α-phellandrene, α-pinene, α-fenchene, thuja-2,4(10)-diene, δ-2-carene, benzaldehyde, sabinene, myrcene, β-phellandrene, δ-3-carene, o-cymene, limonene, (*Z*)-β-ocimene, γ-terpinene, (*E*)-sabinene hydrate, *p*-cymenene, linalool, *p*-1,3,8-menthatriene, α-thujone, *p*-(*Z*)-menth-2-en-1-ol, camphor, sabina ketone, umbellulone, terpinen-4-ol, [α,α],4-trimethyl-benzene-methanol, α-terpineol, γ-terpinen-7-al, eçrvone, cumin aldehyde, piperitone, thymol, terpinolene, α-terpinene, 3-isopropyl-benzaldehyde, premnaspirodiene, α-cedrene, (*E*)-caryophyllene, (*E*)-muurola-3,5-diene, (*E*)-muurola-4(14),5-diene, α-macrocarpene, α-curcumene, *epi*-zonarene, viridiflorene, α-calacorene, β-calacorene, β-macrocarpene, β-vetivenene, (*Z*)-calamenene, α-dehydro-*ar*-himachalene, spathulenol, caryophyllene oxide, 1,10-di-*epi*-cubenol, α-colocalene, β-acoradiene, (*Z*)-cadina-1(6),4-diene, β-eudesmol, cadalene, (*Z*)-14-*nor*-muurol-5-en-4-one, 10-*nor*-calamenen-10-one, (*Z*)-5-hydroxy-calamenene, isopimara-9(11),15-diene, kaur-15-ene, nezukol, sandaracopimara-8(14),15-diene, 13-*epi*-manool oxide, abietadiene, (*E*)-totarol	[88]
	Rwanda (wild population)	Leaves	HD, FTIR, GC-MS	thujene, α-pinene, tricyclene, sabinene, β-pinene, myrcene, α-phellandrene, β-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, (*Z*)-β-ocimene, limonene, γ-terpinene, terpinolene, δ-2-carene, 1,8-cineole, sabinene hydrate, linalool, 2-nonanone, camphor, α-thujone, borneol, camphene hydrate, *p*-cymen-8-ol, benzyl alcohol, umbellulone, terpinen-4-ol, *p*-menth-2-en-1-ol, α-terpineol, *cis*-carveol, γ-terpinen-7-al, verbenone, isobornyl acetate, peperitone, α-terpinyl acetate, α-cubebene, β-cedrene	[89]
	Rwanda (wild population)	Leaves	HD, FTIR, GC-MS	thujene, α-pinene, tricyclene, sabinene, β-pinene, myrcene, α-phellandrene, β-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, (*Z*)-β-ocimene, limonene, γ-terpinene, 1,8-cineole, sabinene hydrate, linalool, linalool oxide, camphor, α-thujone, borneol, camphene hydrate, *p*-cymen-8-ol, benzyl alcohol, umbellulone, terpinen-4-ol, *p*-menth-2-en-1-ol, α-terpineol, *cis*-carveol, γ-terpinen-7-al, verbenone, peperitol, peperitone, β-cedrene, β-elemene	[89]
	Rwanda (wild population)	Leaves	HD, FTIR, GC-MS	thujene, α-pinene, tricyclene, sabinene, β-pinene, myrcene, α-phellandrene, β-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, (*Z*)-β-ocimene, limonene, γ-terpinene, 1,8-cineole, linalool, borneol, camphene hydrate, benzyl alcohol, umbellulone, terpinen-4-ol, α-terpineol, γ-terpinen-7-al, verbenone, eucarvone, isobornyl acetate, peperitone, β-cedrene	[89]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Kenya (wild population)	Leaves	HD, GC-MS	(*E*)-3-methylpenta-1,3-diene-5-ol, 2-heptanol, tricyclene, α-pinene, camphene, sabinene, 1-octen-3-ol, myrcene, α-phellandrene, δ-3-carene, δ-2-carene, *o*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, 2-nonanone, 1,3,8-*p*-menthatriene, *cis*-*p*-menth-2-en-1-ol, camphene hydrate, 2,6,6-trimethyl-, (1α,2β,5α)-bicyclo-[3.1.1]heptan-3-one, umbellulone, terpinen-4-ol, cryptone, α-terpineol, 3,7-dimethyl-2-octen-1-ol, carvacrol methyl ether, 3-methyl-6-(1-methylethyl)-2-cyclohexen-1-one, 4-(1-methylethyl)-1-cyclohexene-1-carboxaldehyde, bornyl acetate, thymol, 3,7,7-trimethyl-bicyclo[4.1.0]hept-2-ene, 2*E*,4*E*-decadienol, myrtenyl acetate, (1R)-2,2-dimethyl-3-methylene-bicyclo[2.2.1]heptane, α-copaene, *cis*-muurola-3,5-diene, α-funebrene, acora-3,7(14)-diene, α-cedrene, E-caryophyllene, dauca-5,8-diene, α-humulene, δ-cadinene, β-cubebene, *trans*-cadina-1(6),4-diene, *ar*-curcumene, *cis*- muurola-3,5-diene, amorpha-4,7(11)-diene, β-curcumene, γ-cadinene, δ- cadinene, *trans*-cadina-1,4-diene, α-cadinene, *trans*-dauca-4(11),7-diene, nezukol, α-calacorene, 1,6-dien-5-germacrol, cedrol, germacrene B, 1,10-di-*epi*-cubenol, 1-*epi*-cubenol, italicene, γ-cadinene, α-cadinol, α-bisabolol, *trans*-totarol, isopimara-9(11),15-diene, *cis*-sclareoloxide, 4-methylene-2,8,8-trimethyl-2-vinyl-bicyclo[5.2.0]nonane, cyclopentadecanolide, 6,10,14-trimethyl-2-pentadecanone, *iso*-phyllocladene, 13-*epi*-manool oxide, phyllocladene, 5-α-androst-16-en-3-one, abietadiene, *cis*-ferruginol, sempervirol, sandaracopimarinal	[90]
C. lusitanica var. *benthamii* (Endl.) Carrière	Mexico (several wild populations)	Heartwood	SE, PC	β-thujaplicin, nootkatin, hydro-nootkatinol	[6]
	n.r.	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	Mexico (several samples of the same population)	Leaves	SD, GC-MS	tricyclene, α-pinene, α-thujene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, γ-terpinene, terpinolene, 2-nonanone, linalool, *cis*-*p*-menth-2-en-1-ol, *trans*-*p*-menth-2-en-1-ol, camphor, umbellulone, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, bornyl acetate, α-terpinyl acetate, β-caryophyllene, *cis*-muurola-3,5-diene, α-humulene, *cis*-muurola-4(14),5-diene, *epi*-zonarene, α-muurolene, γ-cadinene, δ-cadinene, caryophyllene oxide, humulene epoxide II, 1,10-di-*epi*-cubenol, 1-*epi*-cubenol, α-cadinol, 13-*epi*- manoyl-oxide, abieta-8, 12-diene, abietatriene, abietadiene, nezukol, abieta-8(14),13(15)-diene, phyllocladnaol, *cis*-totarol, *trans*-totarol, *trans*-ferruginol, abietol	[13]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Greece (wild population)	Aerial parts	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, camphene, thuja-2,4(10)-diene, verbenene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, (*Z*)-β-ocimene, (*E*)-β-ocimene, γ-terpinene, *cis*-sabinene hydrate, fenchone, terpinolene, *p*-cymenene, *trans*-sabinene hydrate, n-nonanal, 1,3,8-*p*-menthatriene, *trans*-thujone, *cis*-*p*-menth-2-en-1-ol, camphor, *p*-mentha-1,5-dien-8-ol, umbellulone, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, verbenone, thymol methyl ether, carvone, *car*-3-en-2-one, piperitone, bornyl acetate, thymol, 3-thujanol acetate, carvacrol, α-terpinyl acetate, α-copaene, *cis*-muurola-3,5-diene, α-humulene, *cis*-cadina-1(6),-4-diene, γ-muurolene, α-muurolene, γ-cadinene, δ-cadinene, α-cadinene, α-calacorene, germacrene B, β-calacorene, caryophyllene oxide, spathulenol, β-oplopenone, humulene epoxide II, 1,10-di-*epi*-cubenol, α-acorenol, β-acorenol, *epi*-α-cadinol, *epi*-α-muurolol, α-muurolol, α-cadinol, α-bisabolol, *cis*-14-*nor*-muurol-5-en-4-one, (*Z*)-nuciferol, oplopanonyl acetate, pimaradiene, *iso*-phyllocladene, manool oxide, abietatriene, abietadiene, nezukol, phyllocladanol, abienol, sempervirol, *trans*-totarol	[27]
C. macnabiana A.Murray bis	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin, hydro-nootkatinol, β-thujaplicinol	[6]
	n.s. (several cultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	California (wild population)	Foliage	HD, GLC, IR	tricyclene, α-pinene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, β-phellandrene, *cis*-ocimene, γ-terpinene, *p*-cymene, terpinolene	[91]
	California (several wild populations)	Foliage	SE, LC, GC, GC-MS, IR, NMR, $[\alpha]_D$, MS	cis-calamenene, α-cadinol, τ-cadinol, macnabin	[92]
	n.r.	Wood	n.r.	α-thujaplicin, β-thujaplicin, γ- thujaplicin, nootkatin	[16]
	France (cultivated population)	Leaves	HD, GC-MS	α-thujene, α-pinene, sabinene, α-fenchene, β-pinene, myrcene, δ-3-carene, α-phellandrene, α-terpinene, *p*-cymene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, terpinolene, linalool, *cis*-rose oxide, *p*-mentha-1,3,8-triene, *cis*-sabinene hydrate, campholene aldehyde, ocimenol, *trans*-pinocarveol, pinocarvone, *trans*-rose oxide, *trans*-*p*-menth-2-en-1,8-diol, mentone, terpinen-4-ol, myrtenal, α-terpineol, *cis*-carveol, cuminaldehyde, citronellol, carvone, piperitone, phellandral, bornyl acetate, methyl- eugenol, α-copaene, β-bourbonene, β-elemene, β-caryophyllene, α-guaiene, α-humulene, germacrene D, *cis*-muurola-4(14),5-diene, *epi*-zonarene, *cis*-calamenene, α-calacorene, caryophyllene oxide, cedrol, 1,10-di-*epi*-cubenol, τ-muurolol, α-cadinol, *nor*-14-cadin-5-en-4-one, manoyl oxide, sandaracopimaradiene, isopimaradiene, *trans*-totarol	[51]
C. macrocarpa Hartw.	New Zealand (wild population)	Leaves and terminal branchlets	HD, CC, MP, BP, $[\alpha]_D$, MS	α-pinene, sabinene, myrcene, α-phellandrene, γ-terpinene, terpinolene, *iso*-phyllocladene, cupressene, terpinen-4-ol, macrocarpol	[93]
	California (wild population)	Leaves	GLC	phyllocladane, *iso*- phyllocladane, kaurene, *iso*-kaurene, cupressene	[94]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	California (wild population)	Heartwood	SE, PC	β-thujaplicin, nootkatin	[6]
	n.r.	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	n.s. (several cultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	California (several populations)	Leaves	GLC	tricyclene, α-pinene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-phellandrene, α-terpinene, limonene, β-phellandrene, *cis*-ocimene, *trans*-ocimene, γ-terpinene, terpinolene, *p*-cymene	[74]
	n.r.	Heartwood	SE, CC, $[\alpha]_D$, IR, NMR, MS	cedrol, carvacrol methyl ether	[11]
	n.r.	Wood	n.r.	α-thujaplicin, β-thujaplicin, nootkatin	[16]
	Argentina (wild population)	Leaves	HD, GC-FID, GC-MS	α-pinene, α-thujene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, *cis*-sabinene hydrate, γ-terpinene, undecane, *cis*-*p*-menth-2-en-1-ol, *iso*-thujol, terpinolene, camphor, borneol, terpinen-4-ol, α-terpineol, dihydro-carveol, *cis*-piperitol, citronellol, elemol, *iso*-phyllocladene, manoyl oxide, phyllocladane, phyllocladanol	[17]
	California (wild population)	Foliage	SE, GC-FID, GC-MS, HPLC, $[\alpha]_D$, IR, NMR, MS	(−)-α-macrocarpene, (−)-β-macrocarpene, (*Z*)-γ-macrocarpene, (*E*)-γ-macrocarpene, *ar*-macrocarpene (−)-cumacrene, (−)-α-chamipinene, (−)-10-*epi*-β-acoradiene, ent-widdra-2,4(14)-diene, (*E*)-*iso*-γ-bisabolene, (+)-guaia-6,9-diene, (1R,4S,5R)-guaia-6,10(15)-diene, (−)-δ-sesquiphellandrene, δ-cuprenene, acora-3,7- diene, acora-4,7-diene, α-cubebene, β-funebrene, caryophyllene, germacrene A, germacrene B, cedrol, a-bisabolol, nerolidol, farnesol, δ-elemene, (−)-dauca-8,11-diene, (−)-cuparene, (−)-α-cuprenene, grandisol, fragranol, ent-γ-acoradiene, widdrol, *iso*-γ-bisabolene	[95]
	Egypt (wild population)	Leaves	SE, GC-FID, GC-MS	santene, 5-hydroxy-pentanal, benzaldehyde, 1-octen-3-ol, camphene, sabinene, 3-*p*-menthene, myrcene, 1-*p*-menthene, *cis*-vertocitral, α-pinene oxide, camphenilone, *p*-cymenene, linalool, stemone, *trans*-piperitol, neral, geraniol, hydroxy-citronellal, o-vanilin, limonene aldehyde, 4-methoxy-acetophenone, α-terpinyl acetate, dihyrdo-eugenol cyclo-sativene, carvacrol acetate, α-copaene, 6-γ-E-methyl-ionone, abietadiene, nezukol, ohyllocladanol, 4-*epi*-abietal, *iso*-pimarol, *trans*-ferruginol, abietol	[96]
	India (wild population)	Cones	HD, GC-MS	ocimene, terpinene-4-ol, α-pinene, β-pinene, terpinoline, β-cadinene, β-phellandrene, *cis*-muurola-3,5-diene, 10-*epi*-cubenol, muurol-5-en-4-ol, dinopol, 5-α- pregnan-15-one, phyllocladene	[97]
	Egypt (wild population)	Leaves	SD, GC-MS	α-pinene, sabinene, β-myrcene, α-phellandrene, limonene, α-terpinolene, bornyl acetate, terpinenyl acetate, α-cedrol α-cubebene, *trans*-caryophyllene, α-humulene, chamigrene	[98]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Greece (wild population)	Aerial parts	HD, GC-FID, GC-MS	α-thujene, α-pinene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, linalool, *trans*-sabinene hydrate, n-nonanal, 1,3,8-*p*-menthatriene, *trans*-thujone, *cis*-*p*-menth-2-en-1-ol, *trans*-*p*-menth-2-en-1-ol, citronellal, borneol, terpinen-4-ol, α-terpineol, *trans*-piperitol, citronellol, thymol methyl ether, carvone, piperitone, bornyl acetate, carvacrol, geranyl acetate, β-elemene, (*E*)-caryophyllene, germacrene D, β-selinene, δ-cadinene, germacrene B, (*E*)-nerolidol, cedrol, *epi*-α-cadinol, *epi*-α-muurolol, α-bisabolol, pimaradiene, *iso*-phyllocladene, abietatriene, abietadiene, sempervirol, phyllocladanol	[27]
	Egypt (wild population)	Leaves	SE, LC, NMR, UV, HR-MS	cupressuflavone	[99]
	Egypt (wild population)	Leaves	HD, GC-MS	terpinen-4-ol, sabinene, β-citronellol (only major compounds specified)	[100]
	India (wild population)	Leaves	SE, PS	carbohydrates, glycosides, sterols, saponins, phenolics, tannins, flavonoids (exact compounds not specified)	[101]
	Egypt (wild population)	Leaves	HD, GC-MS	terpinen-4-ol, sabinene, β-citronellol (only major compounds identified)	[102]
	Mauritius (wild population)	Leaves	HD, GC-MS	α-pinene, β-pinene, β-myrcene, camphene, sabinene, γ-terpinene, cymene, α-terpineol, thujone, carvacrol, β-caryophyllene, aromadendrene, δ-cadinene, germacrene, γ-muurolene, cedrol, bornyl acetate	[103]
	Lebanon (wild population)	Leaves	HD, GC-FID, GC-MS	α-thujene, α-pinene, camphene, sabinene, myrcene, α-phellandrene, α-terpinene, *p*-cymene, sylvestrene, γ-terpinene, *cis*-sabinene hydrate, terpinolene, *trans*-sabinene hydrate, linalool, *cis*-*p*-menth-2-en-1-ol, *trans*-*p*-menth-2-en-1-ol, camphor, citronellal, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, citronellol, 2-undecanone, citronellic acid, farnesol, *iso*-phyllocladene	[104]
	Egypt (wild population)	Leaves	HD, GC-FID, GC-MS	camphene, *p*-cymene, α-phellandrene, α-terpinene, α-terpineol, α-terpinyl acetate, (−)-δ-elemene, elemol, (*E*)-santaline, dendrolasin, β-bisabolol, camphenilone, *iso*-phyllocladene, 2-tridecanone	[105]
	Egypt (wild population)	Leaves	SE, PP, UV, HPLC-UV, NMR, HR-MS	cupressuflavone	[106]
	Egypt (wild population)	Leaves	HD, GC-MS	terpinen-4-ol, sabinene, β-citronellol, γ-terpinene, camphor, α-terpinene plus others not specified	[107]
	Egypt (wild population)	Branchlets	HD, GC-FID, GC-MS	thujene, α-myrcene, α-phellandrene, α-terpinene, m-cymene, limonene, terpinolene, γ-terpinene, α-linalool, *trans*-2-menthenol, D-camphor, citronellal, borneol, terpinen-4-ol, α-terpineol, piperitol, α-citronellol, citronellic acid, farnesol	[108]
	Mauritius (wild population)	Leaves	HD, GC-MS	α-pinene, sabinene, β-pinene, β-myrcene, γ-terpinene, germacrene, cedrol	[109]
	Egypt (wild population)	Leaves	HD, GC-MS	terpinen-4-ol, sabinene, β-citronellol, γ-terpinene, camphor, α-terpinene (only major compounds identified)	[110]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Egypt (obtained from a botanical garden)	Leaves	HD, GC-MS	tricyclene, α-phellandrene, α-pinene, camphene, *p*-cymene, sabinene, β-pinene, β-myrcene, β-thujene, δ-3-carene, α-terpinene, 4-carene, o-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, γ-terpinene, *iso*-terpinolene, β-terpinene, terpinolene, *p*-cymenene, camphene hydrate, δ-fenchane, *cis*-sabinene, hydrate, myrcenol, β-linalool, rose oxide II, citronellol, *trans*-sabinene hydrate, α-campholenal, pinocarveol, citronellal, (*E*)-piperitol, camphor, 4-caranone, *iso*-borneol, *p*-mentha-1,5-dien-8-ol, *endo*-borneol, terpinen-4-ol, *p*-cymen-8-ol, α-terpineol, (*Z*)-piperitol, α-thujenal, 2,4-decadienal, geranial, (*Z*)-geraniol, piperitone, α-citral, bornyl acetate, citronellic acid, epiphotocitral A, *cis*-muurola-4(14),5-diene, α-humulene, *epi*-bicyclosesquiphellandrene, elixene, γ-muurolene, cloven, α-farnesene, germacrene D, β-copaene, β-eudesmene, α-muurolene, β-himachalene, (*Z*)-α-bisabolene, α-chamigrene, δ-cadinene, *iso*-sativene, α-santalene, dihydro-cis-α-copaen–ol, 10-*epi*-γ-eudesmol, *p*-valeryl-phenol, α-bisabolol	[111]
	Egypt (wild population)	Young leaves	SE, PL, GC-MS	α-phellandrene, α-pinene, γ-terpinene, myrcene, o-cymene, limonene, α-terpinene, carvone, kaur-16-ene, ferruginol, kauren-18-ol, cholesterol, urs-12- ene-28-ol, docosene, 13-methyl-13-vinyl-podocar*p*-7-en-3-one	[112]
	Egypt (wild population)	Old leaves	SE, PL, GC-MS	α-phellandrene, *trans*-ocimene, γ-terpinene, limonene, α-terpinene, camphor, camphene, citronellol, δ-3-carene, 13-isopropyl-podocarpa-6,13 diene, kaur-16-ene, jasmine lactone, kaur-15-ene, ferruginol, prasterone, cholesterol, 13-methyl-13-vinyl-podocar*p*-7-en-3-one	[112]
	Egypt (obtained from a botanical garden)	Leaves	SE, PP, LC, TLC, HPLC-UV, NMR, MS	cupresin A, cupresin B, cupresin C, agathadiol, 19-hydroxy-13-oxo-15,16-di-*nor*-*ent*-labda-8(17)-ene, isocupressic acid, acetyl-isocupressic acid, (−)-matairesinol, arctigenin, (−)-deoxy-podophyllotoxin	[113]
	Turkey (wild population)	Leaves	HD, GC-MS	vinyl carbinol, isoprenol, prenol, prenal, caproaldehyde, sabinene, sabinene hydrate, linalool oxide, limonene, α-pinene, dihydrocamphene carbinol, citronellal, terpinen-4-ol, α-terpineol, β-citronellol, 1,4-dihydroxy-*p*-menth-2-ene, pulegone, *p*-menthane-3,8-diol	[114]
	Cameroon (wild population)	Leaves	HD. GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, γ-terpinene, terpinolene, linalool, *cis*-*p*-menth-2-en-1-ol, *cis*-β-terpineol, *trans*-β-terpineol, terpinene-4-ol, α-terpineol, *cis*-piperitol, piperitone, bornyl acetate, 2-cis-dihydro-terpinyl acetate, deca-(2*E*,4*E*)-dien-1-ol, α-terpinyl acetate, cyclosativene, longifolene, β-copaene, α-humulene, γ-muurolene, germacrene D, α-germacrene, δ-cadinene, α-cadinene, 10-*epi*-cubebol, 1,10-di-*epi*-cubenol, humulene epoxide I, α-cadinol, α-eudesmol, γ-eudesmol	[115]
	Egypt (wild population)	Leaves	SE, qNMR, HPTLC	cupressuflavone	[116]
	Egypt (wild population)	Leaves	SE, CC, pTLC, NMR, MS	3′-demethoxy-dihydro-dehydro-diconiferyl alcohol-9′-*O*-α-L-rhamnopyranoside, β-sitosterol, agathadiol, sandaracopimaric acid, cupressuflavone, blumenol-C-glucoside, 3-methyl-but-3-en-1-ol-*O*-β-D-glucopyranoside, protocatechuic acid, gallic acid, shikimic acid	[117]
	New Zealand (wild population)	Sap wood	SCDE, NMR NMRI	functional groups screening (exact compounds not specified)	[118]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Egypt (wild population)	Leaves and branchlets	SE, LC-MS, NMR	maleic acid, quercetin-3,4′-*O*-β-di-glucopyranoside, (−)-shikimic acid, D-(−)-quinic acid, myricetin, *p*-coumaric acid, rhoifolin, quercitrin, kaempferol-3-*O*-α-L-arabinoside, kaempferol-3-*O*-glucuronide, acacetin, 3,4-dihydroxy-mandelate, kaempferol-3-*O*-α-L-rhamnoside, catechin, myricitrin, 1-*O*-β-D-glucopyranosyl sinapate, eriodictyol-7-*O*-glucoside, luteolin-3′,7-di-*O*-glucoside, naringenin-7-*O*-glucoside, phlorizin, okanin-4′-*O*-glucoside, eriodictyol-7-*O*-rutinoside, baicalein-7-*O*-glucuronide, isorhamnetin-3-*O*-rutinoside, hesperidin, quercetin-3-*O*-arabinoside, isorhamnetin-3-*O*-glucoside, syringetin-3-*O*-glucoside, quercetin-7-*O*-rhamnoside, quercetin-3-D-xyloside, E-3,4,5′-trihydroxy-3′-glucopyranosyl-stilbene, quercetin-4′-glucoside, apigenin-7-*O*-glucoside, luteolin-7-*O*-glucoside, daidzein-8-C-glucoside, syringetin-3-*O*-galactoside, hesperetin, cupressuflavone, quercetin, 3,5,7-trihydroxy-4′-methoxy-flavone, syringaldehyde, naringenin, neohesperidin dihydrochalcone, luteolin, 3′-methoxy-4′,5,7-trihydroxy-flavonol, isocupressic acid, acetyl-isocupressic acid, agathadiol	[119]
	Egypt (cultivated population)	Roots	SE, LC-MS/MS, NMR, MS	quinic acid, shikimic acid, maleic acid, citraconic acid, procyanidin B2, urocanic acid, *epi*-catechin, *neo*-hesperidin dihydrochalcone, dihydro-kaempferol-3-*O*-α-L-rhamnoside, rhoifolin, procyanidin C1, procyanidin B1, prunin, amentoflavone, astringin, narcissin, luteolin-7-*O*-glucoside, quercetin-3-D-xyloside, 5-methoxy-salicylic acid, isorhamnetin-3-*O*-glucoside, ferulic acid, tetrahydro-4′-*O*-methyl amentoflavone, apigenin-7-*O*-glucoside, acacetin-7-*O*-rutinoside, baicalein-7-*O*-glucuronide, kaempferol-3-glucuronide, quercetin, naringenin, sinapyl aldehyde, 3,3′,4′,5,7-pentahydroxy-flavan, isorhamnetin, hesperetin, apigenin, acacetin, esculin, luteolin, diosmetin, kaempferol-7-neohesperidoside, glycyrrhizin	[120]
C. nootkatensis D.Don	n.r.	Needles	SD, GLC, IR, NMR	α-pinene, β-pinene, myrcene, δ-3-carene, limonene, α-copaene, α-ylangene, longifolene, δ-cadinene, α-curcumene, β-bisabolene, γ-cadinene, β-curcumene, γ-curcumene, β-farnesene, β-bisabolene, β-alaskene, α-alaskene, *trans*-nerolidol	[121]
	Canada (several wild populations)	Foliage	SD, SE, CC, GLC, $\alpha_{[D]}$, IR, NMR	α-pinene, fenchene, camphene, β-pinene, sabinene, myrcene, δ-3-carene, α-phellandrene, limonene, β-phellandrene, α-terpinene, *p*-cymene, terpinolene, bornyl acetate, terpinen-4-ol, α-terpineol, α-terpinyl acetate, piperitone, citronellol, *p*-cymene, m-cymene, α-cubebene, α-copaene, thujopsene, *ar*-curcumene, nerolidol, cedrol, bisabolol, α-cadinol, isopiimara-8(9),15-diene, isohibaene, sandaracopimaradiene, *iso*-phyllocladnee, *iso*-pimaradiene, manoyl oxide, 13-*epi*-manoyl oxide, phyllocladane, abieta-7,13-diene, dehydro-abietadiene, 8,13-di-*epi*-manoyl oxide, 8-*epi*-manoyl oxide, phyllocladan-16-ol, *n*-pentadecane, *n*-tricosane, *n*-pentacosane, *n*-docosanal, *n*-nonadecane, *n*-tetradecnal, pelargonic acid, pelargonaldehyde	[122]
	Scotland (wild population)	Leaves	SE, CC, pTLC, GLC	saturated and unsaturated fatty acids	[123]
	Australia (obtained from a botanical garden)	Leaves	SE, TLC, UV, R*p*-HPLC	amentoflavone, 4‴-*O*-mehtyl-amentoflavone, 4′,4‴-di-*O*-mehtyl-amentoflavone, 7,4‴-di-*O*-mehtyl-amentoflavone cupressuflavone, hinokiflavone, robustaflavone	[80]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	n.r.	Wood	n.r.	nootkatine, chanootine	[16]
	Washington State (wild population)	Outer bark	SE, GC-MS	totarol	[124]
C. × *notabilis* (A.F.Mitch.) Silba	France (several populations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
C. × *ovensii* (A.F.Mitch.) Silba	France (several populations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
C. sargentii Jeps.	California (several wild populations)	Heartwood	SE, PC	β-thujaplicin, nootkatin, β-dolabrin, β-thujaplicinol	[6]
	Kenya (several populations)	Leaf wax	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[9]
	n.s. (several cultivated and wild populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	California (several populations)	Leaves	GLC	tricyclene, α-pinene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-phellandrene, α-terpinene, limonene, β-phellandrene, *cis*-ocimene, *trans*-ocimene, γ-terpinene, terpinolene, *p*-cymene,	[74]
	California (wild population)	Foliage	HD, GLC	α-pinene, α-thujene, β-pinene, sabinene, myrcene, α-terpinene, limonene, β-phellandrene, γ-terpinene, terpinolene	[74]
	California (wild population)	Foliage	HD, GLC, IR	tricyclene, α-thujene, camphene, β-pinene, sabinene, δ-3-carene, myrcene, α-terpinene, limonene, β-phellandrene, *cis*-ocimene, γ-terpinene, *p*-cymene, terpinolene	[91]
	n.r.	Wood	n.r.	β-thujaplicin, β-dolabrine, β-thujaplicinol, nootkatin	[16]
C. tonkinensis Silba	Vietnam (wild population)	Leaves	HD, FC, GC-FID, GC-MS, NMR	tricylene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, β-phellandrene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, terpinolene, *cis*-sabinene hydrate, camphor, exo-camphene hydrate, terpinen-4-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, fenchyl acetate, bornyl acetate, α-terpinyl acetate, (*E*)-β-caryophyllene, α-humulene, 4-methoxy-safrole, germacrene D, γ-humulene, bornyl 2-methylbutyrate, bornyl *iso*-valerate, δ-cadinene, β-elemol, caryophyllene oxide, cedrol, γ-eudesmol, β-eudesmol, α-eudesmol, manoyl oxide, abietatriene, abieta-7,13-diene, *iso*-abienol, *trans*-totarol	[125]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	Vietnam (wild population)	Stems	HD, FC, GC-FID, GC-MS, NMR	tricylene, α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, β-phellandrene, limonene, (*E*)-β-ocimene, γ-terpinene, *trans*-sabinene hydrate, terpinolene, *cis*-sabinene hydrate, camphor, exo-camphene hydrate, terpinen-4-ol, α-terpineol, *cis*-piperitol, fenchyl acetate, bornyl acetate, α-terpinyl acetate, (*E*)-β-caryophyllene, α-humulene, germacrene D, γ-humulene, bornyl 2-methylbutyrate, bornyl *iso*-valerate, δ-cadinene, β-elemol, caryophyllene oxide, cedrol, γ-eudesmol, β-eudesmol, α-eudesmol, manoyl oxide, abietatriene, abieta-7,13-diene, *iso*-abienol, *trans*-totarol, thujopsene	[125]
C. torulosa D.Don	Switzerland (wild population)	Heartwood	SE, CC, GLC, MP, $[\alpha]_D$, IR, SB, CR.	carvacrol, carvacrol methyl ether, β-dolabrin, α-thujaplicin, β-thujaplicin, β-thujaplicinol, cuparene, humulene, nootkatin, thujopsene, ferruginol, hinokiol, hinokione, manool, torulosal, torusol	[126]
	India (wild population)	Heartwood	SE, PC	nootkatin, hydro-nootkatinol	[6]
	n.r.	Leaf waxes	SE, CC, IR, GC	long chain *n*-alkanes (from C-25 to C-35)	[7]
	n.r.	Leaf waxes	SE, CC, IR, GC	ω-hydroxy acids (from C-12 to C-18), fatty acids (from C-12 to C-18)	[8]
	n.s. (several cultivated populations)	Resin	SE, CC, $[\alpha]_D$, IR, NMR, MS	*trans*-communic acid, *cis*-communic acid, sandaracopimaric acid, imbricatolic acid	[10]
	India (wild population)	Leaves	SE, CC, TLC, MP, IR	amentoflavone, apigenin, cupressuflavone, hinokiflavone	[66]
	n.r.	Heartwood	SE, CC, $[\alpha]_D$, IR, NMR, MS	carvacrol methyl ether, cuparene	[11]
	n.r.	Wood	n.r.	α-thujaplicin, β-thujaplicin, β-thujaplicinol, nootkatin	[16]
	Argentina (wild population)	Leaves	HD, GC-FID, GC-MS	α-pinene, α-thujene, sabinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cienole, γ-terpinene, linalool, camphor, *m*-cresol acetate, terpinen-4-ol, α-terpinyl acetate, *cis*-muurola-3,5-diene, *cis*-muurola-4(14),5-diene, *epi*-zonarene	[17]
	France (several populations obtained from a botanical garden)	Leaves	SE, GLC, GC-FID	saturated, mono-unsaturated fatty and poly-unsaturated fatty acids (from C12 to C22)	[48]
	Greece (wild population)	Aerial parts	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, camphene, verbenene, sabinene, β-pinene, myrcene, δ-3-carene, α-terpinene, *p*-cymene, limonene, β-phellandrene, (*E*)-β-ocimene, *p*-cymenene, linalool, γ-terpinene, terpinolene, α-campholenal, terpinen-4-ol, α-terpineol, *iso*-bornyl acetate, α-terpinyl acetate, (*E*)-caryophyllene, α-humulene, *trans*-cadina-1(6),-4-diene, γ-muurolene, γ-cadinene, cubebol, α-calacorene, cedrol, β-calacorene, caryophyllene oxide, spathulenol, α-acorenol, β-acorenol, *epi*-α-cadinol, *epi*-α-muurolol, α-muurolol, α-cadinol, pimaradiene, manool oxide, abietatriene, abienol, sempervirol, *trans*-totarol	[27]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	India (wild population)	Male branches	HD, GC-FID, GC-MS	α-thujene, α-pinene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, γ-terpinene, *cis*-sabinene hydrate, fenchone, terpinolene, linalool, ipsenol, *cis*-*p*-menth-2-e*n*-1-ol, *trans*-*p*-menth-2-e*n*-1-ol, citronellal, umbellulone, terpine*n*-4-ol, *p*-cyme*n*-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, thymol, terpine*n*-4-ol acetate, α-terpinyl acetate, (*Z*)-nuciferol, (*E*)-isoamyl cinnamate, (*E*)-nuciferol, *iso*-hibaene, pimaradiene, *iso*-phyllocladene, sclarene, kaurene, abietatriene, abietadiene, semperulol, *trans*-ferruginol	[127]
	India (wild population)	Female branches	HD, GC-FID, GC-MS	α-thujene, α-pinene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, γ-terpinene, *cis*-sabinene hydrate, fenchone, terpinolene, linalool, ipsenol, *cis*-*p*-menth-2-e*n*-1-ol, *trans*-*p*-menth-2-e*n*-1-ol, citronellal, umbellulone, terpine*n*-4-ol, *p*-cyme*n*-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, citronellol, piperitone, bornyl acetate, thymol, terpine*n*-4-ol acetate, δ-elemene, α-terpinyl acetate, α-cubenene, α-copaene, β-caryophyllene, γ-gurjunene, α-muurolene, spathulenol, caryophyllene oxide, 10-*epi*-γ-eudesmol, α-cadinol, β-bisabolol, (*Z*)-nuciferol, (*E*)-isoamyl cinnamate, (*E*)-nuciferol, *iso*-hibaene, pimaradiene, *iso*-phyllocladene, sclarene, kaurene, abietatriene, abietadiene, semperulol, *trans*-ferruginol	[127]
	India (wild population)	Female cones	HD, GC-FID, GC-MS	α-thujene, α-pinene, sabinene, β-pinene, myrcene, α-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, 1,8-cineole, γ-terpinene, *cis*-sabinene hydrate, fenchone, terpinolene, linalool, *cis*-*p*-menth-2-e*n*-1-ol, *trans*-*p*-menth-2-e*n*-1-ol, citronellal, umbellulone, terpine*n*-4-ol, *p*-cyme*n*-8-ol, α-terpineol, *cis*-piperitol, *trans*-piperitol, citronellol, piperitone, bornyl acetate, thymol, terpine*n*-4-ol acetate, δ-elemene, α-terpinyl acetate, α-cubenene, α-copaene, β-caryophyllene, γ-gurjunene, α-muurolene, spathulenol, caryophyllene oxide, 10-*epi*-γ-eudesmol, α-cadinol, β-bisabolol, (*Z*)-nuciferol, (*E*)-isoamyl cinnamate, (*E*)-nuciferol, *iso*-hibaene, pimaradiene, *iso*-phyllocladene, sclarene, kaurene, abietatriene, abietadiene, semperulol, *trans*-ferruginol	[127]
	India (several collections in the time)	Leaves	HD, GC-FID, GC-MS	α-pinene, α-thujene, α-fenchene, sabinene, β-pinene, β-myrcene, δ-3-carene, α-terpinene, cymene, limonene, γ-terpinene, 2-nonanone, α-terpinolene, *cis*-*p*-menth-2-e*n*-1-ol, *trans*-*p*-menth-2-e*n*-1-ol, camphor, terpine*n*-4-ol, α-terpineol, umbellulone, bornyl acetate, α-terpinyl acetate, *epi*-zonarene, α-cubebene, β-cubebene	[128]
	India (wild population)	Leaves	HD, GC-FID, GC-MS	α-thujene, α-pinene, α-fenchene, camphene, sabinene, β-pinene, β-myrcene, L-phellandrene, δ-3-carene, α-terpinene, *p*-cymene, limonene, γ- terpinene, α-terpinolene, *cis*-*p*-menth-2-e*n*-ol, *trans*-*p*-menth-2-e*n*-ol, camphor, 4-terpineol, α-terpineol, bornyl acetate, β-terpinyl acetate, α-cubebene, β- cubebene, germacrene D, δ-cadinene	[129]
	India (wild population)	Needles	PS (different extracts)	alkaloids, carbohydrates, proteins, flavonoids, tannins, saponins, quinones, terpenoids	[130]
	India (wild population)	Leaves	SE, PS	terpenoids, coumarins, quinones, saponins, glycosides, alkaloids, phenolics, flavonoids, anthraquinones	[131]

Table 1. *Cont.*

Cupressus spp.	Collection Area	Studied Organs	Analysis Methodology	Identified Compounds	References
	India (wild population)	Leaves	HD, GC-MS	α-pinene, δ-3-carene, terpinolene, aromadendrene plus others not specified	[131]
	Nepal (wild population)	Leaves	SE, PS	alkaloids, tannins, carbohydrates, proteins, steroids, terpenoids, flavonoids, saponins, phenolics	[132]

Legend = $\alpha_{[D]}$: optical rotation; BP: boiling point; CC: column chromatography; CD: circular dichroism; CTLC: centrifugally accelerated thin layer chromatography; CR: crystallization; DHS: dynamic headspace sorption; EH: enzymatic hydrolysis; FC: flash chromatography; FTIR: Fourier transform infrared spectroscopy; GC: gas chromatography; GC-FID: gas chromatography coupled to a flame ionization detector; GC-MS: gas chromatography coupled to mass spectrometry; GLC: gas-liquid chromatography; HD: hydrodistillation; HPLC-DAD: high performance liquid chromatography coupled to a diode array detector; HPLC-MS: high performance liquid chromatography coupled to mass spectrometry; HR-MS: high resolution mass spectrometry; GLC-FID: gas-liquid chromatography coupled to a flame ionization detector; HPLC-FD = high performance liquid chromatography coupled to a fluorescence detector; HPLC-MS: high performance liquid chromatography coupled to mass spectrometry; HPLC-RID: high performance liquid chromatography coupled to refractive index detector; HPLC-UV: high performance liquid chromatography coupled to ultraviolet spectroscopy; HPTLC: high performance thin layer chromatography; IR: infrared spectroscopy; LC: liquid chromatography; LC-MS/MS: = liquid chromatography coupled to tandem mass spectrometry; MP: melting point; MS: mass spectrometry; NMR: nuclear magnetic resonance spectroscopy; NMRI = nuclear magnetic resonance imaging; n.r.: not reported; n.s.: not specified; PC: paper chromatography; PE: percolation; PL: percolation; PP: partition procedure; PS: phytochemical screening; pTLC: preparative thin layer chromatography qNMR; quantitative nuclear magnetic resonance spectroscopy; RP-HPLC-UV: reverse phase high performance liquid chromatography coupled to ultraviolet spectroscopy; SB: sublimation; SCDE: supercritical carbon dioxide extraction; SD: steam distillation; SE: solvent extraction; SP: solvent partition; TLC: thin layer chromatography; UHPLC-MS: ultra high performance liquid chromatography coupled to mass spectrometry; UV: ultra-violet spectroscopy; VF: vacuum fractionation.

Table 1 clearly displays how the phytochemical studies on *Cupressus* species other than *C. sempervirens* are mainly focused on *C. macrocarpa*, *C. lusitanica* and *C. arizonica*. In addition, it is evident that not all the existing species have been studied, also considering that some works are only phytochemical screenings or are only about specific classes of compounds like phenolics and fatty acids. Another important aspect to underline is that most of these phytochemical studies regarded populations collected mainly in United States of America, Iran and Northern Africa with only a few exceptions. Thus, further populations should be taken in consideration in order to provide more general information on the genus in this context, especially in Europe. With respect to the organs, cones and leaves are surely the most studied ones, even if some studies on other organs, such as seeds, are present. These two last aspects are extremely important since it is well known that the phytochemical composition in terms of quality and quantity is deeply affected by the environment as well as by the studied organ [133,134]. In this respect, studying more different populations and organs might lead to interesting phytochemical results in several fields. As for the methodologies adopted, the main ones are hydro-distillation and gas-chromatography techniques for the study of the essential oil composition and solvent extraction, column chromatography, and nuclear magnetic resonance for the extraction, separation and identification of non-volatile compounds, respectively. Nevertheless, it is noted that traditional and modern techniques have also been employed in both cases.

3. Chemotaxonomy

The chemotaxonomy of *Cupressus* genus must be first considered in the general context concerning Gymnospermae [135–137]. In particular, on the basis of the phytochemical compounds evidenced, three main compositionally distinct groups can be distinguished within that. The first one regards the non-conifers, i.e., the divisions Ginkgophyta and Cycadophyta that mainly contain gums but biosynthesise other compounds, too. The second one regards the division Gnetophyta which, considering their intermediate position to angiosperms [138,139], must be separately considered as also evidenced by the anomalous presence of alkaloids and the recent isolation of stilbenoids [140]. The third one regards the division Pinophyta which comprises species that mainly biosynthesize volatile-rich exudates and phenolics contained in gums and resins. *Cupressus* genus, being a member of the Cupressaceae family, belongs to this latter group together with Araucariaceae and Podocarpaceae families. In fact, *Cupressus* species have evidenced volatile components and phenolic compounds as their major phytochemical classes. Going in major detail, monoterpenes, sesquiterpens and diterpenes mainly characterize the volatile profiles of *Cupressus* species. Yet, these compounds are very common in the plant kingdom having been identified in many other families like Apiaceae, Araucariaceae, Boraginaceae, Lamiaceae, Podocarpaceae, Rutaceae, Scrophulariaceae and Verbenaceae [141–149] and for this, individuating a specific chemotaxonomic marker is not easy. Nevertheless, one chemotaxonomic marker could be found, i.e., bakerol, the occurrence of which seems to be limited to only *C. bakeri* [43,44]. Indeed, for what concerns the non-volatile constituents, simple flavonoids and bioflavonoids are predominant in *Cupressus* species, but other classes of non-volatile compounds were also found like fatty acids, diterpenoids, triterpenoids, alkaloids, and simple organic acids. In this respect, *Cupressus* species present several phytochemical similarities with the genera *Wollemia* W.G.Jones, K.D.Hill & J.M.Allen, *Araucaria* Juss. and *Agathis* Salisb., all belonging to the Auracariaceae family, which is considered to be taxonomically close to Cupressaceae [148]. In particular, these phytochemical similarities mainly regard the contents in biflavonoids and diterpenoids with compounds that had been previously considered as chemotaxonomic markers of the *Cupressus* genus like cupressuflavone and its derivatives and cupressic acid and its derivatives and that have been later found in *Wollemia*, *Araucaria* and *Agathis* genera, thus losing this characteristic. All these facts are extremely interesting and urge new phytochemical studies on *Cupressus* species in this sense but confirm the previous subdivision.

4. Ethnobotanical Uses

Several *Cupressus* species are employed in the traditional medicine of several countries all around the world. The most common utilizations regard *C. lusitanica* and *C. macrocarpa*. The following sections explore the ethnobotanical uses of *Cupressus* species other than *C. sempervirens* as reported in literature. It is important to underline that not all the *Cupressus* species possess ethnobotanical uses and that not all the reported ethnobotanical uses are accompanied by a strong phytochemical analysis capable to explain the relative utilizations.

4.1. C. cashmeriana

In Kashmir, the species is mainly an ornamental plant [150].

4.2. C. chengiana

This species has been traditionally used in Chinese folk medicine for the treatment of rheumatoid arthritis, pruritus, rheumatism, and pertussis [53].

4.3. C. dupreziana

In the Tassili N'ajjer desert in Sahara, the infusion of the leaves is drunk to treat fever [151].

4.4. C. funebris

In Vietnam, the cones are used to treat fever and physical injuries [152].

4.5. C. goveniana

In Myanmar, this species is said to be used for medicinal purposes, but the exact uses are not provided [153].

4.6. C. x leylandii

The leaves are used in Cameroon for screening or hedging [154].

4.7. C. lusitanica

The leaves and cones of this species are used in Kenya to treat liver, spleen, kidney, bladder, bone and joint diseases as well as antitumoral [155]. In Cameroon, this species is used in postpartum and against hair loss [156]. The decoction of the leaves is used to treat toothache in Ethiopia [157]. In the Bambotous department of Cameroon, the decoction of the leaves, whole plant and stems is used against postpartum pains and hair loss [158]. In Guatemala and Mexico, the crude extract of this species is used against cancer [159]. The decoction of the leaves is used in Ethiopia for the treatment of toothache [160].

4.8. C. macrocarpa

The leaves are employed by Baduga sub-tribe in India for the treatment of rheumatic muscular pains both externally and internally [161]. In Ecuador, the leaves and cones are used as infusions, vapors and plasters to treat wounds, cardiovascular and gastric problems, respiratory problems, inflammations, diarrhea, varix, phlebitis and as tonic [162].

4.9. C. nootkaensis

In the state of Washington, the branches are sued in baths to treat arthritis and rheumatism while their infusion is used to wash sores and swellings [124].

4.10. C. sargentii

The decoction of the branch apexes is used in Bolivia to treat cough [163]. In the same country, the species is also used to treat asthma [164].

4.11. C. torulosa

The seeds are used in Nepal against sinusitis and gingivitis [165]. In Kashmir, the species wood is used for general constructions and to make pencils and incense. In addition, its essential oil is used to cure inflammatory wounds and as an antiseptic [150].

5. Biological Activities

Several biological studies have been performed on *Cupressus* species other than *C. sempervirens*, evidencing interesting biological activities of their essential oils, extracts and derived compounds. These biological activities are mainly insecticidal, antibacterial, and antifungal, even if other properties have also been reported. The most extensive reports are on *C. arizonica*, *C. lusitanica* and *C. marocarpa.* The following sections explore the biological activities associated to *Cupressus* species other than *C. sempervirens* as reported in literature. Additionally in this case, it is important to underline that not all the *Cupressus* species have been studies in this sense and that not all the reported biological uses are accompanied by a strong phytochemical analysis capable to explain them.

5.1. C. arizonica

5.1.1. Essential Oil

The essential oil from the leaves, branches and cones collected in Tunisia shows modest activity against *Escherichia coli* ATCC 25922, *Salmonella typhimurium* ATCC 19430, *Staphylococcus aureus* ATCC 25923, *Enterococcus faecalis* ATCC 29212, *Klebsiella pneumoniae* and *Streptococcus pneumoniae*, with MIC values ranging from 0.37 to 11.8 µg/mL. All these values are generally much lower than the standard compound levofloxacin in the relative assays (MIC values from 0.3 to 4.88 µg/mL) [21]. The essential oil from the cones collected from a cultivated population in Iran exerts strong growth inhibiting effects against *Aspergillus flavus* Link in a concentration-dependent manner according to the disc diffusion medium [22]. The essential oil from the leaves and cones collected from a cultivated population in Iran shows a modest antioxidant activity, according to the $DPPH^+$ assay, at the concentration of 4 µL/mL, with inhibition percentage values of 21% and 25.7%, respectively. The same essential oil shows very poor antioxidant activity according to the deoxyribose degradation assay. Lastly, the same essential oils show a moderate antioxidant activity according to the non-enzymatic lipid peroxidation test with inhibition percentages values of 27.1% and 31.6%, respectively, at the concentration of 0.05 µL/mL [23]. The essential oil from its leaves exerts strong larvicidal effects on *Anopheles stephensi* with a LC_{50} value of 79.30 µg/mL [25]. The essential oil from the needles collected in Mississippi exhibits no significant antifungal, antibacterial, antimalarial and antileishmanial activities [26]. The essential oil from the leaves collected in Greece exerts medium larvicidal effects against third to fourth instar larvae of *Aedes albopictus* with LC_{50} value of 64.8 mg/L. The same essential oil exerts weak repellent activity at the concentration of 0.2 mg/cm^2 [27]. The essential oil from the leaves collected in a Tunisian botanical garden exerts strong herbicidal activity. At the doses of 0.8 and 1.0 mg/mL, it totally inhibits the shoot and the root growth of *Sonchus arvensis* L., whereas only at the dose of 1.0 mg/mL does it totally inhibit the shoot and root growth of *Trifolium campestre* Schreb. At the same doses, it partially reduces the germination and the shoot and root growth of *Phoenix canariensis* Chabaud and *Lolium rigidum* Gaudin, too. The cone and stem essential oils were much less active [28]. The essential oil from the leaves of this species collected in Tunisia exhibits good antifungal properties against *Candida albicans* ATCC 18804, *Candida glabrata* 8D, *Candida dubliniensis* CIPO 82, *Candida parapsilosis* 28B, *Candida tropicalis* IGC3097, *Candida bracarensis* NCYC 3133 and *Saccharomyces cerevisiae* BY4741 with MIC values from 0.1 to 0.05 µg/mL. The mechanism of action is via an oxidative process leading to increased intracellular oxidation and DNA [29]. The essential oil from the cones collected in Lebanon exerts moderate antibacterial activities against *Escherichia coli* K12 strain carrying plasmid DH5-alpha/pTY250 (PTA-4079) and *Staphylococcus epidermidis* ATCC 14990 with MIC values of 200 µg/mL in both cases [166]. The essential oil from the leaves collected in

Iran exhibit effects against two spotted spider mites on Alii fig leaf with 100% mortality starting from the concentration of 2.5 mg/L. This same essential oil also shows minimal toxic effects on humans and environment [167]. The essential oil of the leaves of this species obtained from a botanical garden in Iran shows moderate feeding deterring effects on *Callosobruchus maculatus* Fabricus, *Sitophilus granarius* L. and *Oryzaphilus surinamensis* L. with various percentages (10.66, 10.66 and 11.33%, respectively), as well as good inhibitory effects on their F1-progeny with various percentages (50.81, 59.64 and 49.99%, respectively) [31]. The essential oil of this species collected in Morocco exerts a high anticorrosion effect on carbon steel in 1.0 M HCl solution which is dependent on the temperature. The maximum efficiency of 97% is reached at the concentration of the essential oil equal to 500 ppm and at 25 °C. The mechanism of action is through the formation of a protective film on the carbon steel surface from the adsorbed components of the essential oil [34]. The essential oil of this species exhibits contact insecticidal activity on the larvae of the 3rd, 4th and 5th instars of *Tortrix viridana*. The concentration of 0.5% showed the best results with MMT of 1h 31 min 12 s [168]. The essential oil from the aerial parts collected in Iran exerts high toxic fumigant effects against adult rice weevil (*Sitophilus oryzae* L.) with a LC_{50} value of 172.36 µL/L air [36]. The essential oil from the cones collected in Iran exerts strong antinociceptive and anti-inflammatory activities in mice. In particular, according to the formalin test, it is able to reduce the nociceptive responses especially at the concentration of 0.5 g/Kg in the late phase with values similar to those of diclofenac acting at the level of opioid and benzodiazepine receptors. With respect to the anti-inflammatory activity, according to the carrageenan induced paw edema assay, at the doses of 1, 0.5 and 0.25 g/Kg, the essential oil is able to significantly decrease the paw edema especially after 4 h from carrageenan injection. The values of these reduction are very similar among them and also with respect to diclofenac [37].

5.1.2. Solvent Extracts

The methanolic extracts of the leaves and cones of this species obtained from a botanical garden in Iran show moderate feeding deterring effects on *Callosobruchus maculatus* Fabricus, *Sitophilus granarius* L. and *Oryzaphilus surinamensis* L. with various percentages (13.66, 13.66 and 14.66%, respectively) as well as good inhibitory effects on their F1-progeny with various percentages (49.74, 47.24 and 50.65%, respectively) [31]. The ethanolic extract from the wood knots collected from a cultivated population in Iran exhibits good $DPPH^{\cdot+}$ effects with a percentage of inhibition equal to 47.99 at the volume of 0.1 mL and $DPPH^{\cdot+}$ concentration of 0.5 mg/mL. This value is comparable to that of BHA (57.96%). It also exerts very strong Fe^{2+} chelating capacities with a percentage of 100% at the volume of 150 µL and Fe^{2+} concentration of 2 mg/mL [33].

5.2. C. arizonica var. glabra

The essential oils from the female cones, male cones, needle twigs and wood barks of this species collected in South Carolina show good to moderate toxicity activity against first-instar larvae of *Aedes aegypti* at 24 h post treatment, with LD_{50} values ranging from 33.7 to 55.5 ppm. Indeed, only the needle twig and wood bark essential oils show good deterrent activities on *Aedes aegypti* females, at 100 µg/cm^2, with BDI values of 1.04 and 1.01, respectively. Lastly, only the wood bark essential oil exerts modest activity against *Colletotrichum acutatum*, *Colletotrichum fragariae* and *Colletotrichum gloeosporioides* with inhibition zone diameter values equal to 4.0, 4.5 and 4.0 mm, respectively, at the concentration of 320 µg/spot [39].

5.3. C. dupreziana var. atlantica

5.3.1. Essential Oil

The essential oil from the leaves of this species collected in Morocco has shown significant bacteriostatic action against *Klebsiella pneumoneae*, *Proteus mirabilis*, *Escherichia coli* and *Staphylococcus aureus* bacterial strains with diameters of inhibition zones between

17.6 and 28.4 mm and presented MIQ values between 80 and 140 µL [63]. The essential oils derived from the cones, branches and sawdust of this species collected in Morocco show some concentration-dependent antibacterial, antifungal and antimould effects on *Escherichia coli*, *Bacillus subtilis*, *Staphylococcus aureus*, *Micrococcus luteus*, *Aspergillus niger*, *Penicillium digitatum*, *Penicillium expansum*, *Coniophora puteana*, *Coriolus versicolor*, *Gloeophyllum trabeum* and *Poria placenta* [64]. The essential oils from the leaves, twigs, cones and heartwood of this species collected in Morocco show moderate to weak antifungal activities against *Gloeophyllum trabeum*, *Oligoporus placenta*, and *Coniophora puteana* with MIC values from 900 to 1900 ppm obtained by micro atmosphere technique on Malt-Agar medium [65].

5.3.2. Solvent Extracts

The polyphenol rich extract (10% *w/v*) from the plant pruning wastes recovered from leaves, branches twigs, needles and cones collected in Morocco exerts good antifungal activity. At the concentration of 4%, it inhibits the *Fusarium oxysporum* f.sp. *albedinis* mycelial growth by about 61% as well as its spore germination by about 68% and its sporulation by about 45%. The same extract shows high antioxidant effects according to the TEAC and FRAP methods with values equal to about 25,000 and 35,000 µTE/100g DW, respectively [169].

5.4. C. funebris

5.4.1. Essential Oil

The essential oil of the wood purchased in China shows high repellency effects on *Amblyomma americanum* and *Ixodes scapularis* nymphs with an EC_{95} value of 0.43 mg oil/cm^2 filter paper. DEET has an EC_{95} value of 0.68 mg oil/cm^2 filter paper. At the concentration of 0.103 mg oil/cm^2 filter paper, the essential oil repels all *I. scapularis* nymphs. At the concentration 0.827 mg oil/cm^2 filter paper, the essential oil repels more than 80% *A. americanum* 4 h after application. The same essential oil causes a mortality of 80% to *Aedes aegypti* larvae at 250 ppm. This concentration is much higher than that obtained for permethrin (0.25 ppb with mortality of 67%) [70] (Carrol et al., 2001).

5.4.2. Solvent Extracts

The methanolic, hydro-methanolic and aqueous extracts of this species collected in Vietnam exert very poor antiproliferative effects on human HT-1080 fibrosarcoma cells with EC_{50} values much above 100 µg/mL [152].

5.5. C. × leylandii

Several aqueous extracts from the leaves of this species, macerated for different periods, are able to delay the germination of *Trifolium repens* L. by at least 1.5 days as well as the germination of *Lepidium sativum* L. by at least 2 days. The same macerates can also slow down the appearance of their seedlings [79].

5.6. C. lusitanica

5.6.1. Essential Oil

The essential oil from the leaves and the cones of this species collected in Cameroon shows a dose-dependent anti-dermatophytic activity on *Microsporum audouinii* (cp22), *Microsporum langeronii* (cp46), *Trichophyton rubrum* (cp21) and *Trichophyton mentagrophytes* (cp38). In addition, the leaf essential oil highly prevents the growth of *Microsporum audouinii* (cp22), *Microsporum langeronii* (cp46), *Trichophyton rubrum* (cp21) at the doses of 500 and 1000 µg/mL. At the dose of 500 µg/mL, it also shows fungicidal effect while at the dose of 275 µg/mL, it is fungistatic [81]. The essential oil from the leaves collected in Costa Rica exerts good antibacterial and antifungal effects against *Bacillus cereus* ATCC14579 and *Aspergillus niger* ATCC1688 with MIC values equal to 78 µg/mL both [84]. The essential oil from the cones collected in India shows moderate antibacterial effects on *Staphylococcus aureus*, *Bacillus subtilis*, *Escherchia coli* and *Salmonella typhi* with MIC values above 125 µg/mL.

Amoxycillin trihydrate show much lower MIC values (3.125, 6.25, 6.25 and 50, respectively). The same essential oil also has moderate antifungal effects on *Candida albicans* and *Candida neoformans* with MIC values of 250 µg/mL, compared to Amphotericin B which has much lower MIC values (12.5 and 6.25, respectively). This essential oil also has a big effect on excision wound with infection with a percentage of wound contraction after 8 days from incision of 51.0% and after 12 days of 84.4%. The healing is characterized by deposition of collagen fibers and maturation of fibrous connective tissues with no hair follicles in the healed area and with a big keratinization of grown epidermis [170]. The essential oil from its leaves collected in Brazil showed moderate activity against the growth of its endophytic fungi associated *Xylaria* sp1 (MIC = 500 ppm), *Guignardia* sp. and *Xylaria* sp2 (MIC = 250 ppm) [87]. The essential oil from the leaves of this species collected in Cameroon exhibits good concentration dependent effects against *Escherichia coli* ATCC 11775, *Klebsiella pneumoniae* ATCC 13883, *Proteus mirabilis*, *Pseudomonas aeruginosa* ATCC 27853, *Salmonella typhi* ATCC 6539, *Shigella flexneri*, *Enterococcus faecalis* ATCC 10541, *Staphylococcus aureus* ATCC 25922, *Candida albicans* ATCC 9002, *Candida glabrata* CIPA 35, *Candida krusei* ATCC 6258, *Candida lusitaniae* ATCC 200950, *Candida parapsilosis* ATCC 22019, *Candida tropicalis* ATCC 750 with inhibition zone diameters ranging from 6 to 18 mm [87]. The essential oil from whole plant, leaf and cone extracts of this species collected in Cameroon exert very poor effect against *Salmonella typhi* ATCC 6539 with MIC values above 2048 mg/mL [156]. The leaf essential oil of this species collected in Kenya is a strong insect pest contact toxicant depending on the insect species, duration of exposure and concentration according to the instant toxicity assay. In particular, it is highly toxic on *Sitotroga cerealella* and *Acanthoscelides obtectus* with LC_{50} values of 0.05 and 0.11% *v/w* after 24 h from contact, respectively, and less toxic on *Tribolium castaneum* and *Sitophilus zeamais* with LC_{50} values of 0.11 and 0.13% *v/w* after 168 h from contact, respectively. The same essential oil is also a very good space fumigant with LC_{50} values of 4.08 and 4.71 µL/L air against *A. obtectus* and *S. cerealella*, respectively, 24 h post fumigation and LC_{50} values of 13.54 and 15.28 µL/L air against *S. zeamais* and *T. castaneum*, respectively, 168 h post fumigation. This essential oil is also a strong repellent to *T. castaneum* at 0.20% *v/w* with a value of 92.5% and decreases the PR values also for *A. obtectus*, *S. cerealella* and *S. zeamais*, 24 h after exposure [88].

5.6.2. Solvent Extracts

Several fractions derived from *n*-hexane leaf extract of this species collected inCameroon and differently enriched in essential oil compounds, show antifungal activity against *Microsporum audouinii*, *Microsporum langeronii*, *Microsporum canis*, *Trichophyton rubrum* and *Trichophyton tonsurans* with MIC values ranging from 125 to 500 µg/mL [82]. The chloroform, methanolic and ethyl acetate extracts from the leaves collected in Tanzania show weak or very good antibacterial and antifungal activities against *Escherichia coli* ATCC11775, *Klebsiella pneumoniae* ATCC13883, *Pseudomonas aeruginosa* ATCC27853, *Salmonella typhi* ATCC6539, *Klebsiella oxytoca*, *Salmonella kisarawe*, *Candida albicans* and *Cryptococcus neoformans* with MIC values ranging from 25.0 to 1.56 mg/mL. The chloroform, methanolic and ethyl acetate extracts from the covers of the seeds collected in Tanzania show weak or good antibacterial and antifungal activities against the same strains with MIC values ranging from 25.0 to 6.25 mg/mL. The chloroform and methanolic extracts from the seeds collected in Tanzania show weak or moderate antibacterial and antifungal activities against the same strains with MIC values ranging from above 25.0 to 3.12 mg/mL [171]. The ethanol extract from the leaves of this species collected in Cameroon shows high antifungal activity on *Colletotrichum lindemuthianum* and different *Fusarium* spp., especially at the concentration of 8 mg/mL, which resulted in 100% growth inhibition. The aqueous extract was not so active against the same fungi giving 86.08% of growth inhibition at the concentration of 30 mg/mL [172].

5.7. C. lusitanica var. benthamii

The essential oil from the leaves of this species collected in Greece exerts moderate larvicidal effects against third to fourth instar larvae of *Aedes albopictus* with LC_{50} value of

37.5 mg/L. The same essential oil exerts strong repellent activity at the concentration of 0.2 mg/cm^2 [27].

5.8. C. macrocarpa

5.8.1. Essential Oil

The essential oil from the leaves collected in Egypt shows good DPPH$^{\cdot+}$ antioxidant effects with an inhibition percentage of 68%. This value is comparable to that of BHA (87%). In addition, the same essential oil exerts good antibacterial and antifungal effects on *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Aspergillus niger*, *Aspergillus parasiticus* and *Candida albicans* with MIC values from 0.65 to 0.75 mL/100 mL. The ethanol and dichloromethane extracts of the same leaves show good DPPH$^{\cdot+}$ antioxidant effects with inhibition percentages of 70 and 65%, respectively. The same extracts also show good antibacterial and antifungal effects on the same strains with MIC values from 0.55 to 0.8 mL/100 mL [96]. The essential oil derived from the cones of this species collected in India exerts potent antimicrobial and antifungal properties against *Bacillus coagulans*, *Bacillus megaterium*, *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Kleibseilla pneumoniae*, *Pseudomonas aeruginosa*, *Salmonella typhii*. *Aspergillus flavus*, *Candida albicans*, *Trichoderma lignorium* and *Cryptococcus neoformans* with inhibition zone values between 11 and 17 mm [97]. The essential oil from the leaves of this species collected in Egypt exerts toxicity effect against the third instar larvae of *Synthesiomyia nudiseta* exposed for 24 h with an LC_{50} value of 1.11%. In addition, it is able to decrease the percentage of pupation by 91.57%. The treatment with this volatile oil decreases the survival of the larvae and leads to noticeable larval, pupal, and adult abnormalities, especially at the level of the integument, muscles, fat body cells, midgut and salivary gland [98]. The essential oil from the leaves of this species collected in Greece exerts medium larvicidal effects against third to fourth instar larvae of *Aedes albopictus* with LC_{50} value of 54.6 mg/L. The same essential oil exerts strong repellent activity at the concentration of 0.08 mg/cm^2 [27]. The essential oil from the leaves of this species shows very good antifungal activity against *Alternaria alternata*, *Botrytis cinerea* and *Fusarium oxysporum* with EC_{50} values of 182, 181 and 109 mg/L respectively. The same essential oil shows moderate antibacterial activity against *Agrobacterium tumefaciens* and *Erwinia carotovora* var. *carotovora*. with MIC values of 600 and 525 mg/L, respectively. This essential oil also shows good and moderate inhibitory effects on the spore germinations of *Alternaria alternata*, *Fusarium oxysporum* and *Fusarium solani* with EC_{50} values of 318, 199 and 485 mg/L, respectively [100]. The essential oil from the leaves collected in Egypt exerts mild fumigant toxicity effects against the fourth larval stage of *Spodoptera littoralis* with a LC_{50} value equal to 9.91 µL/L air. The same essential oil exerts modest fumigant toxicity effects against the adults of *Theba pisana* with a LC_{50} value equal to 11.67 µL/L air [103]. The essential oil from the leaves of this species collected in Mauritius shows good antibacterial effects against *Escherichia faecalis*, *Escherichia coli* ATCC25922, *Staphylococcus aureus* ATCC25923, *Pseudomonas aeruginosa* ATCC27853, *Staphylococcus epidermidis* ATCC12228 with inhibition zone diameters ranging from 16.1 for the first one to 24.0 for the second one. The same essential oil shows also fungicidal activity against *Candida albicans* ATCC10231, *Candida tropicalis* ATCC750, *Aspergillus niger* ATCC16404 and *Trichophyton mentagrophytes* ATCC9533. The same essential oil shows weak anti-tyrosinase activity with an IC_{50} value of 70.98 µg/mL [104]. The essential oil from its leaves collected in Lebanon exerts good antimicrobial properties against *Trichophyton rubrum* SNB-TR1, *Trichophyton mentagrophytes* SNB-TM1, *Trichophyton soudanense* SNB-TS1, *Trichophyton violaceum* SNB-TV1 and *Trichophyton tonsurans* SNB-TT1 with MIC values of 64, 64, 32, 32 and 64 µg/mL, respectively [104]. The essential oil from the leaves of this species collected in Egypt exhibit promising concentration dependent effects against *Fusarium solani*, *Fusarium oxysporum* NRRL 28184, *Aspergillus niger* NRRL 599, *Candida albicans* NRRLY-477, *Pseudomonas aeruginosa* NRRLB-23, *Staphylococcus aureus* NRRLB-313, *Escherichia coli* NRRLB-210 and *Bacillus subtilis* NRRL-543 with inhibition zone diameters ranging from 10.5 to 21 mm [105]. The essential oil from the leaves collected in Egypt

exerts good toxic effects on *Culex pipiens* adults after 24 and 48 h of exposure with LC_{50} values of 0.12 and 0.11 mg/L, respectively. Indeed, the same essential oil exerts very poor toxic effects against fourth instar larvae *of Culex pipiens* after 24 and 48 h of treatment with LC_{50} values of 67.37 and 46.07 mg/L, respectively [173]. The essential oil from the leaves collected in Egypt possesses good antioxidant activities according to the $DPPH^{\cdot+}$ radical scavenging and β-carotene-linoleic acid methods, with IC_{50} values of 6.1 and 4.2 mg/L, respectively. BHT shows IC_{50} values of 2.9 and 2.6 mg/L, respectively. The same essential oil also shows good antibacterial activities against *Bacillus cereus* ATCC14579, *Micrococcus flavus* ATCC10240, *Listeria monocytogenes* (clinical isolate), *Staphylococcus aureus* ATCC6538, *Pseudomonas aeruginosa* ATCC 27853, *Dickeya solani* DS0432–1 and *Escherichia coli* ATCC35210 with MIC values from 0.63 to 0.38 mg/mL. The same essential oil also shows good antifungal activities against *Aspergillus flavus* ATCC9643, *Aspergillus ochraceus* ATCC12066, *Aspergillus niger* ATCC 6275, *Penicillium ochrochloron* ATCC 48663, *Penicillium funiculosum* ATCC56755 and *Candida albicans* ATCC 12066 with MIC values from 1.53 to 0.37 mg/mL. Lastly, the same essential oil exerts moderate antitumoral activity against MCF-7, HeLa and Jurkat with IC_{50} values of 25.4, 24.16 and 30.54 µg/mL, respectively, as well as weak antitumoral activities against HT-29 with an IC_{50} value of 124.8 µg/mL [107]. The essential oil from the branchlets of this species collected in Egypt shows medium antibacterial and antifungal effects on *Agrobacterium tumefaciens*, *Bacillus cereus*, *Dickeya solani*, *Escherichia coli*, *Pectobacterium atrosepticum*, *Pectobacterium carotovorum* and *Staphylococcus aureus* with MIC values between 0.07 and 0.31 mg/mL. The same essential oil exerts only weaker antifungal effects on *Aspergillus flavus*, *Aspergillus ochraceus*, *Aspergillus niger*, *Candida albicans*, *Fusarium oxysporum*, *Penicillium funiculosum* and *Penicillium ochrochloron* with MIC values between 0.29 and 3.21 mg/mL. In addition, it exhibits good DPPH antioxidant activities, with an IC_{50} value equal to 6.1 µg/mL, which is, anyway, lower than BHT (IC_{50} = 2.9 µg/mL) [108]. The essential oil of the leaves collected in Mauritius shows moderate antioxidant effects according to several assay such as $DPPH^{\cdot+}$, ABTS, xanthine oxidase, nitric oxide, hydroxyl radical, FRAP and ORAC with IC_{50} values of 3.667 µg/mL, 1.068 µg/mL, 1.546 µg/mL, 1.258 µg/mL, 106.87 µM Fe^{2+}/mg EO and 0.925 g TE/µg EO, respectively. In addition, its TPC value is 1223.17 µg GAE/µg EO, and it shows modest antiglycation properties with an IC_{50} value of 451.53 µg/mL [109]. The essential oil from the leaves collected from Egypt exerts decent acaricidal effects against the adults of *Tetranychus urticae* with a LC_{50} value equal to 5.69 mg/L air after 24 h of treatment using a fumigant assay. This activity is also confirmed by the slide dip technique assay with a LC_{50} value equal to 170.07 mg/L after 24 h of treatment and 22.76 after 48 h of treatment. The same essential oil also exerts moderate inhibitory effects against AChE from the adults of *Tetranychus urticae* with a IC_{50} value equal to 10.0 mg/L [110]. The essential oil from the leaves of this species obtained from an Egyptian botanical garden shows moderate insecticidal activity against *Sitophilus oryzae* and *Tribolium castaneum* with LC_{50} values of 55.2 and 255.4 µg/cm^3, in the 3 days post exposure test. The same essential oil exerts quite weak acetylcholinesterase inhibitory activity with an IC_{50} value of 350 ppm [111]. The essential oil from the leaves of this species collected in Turkey as a dietary supplement exerts stress-relieving effects in common carp at low concentrations (0.5%) by increasing the total protein, albumin concentrations and growth performance parameters as well as by reducing the serum triglycerides, cholesterol levels and the activities of the serum liver enzymes (GOT, GPT, lactate dehydrogenase) [114]. The essential oil from the leaves of this species collected in Cameroon exerts medium larvicidal and antiplasmodial effects with LD_{50} and IC_{50} values of 60.45 and 147.29 µg/mL, respectively [115].

5.8.2. Solvent Extracts

The methanolic extracts of the leaves, barks and roots collected in Cameroon exert from poor to moderate cytotoxic effects against THP-1, DU145, HeLa, MCF-7 and HepG2 cancer cell lines with IC_{50} values from above 400 to 60.8 µg/mL. These values are much higher than those reported for doxorubicin (from 5.5 to below 3.3 µg/mL). The same

extracts also show poor anti-gonorrheal effects against different *Neisseria gonorrhoeae* strains with MIC values from above 512 to 128 μg/mL. These values are much higher than those reported for gentamicin (from 32 to 0.5 μg/mL). Lastly, the same extracts show poor reverse transcriptase activity with inhibition percentages equal to 16.75, 6.07 and 8.16%, respectively, at the concentration of 200 μg/mL. These values are much lower than those reported for doxorubicin (91.22%) [85]. In rats, the combined methanol and petroleum ether extracts of the leaves and the methanol extract of the roots of this species collected in Egypt exhibit strong protective effects on kidney after gentamicin induced nephrotoxicity. Indeed, they are able to significantly reduce the serum blood urea nitrogen and creatinine levels, to enhance the gene expression of AMPK-α1, to downregulate iNOS and to decrease NF-κB [112]. The methanolic extract of the leaves of this species collected in Egypt shows weak $DPPH^{\cdot+}$ free radical scavenging activity, with a value of 0.20 mg AAE/g [117]. The petroleum ether fraction of its leaves collected in Algeria has good acetylcholinesterase inhibitory properties with an IC_{50} value of 88.79 μg/mL. The same petroleum ether fraction exerts modest antibacterial activity against Methicillin-resistant *Staphylococcus aureus* (MRSA) ATCC33591 with an IC_{50} value of 123.0 μg/mL [117]. The methanolic and diethyl ether extracts of the leaves collected in Egypt exert from strong to moderate antibacterial effects against 41 MRSA isolates with MIC values from 2 to 8 μg/mL for the latter and 256 to 1024 μg/mL for the former, to be compared to vancomycin that shows MIC values from 0.5 to 4 μg/mL. The same diethyl ether extract is able to reduce the growth of all the isolates by 48.78% and the efflux pump of 12 of them as well as to produce a certain degradation of the cell walls. The mechanism of action is in vitro via a significant down expression of *nor*A and *nor*B genes and in vivo by regenerating the epidermis, maturing the granulation tissue and reducing the inflammatory cell infiltration in rats. In rats, this extract is also able to contract wounds by 83.9% and to reduce the size of the injured area by regenerating thin epidermis after 7 days of treatment. The same extract has modest cytotoxic effects on HSF cell line with an IC_{50} value of 21.3 μg/mL. Doxorubicin shows a value of 4.36 μg/mL [119]. The methanolic extract of the roots collected in Egypt exerts from good to moderate antimicrobial effects on several *Salmonella enterica* isolates with MIC values from 64 to 1024 μg/mL. This extract significantly decreases the bacterial membrane of all the isolates as well as the membrane depolarization (40%) and efflux activity. It also significantly increases the inner and outer membrane permeability of all the isolates. The reduction of the biofilm formation at concentration from 32 to 512 μg/mL occurs only in eight isolates. According to the castor-oil induced diarrheal model, the same extract also shows good antidiarrheal effects by reducing the rate of defecation (85.9% at 100 mg/Kg body weight, 88% at 200 mg/Kg body weight, 93.5% at 100 mg/Kg body weight). The value of this rate for loperamide is 91.5% at 3 mg/Kg body weight. This extract has an inhibitory effect on the intestinal transit of charcoal in a dose-dependent manner (64.95% at 100 mg/Kg and 80.24% at 200 mg/Kg) and increases the in vivo antidiarrheal index in the same way [120].

5.9. C. nootkaensis

The methanol extract from the outer bark shows high antibacterial effect against *Mycobacterium tuberculosis* H37Rv with a percentage of inhibition equal to 98% [124].

5.10. C. torulosa

5.10.1. Essential Oil

The essential oil from the leaves of this species collected in Greece exerts medium larvicidal effects against third to fourth instar larvae of *Aedes albopictus* with LC_{50} value of 57.1 mg/L. The same essential oil exerts weak repellent activity at the concentration of 0.2 mg/cm^2 [27]. The essential oil from the leaves showed only moderate antibacterial activities against different bacterial strains such as *Aspergillus niger*, *Aspergillus terreus*, *Candida* spp., *Trichophyton rubrum*, *Trichophyton mentagrophytes*, *Microsporum canis*, *Pencillium crysogensum*, *Pencillium expansum* and *Pencillium griseofulvum* with inhibition zone values

equal or above 10 mm. Indeed, it showed good antibacterial effects against *Microsporum audouinii* with an inhibition zone value of 7 mm [129]. Various solvent extracts and the essential oil from the leaves of this species collected in India possess medium to high antibacterial effects against *Micrococcus luteus*, *Staphylococcus aureus*, *Campylobactor coli*, *Bacillus subtilis*, *Bacillus cereus*, *Alcaligenes denitrificans*, *Pseudomonal aeruginosa* and *Pseudomonas alcaligenes* with mean diameters of zone inhibition from 5 to 21 mm at the concentration of 50 mg/mL, being the essential oil the most powerful. All these values are comparable to those of chloramphenicol. The same extracts and essential oil also have antifungal activity against *Alternaria alternata*, *Curvularia lunata* and *Bipolaris specifera* with IC_{50} values ranging from 0.19 to 4.99 mg/mL. These values are in any case lower than amphotericin B, which is used as a standard [131].

5.10.2. Solvent Extracts

Different extracts of the needles of this species collected in India exert moderate to good antioxidant activities according to the DPPH, ABTS and SSA assay with IC_{50} values from 34.93 to 83.83 µg/mL [130]. The methanolic extract of the leaves collected in Himalaya exerts modest antibacterial activities against *Agrobacterium tumefaciens* MTCC609, *Escherichia coli* MTCC40 and *Xanthomonas phaseoli* with MIC values of 250, 500 and 500 µg/mL, respectively [174]. The leaf ethanolic extract of this species collected in India shows effects against *Pectobacterium carotovorum* subsp. *carotovorum* with a diameter of inhibition zone equal to 18.66 mm according to the agar well diffusion method and a diameter of inhibition zone equal to 13 mm according to the disc diffusion method [175]. The methanol extract from the leaves collected in Himalaya exerts modest antifungal activities against *Alternaria alternata*, *Colletotrichum falcatum*, *Fusarium oxysporum*, *Pyricularia oryzae* and *Sclerotinia rolfsii* with inhibition percentages of 49, 34, 33, 33 and 49%, respectively. The ethanol extract from the same leaves exerts moderate antifungal activities against *Alternaria alternata*, *Colletotrichum falcatum*, *Pyricularia oryzae* and *Sclerotinia rolfsii* with inhibition percentages of 46, 40, 27 and 51%, respectively. The chloroform extract from the same leaves exerts good antifungal activities against *Alternaria alternata*, *Colletotrichum falcatum*, *Fusarium oxysporum* and *Sclerotinia rolfsii* with inhibition percentages of 46, 47, 32 and 63%, respectively. Lastly, the *n*-hexane extract from the same leaves exerts modest antifungal activities against *Alternaria alternata*, *Colletotrichum falcatum* and *Sclerotinia rolfsii* with inhibition percentages of 39, 51 and 42%, respectively [176]. The methanolic extract of the leaves collected in Nepal show good antibacterial effects against *Staphylococcus aureus*, *Streptococcus pyogenes*, *Acinetobacter calcoaceticus* and *Escherechia coli* with inhibition zone diameter values of 14, 15, 12 and 14.5 mm, respectively, at the concentration of 200 mg/mL. The ethyl acetate extract of the same leaves shows moderate antibacterial effects against the same strains with inhibition zone diameter values of 12, 7.5, 7 and 10.5 mm, respectively, at the same concentration. Lastly, the *n*-hexane extract of the same leaves shows moderate antibacterial effects against only *Staphylococcus aureus*, *Streptococcus pyogenes* and *Acinetobacter calcoaceticus* with inhibition zone diameter values of 7, 9 and 10 mm, respectively, at the same concentration [132].

5.11. Activity of Isolated Compounds

Totarol, isolated from the outer bark methanol extract of *C. nootkatensis*, shows medium antibacterial effects against *Mycobacterium tuberculosis* H37Rv with an MIC value of 16 µg/mL [124]. Cupressuflavone isolated from the leaves of *C. macrocarpa* collected in Egypt exerts strong hepatoprotective and nephroprotective effects in mice against carbon tetrachloride poisoning. At the doses of 40, 80 and 160 mg/kg/day preventively administered per 5 days, it is able to significantly inhibit the CCl_4-induced increase in the alanine aminotransferase, aspartate aminotransferase, alkaline phosphatase, lactate dehydrogenase, cholesterol, creatinine, uric acid, urea, and malondialdehyde levels in a dose-dependent manner. Only at the doses of 80 and 160 mg/kg/day is it also able to decrease the total bilirubin levels in a dose-dependent manner. Furthermore, it also significantly increases the activity of glutathione

and superoxide dismutase in a dose-dependent manner. These activities are also confirmed by histological observations [99]. Cupressuflavone isolated from the leaves of *C. macrocarpa* collected in Egypt shows strong analgesic and anti-inflammatory properties in mice. According to the acetic acid induction, it is able to inhibit the writhing response in mice by 25, 48 and 62% at the doses of 40, 80 and 160 mg/kg, respectively, with the last dose showing results similar to those of diclofenac. In addition, it is able to increase the hot plate model reaction time, in a dose-dependent manner, with the best effect after 120 min. According to the carrageenan-induced paw edema model of inflammation, it inhibits the paw edema by 55, 60, and 64% at the doses of 40, 80, and 160 mg/kg, respectively. In addition, at the same doses, it is able to reduce the plasma pro-inflammatory mediators PGE2 (percentages of reduction at the three doses: 44, 54, and 58%, respectively), TNF-a (percentages of reduction at the three doses: 26, 37, and 53%, respectively), IL-1b (percentages of reduction at the three doses: 19, 33, and 41%, respectively) and IL-6 (percentages of reduction at the three doses: 32, 44, and 55%, respectively). At the highest dose, the results were very similar to those obtained with diclofenac sodium at the dose of 100 mg/kg [106]. Apigenin 7-*O*-rhamnoside isolated from *Cupressus goveniana* var. *abramsiana* was shown to be able to highly stabilize the membrane of human red blood cells in vitro, at the concentration of 100 µg/mL [75]. Terpinen-4-ol isolated from *C. macrocarpa* leaves shows good antimicrobial effects on *Trichophyton rubrum* SNB-TR1 with a MIC value of 64 µg/mL whereas sabinene, citronellol, γ-terpinene, citronellal, α-terpinene and camphor are less active with MIC values 256–512 µg/mL [104]. Cupresins A, B and C and acetylisocupressic acid, (−)-matairesinol, arctigenin and (−)-deoxy-podophyllotoxin isolated from the leaves of *C. macrocarpa* possess strong antitumoral effects on HepG2, MDA-MB-231 and A549 cancer cell lines with IC_{50} values ranging from 0.004 for (−)-deoxy-podophyllotoxin against A549 to 19.9 µg/mL for cupresuin A against MDA-MB-231. In addition, (−)-matairesinol exerts very strong inhibitory activity on superoxide anion generation and elastase release with IC_{50} values equal to 2.7 and 6.6 µM, respectively [113]. 3-Methyl-but-3-en-1-ol-*O*-β-D-glucopyranoside from the petroleum ether fraction of *C. macrocarpa* leaves collected in Algeria is able to exhibit moderate acetylcholinesterase inhibitory effects with an IC_{50} value of 144.31 µg/mL [117]. From the leaves of *C. funebris*, collected in China, 1,2-epoxy-1-(3′,4′-dihydroxyphenyl-)-3-(2″,3″,5″-trihydroxyphenyl)-propane, katsumadin, isolariciresinol 9-*O*-α-L- xylopyranoside and (+)-cycloolivil possess stronger $DPPH^{\cdot}$ activity than *L*-ascorbic acid (IC_{50} values of 33.98, 32.97, 32.07 and 33.30 µM, respectively, vs. 64.31 µM). In addition, (−)-(7*S*,8*R*)-3-methoxy-4′,7-epoxy-8,5′-neolishgnan-5,9,3′,9′-tetraol, 1,2-epoxy-1-(3′,4′-dihydroxyphenyl-)-3-(2″,3″,5″-trihydroxyphenyl)-propane, katsumadin, junipercomnoside A, *erythro*-(7*S*, 8*R*)-3-methoxy-8-4′-oxy-*neo*-lignan-3′,4,7,9,9′-pentol, (7*S*,8*S*)-3′,4,7,9-tetrahydroxy-3-methoxy-8-*O*-4′-*neo*-lignan-9′-*O*-α-L-rhamnopyranoside, (−)-isolariciresinol 9-*O*-α-L-xylopyranoside, (+)-cycloolivil, (+)-cyclicoolive 4′-*O*-β-D-glucopyranoside show ABTS radical scavenging abilities similar to *L*-ascorbic acid, i.e., around 59.41 µM. Katsumadin showed the same FRAP ability as *L*-ascorbic acid, i.e., 0.83 mmol/g [72]. From the methanolic extract of the roots of *C. macrocarpa* collected in Egypt, dihydro-kaempferol-3-*O*-L-rhamnoside isolated presents good antimicrobial activity against *Salmonella enterica* isolates with MIC values from 64 to 256 µg/mL. In addition, amentoflavone presents moderate antimicrobial activity against *Salmonella enterica* isolates with MIC values from 128 to 1024 µg/mL and 4′-*O*-methyl-tetrahydro-amentoflavone presents quite a weak antimicrobial activity against *Salmonella enterica* isolates with MIC values from 512 to 1024 µg/mL [120].

6. Conclusions

In this review article, the phytochemical analyses, ethnobotanical uses and pharmacological activities relative to *Cupressus* species other than *Cupressus sempervirens* were described. Several phytochemical compounds have been evidenced in these other *Cupressus* species mainly essential oil components, diterpenoids and flavonoids. For what concerns the traditional medicine uses, only ten species are reported to be employed in this sense for a certain variety of ailments including rheumatisms and fevers. As for the

pharmacological activities associated to these species, only ten species have shown to have several activities including antibacterial, antiviral, anti-inflammatory and antitumoral. Additionally, some compounds isolated from these species have been shown to possess important biological effects (mainly anti-inflammatory and antitumoral), which may justify the ethnobotanical uses of the species where they have been evidenced. However, there is still a large absence of knowledge of these species in several fields and this review article may represent a further reason to study all the *Cupressus* species in major detail.

Author Contributions: Conceptualization, C.F.; Research, All the authors; Data curation, All the authors; Writing—original draft preparation and review and editing, All the authors; Supervision, M.N., M.G., A.B., M.S. and S.F.; funding acquisition, M.S. and S.F. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Farjon, A. *Monograph of Cupressaceae and Sciadopitys*; Royal Botanic Gardens, Kew: Richmond, UK, 2005.
2. Eckenwalder, J.E. *Conifers of the World: The Complete Reference*; Timber Press: Portland, OR, USA, 2009; p. 720.
3. Hussain, M.K.; Saquib, M.; Ahamad, T.; Khatoon, S.; Khan, M.F. Mediterranean cypress "*Cupressus sempervirens*": A review on phytochemical and pharmacological properties. *Curr. Tradit. Med.* **2019**, *5*, 278–297. [CrossRef]
4. Orhan, I.E.; Tumen, I. Potential of *Cupressus sempervirens* (Mediterranean cypress) in health. In *The Mediterranean Diet*; Academic Press: Paris, France, 2015; pp. 639–647. [CrossRef]
5. Al-Snafi, A.E. Medical importance of *Cupressus sempervirens*—A review. *IOSR J. Pharm.* **2016**, *6*, 66–76.
6. Zavarin, E.; Smith, L.V.; Bicho, J.G. Tropolones of cupressaceae—III. *Phytochemistry* **1967**, *6*, 1387–1394. [CrossRef]
7. Dyson, W.G.; Herbin, G.A. Studies on plant cuticular waxes—IV: Leaf wax alkanes as a taxonomic discriminant for cypresses grown in Kenya. *Phytochemistry* **1968**, *7*, 1334–1344. [CrossRef]
8. Herbin, G.A.; Robins, P.A. Studies on plant cuticular waxes—III. The leaf wax alkanes and ω-hydroxy acids of some members of the Cupressaceae and Pinaceae. *Phytochemistry* **1968**, *7*, 1325–1337. [CrossRef]
9. Dyson, W.G.; Herbin, G.A. Variation in leaf wax alkanes in cypress trees grown in Kenya. *Phytochemistry* **1970**, *9*, 585–589. [CrossRef]
10. Gough, L.J.; Mills, J.S. The occurrence of imbricatolic acid in *Cupressus* resins. *Phytochemistry* **1970**, *9*, 1093–1096. [CrossRef]
11. Piovetti, L.; Diara, A. Les sesquiterpenes de cupressus dupreziana. *Phytochemistry* **1977**, *16*, 103–106. [CrossRef]
12. Griffiths, P.G.; Sasse, J.M.; Yokota, T.; Cameron, D.W. 6-Deoxotyphasterol and 3-Dehydro-6-deoxoteasterone, Possible Precursors to Brassinosteroidsin the Pollen of *Cupressus arizonica*. *Biosci. Biotechnol. Biochem.* **1995**, *59*, 956–959. [CrossRef]
13. Adams, R.P.; Zanoni, T.A.; Lara, A.; Barrero, A.F.; Cool, L.G. Comparisons among *Cupressus arizonica* Greene, *C. benthamii* Endl., *C. lindleyi* Klotz, ex Endl. and *C. lusitanica* Mill, using leaf essential oils and DNA fingerprinting. *J. Essent. Oil Res.* **1997**, *9*, 303–309. [CrossRef]
14. Chanegriha, N.; Baaliouamer, A.; Meklati, B.Y.; Chretien, J.R.; Keravis, G. GC and GC/MS leaf oil analysis of four Algerian cypress species. *J. Essent. Oil Res.* **1997**, *9*, 555–559. [CrossRef]
15. Milos, M.; Mastelić, J. Glycosidically bound volatiles in *Cupressus arizonica* Greene var. *glauca* Woodal. *Flavour Fragr. J.* **1998**, *13*, 248–250. [CrossRef]
16. Haluk, J.P.; Roussel, C. Caractérisation et origine des tropolones responsables de la durabilité naturelle des Cupressacées. Application potentielle en préservation du bois. *Ann. For. Sci.* **2000**, *57*, 819–829. [CrossRef]
17. Malizia, R.A.; Cardell, D.A.; Molli, J.S.; González, S.; Guerra, P.E.; Grau, R.J. Volatile constituents of leaf oils from the Cupressacea family: Part I. *Cupressus macrocarpa* Hartw., *C. arizonica* Greene and *C. torulosa* Don species growing in Argentina. *J. Essent. Oil Res.* **2000**, *12*, 59–63. [CrossRef]
18. Romani, A.; Galardi, C.; Pinelli, P.; Mulinacci, N.; Heimler, D.H.P.L.C. HPLC quantification of flavonoids and biflavonoids in *Cupressaceae* leaves. *Chromatographia* **2002**, *56*, 469–474. [CrossRef]
19. Flamini, G.; Cioni, P.L.; Morelli, I.; Bighelli, A.; Castola, V.; Casanova, J. GC/MS and 13C-NMR integrated analyses of the essential oils from leaves, branches and female cones of *Cupressus arizonica* from Italy. *J. Essent. Oil Res.* **2003**, *15*, 302–304. [CrossRef]
20. Afsharypuor, S.; Tavakoli, P. Essential oil constituents of leaves and fruits of *Cupressus arizonica* Greene. *J. Essent. Oil Res.* **2005**, *17*, 225–226. [CrossRef]

21. Chéraif, I.; Jannet, H.B.; Hammami, M.; Khouja, M.L.; Mighri, Z. Chemical composition and antimicrobial activity of essential oils of *Cupressus arizonica* Greene. *Biochem. Syst. Ecol.* **2007**, *35*, 813–820. [CrossRef]
22. Karbin, S.; Rad, A.B.; Arouiee, H.; Jafarnia, S. Antifungal activities of the essential oils on post-harvest disease agent *Aspergilus flavus*. *Adv. Environ. Biol.* **2009**, *3*, 219–225.
23. Emami, S.A.; Fakhrjafary, M.; Tafaghodi, M.; Hassanzadeh, M.K. Chemical composition and antioxidant activities of the essential oils of different parts of *Cupressus arizonica* Greene. *J. Essent. Oil Res.* **2010**, *22*, 193–199. [CrossRef]
24. Hassanpouraghdam, M.B. α-Pinene-and β-myrcene-rich volatile fruit oil of *Cupressus arizonica* Greene from northwest Iran. *Nat. Prod. Res.* **2011**, *25*, 634–639. [CrossRef] [PubMed]
25. Sedaghat, M.M.; Dehkordi, A.S.; Khanavi, M.; Abai, M.R.; Mohtarami, F.; Vatandoost, H. Chemical composition and larvicidal activity of essential oil of *Cupressus arizonica* EL Greene against malaria vector *Anopheles stephensi* Liston (Diptera: Culicidae). *Pharmacogn. Res.* **2011**, *3*, 135–139. [CrossRef]
26. Cantrell, C.L.; Zheljazkov, V.D.; Osbrink, W.L.; Castro, A.; Maddox, V.; Craker, L.E.; Astatkie, T. Podophyllotoxin and essential oil profile of Juniperus and related species. *Ind. Crops Prod.* **2013**, *43*, 668–676. [CrossRef]
27. Giatropoulos, A.; Pitarokili, D.; Papaioannou, F.; Papachristos, D.P.; Koliopoulos, G.; Emmanouel, N.; Tzakou, O.; Michaelakis, A. Essential oil composition, adult repellency and larvicidal activity of eight Cupressaceae species from Greece against *Aedes albopictus* (Diptera: *Culicidae*). *Parasitol. Res.* **2013**, *112*, 1113–1123. [CrossRef] [PubMed]
28. Ismail, A.; Mancini, E.; De Martino, L.; Hamrouni, L.; Hanana, M.; Jamoussi, B.; Gargouri, S.; Scognamiglio, M.; De Feo, V. Chemical composition and biological activities of Tunisian *Cupressus arizonica* Greene essential oils. *Chem. Biodivers.* **2014**, *11*, 150–160. [CrossRef]
29. Khouaja, W.; Oliveira, R.; Raïes, A.; Dias, A.C.P. Antifungal activity of the essential oils from *Cupressus arizonica* var. *arizonica* and var. *glabra*. *Ind. Crops Prod.* **2015**, *77*, 614–623. [CrossRef]
30. Lohani, H.; Bhandari, U.; Gwari, G.; Haider, S.Z.; Chauhan, N.K. Constituents of essential oils of *Cupressus arizonica* Greene from Uttarakhand Himalaya (India). *J. Essent. Oil Res.* **2015**, *27*, 459–463. [CrossRef]
31. Shafaie, F.; Aramideh, S.; Valizadegan, O.; Safaralizadeh, M.H. Bioactivity of Essential Oils, Extracts and Powders of *Cupressus arizonica* Greene, *Juniperus communis* L. and *Mentha longifolia* L. on Three Stored Product Pests. *Thai J. Agric. Sci.* **2019**, *52*, 205–219.
32. Shafaie, F.; Aramideh, S.; Valizadegan, O.; Safaralizadeh, M.H.; Pesyan, N.N. GC/MS analysis of the essential oils of *Cupressus arizonica* Greene, *Juniperus communis* L. and *Mentha longifolia* L. *Bull. Chem. Soc. Ethiop.* **2019**, *33*, 389–400. [CrossRef]
33. Abdulkhani, A.; Sedaghat, A.; Alizadeh, P.; Tabil, L.G. Extraction of bioactive moieties of *Cupressus arizonica* and *Cupressus sempervirens* wood knots. *Can. Biosyst. Eng.* **2020**, *62*, 8.1–8.10. [CrossRef]
34. Cherrad, S.; Jaouadi, I.; El Aoufir, Y.; Tiskar, M.; Satrani, B.; Ghanmi, M.; Chaouch, A. Unveiling corrosion inhibition properties of the *Cupressus Arizonica* leaves essential oil for carbon steel in 1.0 M HCl. *Int. J. Corros. Scale Inhib.* **2020**, *9*, 607–622. [CrossRef]
35. Ganteaume, A.; Romero, B.; Fernandez, C.; Ormeño, E.; Lecareux, C. Volatile and semi-volatile terpenes impact leaf flammability: Differences according to the level of terpene identification. *Chemoecology* **2021**, *31*, 259–275. [CrossRef]
36. Labbafi, M.; Ahvazi, M.; Khalighi-Sigaroodi, F.; Khalaj, H.; Ahmadian, S.; Tajabadi, F.; Khani, M.; Amini, S. Essential oil bioactivity evaluation of the different populations of *Cupressus* against adult rice weevil (*Sitophilus oryzae* L.). *J. Med. Plants* **2021**, *20*, 79–92. [CrossRef]
37. Fakhri, S.; Jafarian, S.; Majnooni, M.B.; Farzaei, M.H.; Mohammadi-Noori, E.; Khan, H. Anti-nociceptive and anti-inflammatory activities of the essential oil isolated from *Cupressus arizonica* Greene fruits. *Korean J. Pain* **2022**, *35*, 33–42. [CrossRef] [PubMed]
38. Rozentsvet, O.A.; Dembitsky, V.M.; Saksonov, S.V. Occurrence of diacylglyceryltrimethylhomoserines and major phospholipids in some plants. *Phytochemistry* **2000**, *54*, 401–407. [CrossRef]
39. Ali, A.; Tabanca, N.; Demirci, B.; Baser, K.H.C.; Ellis, J.; Gray, S.; Lackey, B.R.; Murphy, C.; Khan, I.A.; Wedge, D.E. Composition, mosquito larvicidal, biting deterrent and antifungal activity of essential oils of different plant parts of *Cupressus arizonica* var. *glabra* ('Carolina Sapphire'). *Nat. Prod. Commun.* **2013**, *8*, 257–260. [CrossRef]
40. Senter, P.; Zavarin, E.; Zedler, P.H. Volatile constituents of *Cupressus stephensonii* heartwood. *Phytochemistry* **1975**, *14*, 2233–2235. [CrossRef]
41. Rafii, Z.; Cool, L.G.; Jonas, R.; Zavarin, E. Chemical diversity in *Cupressus bakeri* 1. Megagametophyte fatty acids. *Biochem. Syst. Ecol.* **1992**, *20*, 25–30. [CrossRef]
42. Rafii, Z.; Cool, L.G.; Zavarin, E. Variability of foliar mono-and sesquiterpenoids of *Cupressus bakeri*. *Biochem. Syst. Ecol.* **1992**, *20*, 123–131. [CrossRef]
43. Kim, Y.K.; Zavarin, E. Terpenoids of Cupressus species in California. *J. Korean Wood Sci. Technol.* **1993**, *21*, 35–44.
44. Cool, L.G.; Kim, Y.K.; Zavarin, E.; Ball, G.E. Bakerol: An unusual nor-acorane hemiketal from *Cupressus bakeri* foliage. *Phytochemistry* **1994**, *36*, 1283–1285. [CrossRef]
45. Dodd, R.S.; Rafii, Z.A. Chemical and ecological variability of *Cupressus bakeri* on Goosenest Mountain, California. *Biochem. Syst. Ecol.* **1994**, *22*, 393–400. [CrossRef]
46. Young-Kyoon, K.; Cool, L.G.; Zavarin, E. *cis*-Calamenene-related sesquiterpenoids from *Cupressus bakeri* foliage. *Phytochemistry* **1994**, *36*, 961–965. [CrossRef]
47. Cool, L.G.; Jiang, K. Thujopsene- and *cis*-muurolane-related susquiterpenoids from *Cupressus bakeri*. *Phytochemistry* **1995**, *40*, 177–181. [CrossRef]

48. Mongrand, S.; Badoc, A.; Patouille, B.; Lacomblez, C.; Chavent, M.; Cassagne, C.; Bessoule, J.J. Taxonomy of gymnospermae: Multivariate analyses of leaf fatty acid composition. *Phytochemistry* **2001**, *58*, 101–115. [CrossRef]
49. Khabir, M.; Khatoon, F.; Ansari, W.H. Flavonoids of *Cupressus sempervirens* and *Cupressus cashmeriana*. *J. Nat. Prod.* **1987**, *50*, 511–512. [CrossRef]
50. Cool, L.G.; Hu, Z.L.; Zavarin, E. Foliage terpenoids of Chinese *Cupressus* species. *Biochem. Syst. Ecol.* **1998**, *26*, 899–913. [CrossRef]
51. Pierre-Leandri, C.; Fernandez, X.; Lizzani-Cuvelier, L.; Loiseau, A.M.; Andréoli, C. Chemical composition of cypress essential oils: Volatile constituents of leaf oils from seven cultivated *Cupressus* species. *J. Essent. Oil Res.* **2003**, *15*, 242–247. [CrossRef]
52. RongJiao, L.; Yan, L.; XiaoLing, W. Study on the chemical constituents of *Cupressus chengjana* SY Hu (2). *J. Southeast Univ. Nat. Sci. Ed.* **2014**, *40*, 523–526.
53. Lin, Y.; Li, R.J.; Li, Y.; McGarvey, B.D.; Wu, H.F.; Wang, X.L. A new modified sesquiterpene glycoside from *Cupressus chengiana*. *Nat. Prod. Res.* **2014**, *28*, 611–615. [CrossRef]
54. Xu, J.F.; Cao, D.H.; Tan, N.H.; Liu, Z.L.; Zhang, Y.M.; Yang, Y.B. New lignan glycosides from *Cupressus duclouxiana* (Cupessaceae). *J. Asian Nat. Prod. Res.* **2006**, *8*, 181–185. [CrossRef] [PubMed]
55. Piovetti, L.; Gonzalez, E.; Diara, A. Diterpene composition of *Cupressus dupreziana* and *Cupressus sempervirens*. *Phytochemistry* **1980**, *19*, 2772–2773. [CrossRef]
56. Piovetti, L.; Combaut, G.; Diara, A. Monoterpenes et sesquiterpenes oxygenes de *Cupressus dupreziana*. *Phytochemistry* **1980**, *19*, 2117–2120. [CrossRef]
57. Piovetti, L.; Francisco, C.; Pauly, G.; Benchabane, O.; Bernard-Dagan, C.; Diara, A. Volatile constituents of *Cupressus dupreziana* and the sesquiterpenes of *Cupressus sempervirens*. *Phytochemistry* **1981**, *20*, 1299–1302. [CrossRef]
58. Pauly, G.; Yani, A.; Piovetti, L.; Bernard-Dagan, C. Volatile constituents of the leaves of *Cupressus dupreziana* and *Cupressus sempervirens*. *Phytochemistry* **1983**, *22*, 957–959. [CrossRef]
59. Ramdani, M.; Rached, O.; Laouer, H.; El Koli, M.; Lograda, T. Chemical composition and antibacterial activity of *Cupressus dupreziana* A. Camus. *Nat. Prod. Commun.* **2007**, *2*, 945–949. [CrossRef]
60. Ramdani, M.; Lograda, T.; Chalard, P.; Chalchat, J.C.; Figueredo, G. Chemical variability of essential oils in natural populations of *Cupressus dupreziana*. *Nat. Prod. Commun.* **2011**, *6*, 87–92. [CrossRef]
61. Ramdani, M.; Lograda, T.; Chalard, P.; Figueredo, G.; Chalchat, J.C.; Zeraib, A. Essential oil variability in natural Hahadjerine population of *Cupressus dupreziana* in Tassili n'Ajjer (Algeria). *For. Res.* **2012**, *1*, 101–105. [CrossRef]
62. El Hamrouni, K.; Neffati, M.; Khouja, M.L.; Boussaid, M.; Akrimi, N.; Toumi, L. Chemical composition of the essential oils of *Cupressus dupreziana* Camus growing in Tunisia. *Acta Hortic.* **2013**, *997*, 235–241. [CrossRef]
63. Arjouni, M.Y.; Bahri, F.; Romane, A.; Fels, M.A.E.A.E. Chemical composition and antimicrobial activity of essential oil of *Cupressus atlantica*. *Nat. Prod. Commun.* **2011**, *6*, 1519–1522. [CrossRef]
64. Boukssaim, H.; Ghanmi, M.; Satrani, B.; Aafi, A.; Aberchane, M.; Khia, A.; Alaoui, M.S.B.; Chaouch, A.; Farah, A. Caractérisation chimique et microbiologique des huiles essentielles des rameaux, des cônes etdubois de Cupressusatlantica, arbre forestier endémique du Maroc. *Phytothérapie* **2013**, *11*, 294–300. [CrossRef]
65. Janah, T.; Rahouti, M.; Fidah, A.; Houzali, H.E.; Hallay, B.E.; Laadimi, Y.; Ismaili, M.R.; Aberchane, M.; Famiri, A. Chemical profiling and antifungal activity of essential oils of five moroccan threatened populations of *Cupressus atlantica* gaussen. *J. Essent. Oil-Bear. Plants* **2018**, *21*, 1694–1705. [CrossRef]
66. Natarajan, S.; Murti, V.V.S.; Seshadri, T.R. Biflavones of some *Cupressaceae* plants. *Phytochemistry* **1970**, *9*, 575–579. [CrossRef]
67. Gadek, P.A.; Quinn, C.J. Biflavones and the affinities of *Cupressus funebris*. *Phytochemistry* **1987**, *26*, 2551–2552. [CrossRef]
68. Kobayashi, M.; Ishida, K.; Terabayashi, S.; Mitsuhashi, H. 10-hydroxypheophytins and a new norlabdane diterpene from the leaves of *Cupressus funebris* ENDL. *Chem. Pharm. Bull.* **1991**, *39*, 3348–3349. [CrossRef]
69. Duquesnoy, E.; Dinh, N.H.; Castola, V.; Casanova, J. Composition of a pyrolytic oil from *Cupressus funebris* Endl. of Vietnamese origin. *Flavour Fragr. J.* **2006**, *21*, 453–457. [CrossRef]
70. Carroll, J.F.; Tabanca, N.; Kramer, M.; Elejalde, N.M.; Wedge, D.E.; Bernier, U.R.; Coy, M.; Becnel, J.J.; Demirci, B.; Başer, K.H.; et al. Essential oils of *Cupressus funebris*, *Juniperus communis*, and *J. chinensis* (Cupressaceae) as repellents against ticks (Acari: Ixodidae) and mosquitoes (Diptera: Culicidae) and as toxicants against mosquitoes. *J. Vector Ecol.* **2011**, *36*, 258–268. [CrossRef]
71. Staub, P.O.; Schiestl, F.P.; Leonti, M.; Weckerle, C.S. Chemical analysis of incense smokes used in Shaxi, Southwest China: A novel methodological approach in ethnobotany. *J. Ethnopharmacol.* **2011**, *138*, 212–218. [CrossRef]
72. Zhong, S.Y.; Jiang, H.Y.; Wu, L.P.; Liu, M.Y.; Yu, Y.R.; Li, C.R.; Huang, J. A new neolignan and a new biphenylpropanoid from the leaves of *Cupressus funebris* Endl. *S. Afr. J. Bot.* **2021**, *139*, 140–147. [CrossRef]
73. Chun-Mei, L.I.U.; Hui-Bin, Z.H.O.U.; Zhang, W.D. Terpenoids from stems and leaves of *Cupressus gigantea*. *Chin. J. Nat. Med.* **2010**, *8*, 405–410. [CrossRef]
74. Zavarin, E.; Lawrence, L.; Thomas, M.C. Compositional variations of leaf monoterpenes in *Cupressus macrocarpa*, *C. pygmaea*, *C. goveniana*, *C. abramsiana* and *C. sargentii*. *Phytochemistry* **1971**, *10*, 379–393. [CrossRef]
75. Rajagopolan, N.R. In vitro membrane stabilization study by the drug isolated from *Cupressus goveniana* var *abramsiana*. *JASER* **2014**, *3*, 203–208. [CrossRef]
76. Holloway, P.J. Some variations in the composition of suberin from the cork layers of higher plants. *Phytochemistry* **1983**, *22*, 495–502. [CrossRef]

77. Krauze-Baranowska, M.; Cisowski, W.; Wiwart, M.; Madziar, B. *Antifungal biflavones* from *Cupressocyparis leylandii*. *Planta Med.* **1999**, *65*, 572–573. [CrossRef] [PubMed]
78. Cool, L.G. *Ent*-daucane and acorane sesquiterpenes from × *Cupressocyparis leylandii* foliage. *Phytochemistry* **2001**, *58*, 969–972. [CrossRef]
79. Khaled, A.; Sleiman, M.; Goupil, P.; Richard, C. Phytotoxic Effect of Macerates and Mulches from *Cupressus leylandii* Leaves on Clover and Cress: Role of Chemical Composition. *Forests* **2020**, *11*, 1177. [CrossRef]
80. Gadek, P.A.; Quinn, C.J. Biflavones of the subfamily Cupressoideae, Cupressaceae. *Phytochemistry* **1985**, *24*, 267–272. [CrossRef]
81. Kuiate, J.R.; Bessière, J.M.; Vilarem, G.; Zollo, P.A. Chemical composition and antidermatophytic properties of the essential oils from leaves, flowers and fruits of *Cupressus lusitanica* Mill. from Cameroon. *Flavour Fragr. J.* **2006**, *21*, 693–697. [CrossRef]
82. Kuiate, J.R.; Bessière, J.M.; Zollo, P.H.A.; Kuate, S.P. Chemical composition and antidermatophytic properties of volatile fractions of hexanic extract from leaves of *Cupressus lusitanica* Mill. from Cameroon. *J Ethnopharmacol.* **2006**, *103*, 160–165. [CrossRef]
83. Guimarães, R.; Barros, L.; Carvalho, A.M.; Sousa, M.J.; Morais, J.S.; Ferreira, I.C. Aromatic plants as a source of important phytochemicals: Vitamins, sugars and fatty acids in *Cistus ladanifer*, *Cupressus lusitanica* and *Eucalyptus gunnii* leaves. *Ind. Crops Prod.* **2009**, *30*, 427–430. [CrossRef]
84. Hassanzadeh, S.L.; Tuten, J.A.; Vogler, B.; Setzer, W.N. The chemical composition and antimicrobial activity of the leaf oil of *Cupressus lusitanica* from Monteverde, Costa Rica. *Pharmacogn. Res.* **2010**, *2*, 19–21. [CrossRef]
85. Mbaveng, A.T.; Kuete, V.; Mapunya, B.M.; Beng, V.P.; Nkengfack, A.E.; Meyer, J.J.M.; Lall, N. Evaluation of four Cameroonian medicinal plants for anticancer, antigonorrheal and antireverse transcriptase activities. *Environ. Toxicol. Pharmacol.* **2011**, *32*, 162–167. [CrossRef] [PubMed]
86. Santos Filho, F.C.; da Silva Amaral, L.; Rodrigues-Filho, E. Composition of essential oils from *Cupressus lusitanica* and a *Xylariaceous* fungus found on its leaves. *Biochem. Syst. Ecol.* **2011**, *39*, 485–490. [CrossRef]
87. Teke, G.N.; Elisée, K.N.; Roger, K.J. Chemical composition, antimicrobial properties and toxicity evaluation of the essential oil of *Cupressus lusitanica* Mill. leaves from Cameroon. *BMC Complement. Med. Ther.* **2013**, *13*, 7. [CrossRef]
88. Bett, P.K.; Deng, A.L.; Ogendo, J.O.; Kariuki, S.T.; Kamatenesi-Mugisha, M.; Mihale, J.M.; Torto, B. Chemical composition of *Cupressus lusitanica* and *Eucalyptus saligna* leaf essential oils and bioactivity against major insect pests of stored food grains. *Ind. Crops Prod.* **2016**, *82*, 51–62. [CrossRef]
89. Makatiani, J.; Muhizi, T.; Nteziyaremye, P. Variation of yield and chemical composition of essential oil from *Cupressus lusitanica* growing in different Agro-ecological zones of Rwanda. *Asian J. Appl. Chem.* **2021**, *9*, 42–56. [CrossRef]
90. Bett, P.K.; Ondura Ogendo, J.; Matasyoh, J.C.; Jepkorir Kiplagat, A. Chemical characterization of Kenyan *Cupressus lusitanica* Mill., *Ocimum americanum* L. and *Lippia Javanica* (Burm.f.) Spreng essential oils. *Afr. J. Environ. Sci. Technol.* **2022**, *16*, 79–90.
91. Lawrence, L.; Bartschot, R.; Zavarin, E.; Griffin, J.R. Natural hybridization of *Cupressus sargentii* and *C. macnabiana* and the composition of the derived essential oils. *Biochem. Syst. Ecol.* **1975**, *2*, 113–119. [CrossRef]
92. Cool, L.G.; Jiang, K. A secoamorphane tri-ether from *Cupressus macnabiana* foliage. *Phytochemistry* **1995**, *40*, 857–859. [CrossRef]
93. Briggs, L.H.; Sutherland, M.D. The essential oil of *Cupressus macrocarpa*. *J. Org. Chem.* **1942**, *7*, 397–407. [CrossRef]
94. Aplin, R.T.; Cambie, R.C.; Rutledge, P.S. The taxonomic distribution of some diterpene hydrocarbons. *Phytochemistry* **1963**, *2*, 205–214. [CrossRef]
95. Cool, L.G. Sesquiterpenes from *Cupressus macrocarpa* foliage. *Phytochemistry* **2005**, *66*, 249–260. [CrossRef] [PubMed]
96. El-Ghorab, A.H.; El-Massry, K.F.; Shaaban, H.A. Effect of Drying on the Chemical Composition of the Egyptian *Cupressus macrocarpa* (Hartw.ex Gordon) Essential Oils and their Biological Characteristics. *J. Essent. Oil-Bear. Plants* **2007**, *10*, 399–411. [CrossRef]
97. Manimaran, S.; Themozhil, S.; Nanjan, M.J.; Suresh, B. Chemical composition and antimicrobial activity of cone volatile oil of *Cupressus macrocarpa* Hartwig from Nilgiris, India. *Nat. Prod. Sci.* **2007**, *13*, 279–282.
98. Khalaf, A.F.A.; Hussein, K.T.; Shoukry, K.K. Biocidal activity of two botanical volatile oils against the larvae of *Synthesiomyia nudiseta* (Wulp) (Diptera: Muscidae). *Egypt. Acad. J. Biol. Sci.* **2009**, *2*, 89–101. [CrossRef]
99. Al-Sayed, E.; Abdel-Daim, M.M. Protective role of Cupressuflavone from *Cupressus macrocarpa* against carbon tetrachloride-induced hepato-and nephrotoxicity in mice. *Planta Med.* **2014**, *80*, 1665–1671. [CrossRef] [PubMed]
100. Badawy, M.E.; Abdelgaleil, S.A. Composition and antimicrobial activity of essential oils isolated from Egyptian plants against plant pathogenic bacteria and fungi. *Ind. Crops Prod.* **2014**, *52*, 776–782. [CrossRef]
101. Thukral, S.K.; Singh, S.; Sharma, S.K. Pharmacognostical standardization of leaves of *Cupressus macrocarpa* Hartweg. ex Gordon. *J. Appl. Pharm. Sci.* **1930**, *4*, 071–074. [CrossRef]
102. Saad, M.M.G.; Abou-Taleb, H.K. Chemical composition, fumigant toxicity and biochemical effects of essential oils on *Ppodoptera littoralis* (Lepidoptera: Noctuidae) and *Theba pisana* (Mollusca: Gastropoda: Helicidae). *Egypt. J. Plant Prot. Res.* **2015**, *3*, 1–20.
103. Aumeeruddy-Elalfi, Z.; Gurib-Fakim, A.; Mahomoodally, M.F. Kinetic studies of tyrosinase inhibitory activity of 19 essential oils extracted from endemic and exotic medicinal plants. *S. Afr. J. Bot.* **2016**, *103*, 89–94. [CrossRef]
104. Fahed, L.; Khoury, M.; Stien, D.; Ouaini, N.; Eparvier, V.; El Beyrouthy, M. Essential oils composition and antimicrobial activity of six conifers harvested in Lebanon. *Chem. Biodivers.* **2017**, *14*, e1600235. [CrossRef] [PubMed]
105. Saad, A.M.; Mohammed, M.M.; Ghareeb, M.A.; Ahmed, W.S.; Farid, M.A. Chemical composition and antimicrobial activity of the essential oil of the leaves of *Cupressus macrocarpa* Hartweg. *Ex Gordon. J. Appl. Pharm. Sci.* **2017**, *7*, 207–212. [CrossRef]

106. Al-Sayed, E.; Gad, H.A.; El-Shazly, M.; Abdel-Daim, M.M.; Nasser Singab, A. Anti-inflammatory and analgesic activities of cupressuflavone from *Cupressus macrocarpa*: Impact on pro-inflammatory mediators. *Drug Dev. Res.* **2018**, *79*, 22–28. [CrossRef] [PubMed]
107. Elansary, H.O.; Abdelgaleil, S.A.; Mahmoud, E.A.; Yessoufou, K.; Elhindi, K.; El-Hendawy, S. Effective antioxidant, antimicrobial and anticancer activities of essential oils of horticultural aromatic crops in northern Egypt. *BMC Complement. Med. Ther.* **2018**, *18*, 214. [CrossRef]
108. Salem, M.Z.; Elansary, H.O.; Ali, H.M.; El-Settawy, A.A.; Elshikh, M.S.; Abdel-Salam, E.M.; Skalicka-Woźniak, K. Bioactivity of essential oils extracted from *Cupressus macrocarpa* branchlets and *Corymbia citriodora* leaves grown in Egypt. *BMC Complement. Altern. Med.* **2018**, *18*, 23. [CrossRef]
109. Mahomoodally, F.; Aumeeruddy-Elalfi, Z.; Venugopala, K.N.; Hosenally, M. Antiglycation, comparative antioxidant potential, phenolic content and yield variation of essential oils from 19 exotic and endemic medicinal plants. *Saudi J. Biol. Sci.* **2019**, *26*, 1779–1788. [CrossRef]
110. Mahmoud, N.F.; Badawy, M.E.; Marei, A.E.S.M.; Abdelgaleil, S.A. Acaricidal and antiacetylcholinesterase activities of essential oils from six plants growing in Egypt. *Int. J. Acarol.* **2019**, *45*, 245–251. [CrossRef]
111. Hammoda, H.M.; Harraz, F.M.; Farag, M.A.; El-Aswad, A.F.; El-Hawiet, A.; Eid, A.M. Volatiles profiling and bioactivities of *Cupressus* spp. leaf and cone essential oils as analyzed via chemometrics tools. *J. Essent. Oil Res.* **2019**, *31*, 53–62. [CrossRef]
112. Al-Ashmawy, G.M.; El-Sherbeni, S.A. Protective effect of *Cupressus macrocarpa* and Dioon edule against gentamicin induced nephrotoxicity in rats. *J. Pharm. Pharmacogn. Res.* **2020**, *8*, 434–448.
113. Al-Sayed, E.; Ke, T.Y.; Hwang, T.L.; Chen, S.R.; Korinek, M.; Chen, S.L.; Cheng, Y.B. Cytotoxic and anti-inflammatory effects of lignans and diterpenes from *Cupressus macrocarpa*. *Bioorg. Med. Chem. Lett.* **2020**, *30*, 127127. [CrossRef]
114. Sabri Kesbiç, O.; Parrino, V.; Acar, U.; Yilmaz, S.; Lo Paro, G.; Fazio, F. Effects of Monterey cypress (*Cupressus macrocarpa* Hartw) leaf essential oil as a dietary supplement on growth performance and haematological and biochemical parameters of common carp (*Cyprinus carpio* L.). *Ann. Anim. Sci.* **2020**, *20*, 1411–1426. [CrossRef]
115. Tamdem, G.M.; Ntonga, P.A.; Tsila, H.G.; Tonga, G.; Nkouandou, P.M.; Djeukam, C.A.; Ngaha, R.; Ngo Hondt, O.E.; Mbongue, R.; Soh, W.T.; et al. Biological activities of the essential oils of *Cupressus macrocarpa*, *Lantana camara* and *Psidium littorale* against *Plasmodium falciparum* welch, 1897 and *Anopheles gambiae* giles, 1902. *J. Entomol. Zool. Stud.* **2020**, *8*, 854–862. [CrossRef]
116. Farag, M.A.; Harraz, F.M.; Hammoda, H.M.; Shawky, E.; Mahana, A.; El-Hawiet, A. Quantitative Nuclear Magnetic Resonance and High-Performance Thin-Layer Chromatography of Cupressuflavone as a Marker for *Cupressus* Species. *Rev. Bras. Farmacogn.* **2020**, *30*, 488–493. [CrossRef]
117. Harraz, F.M.; Hammoda, H.M.; El-Hawiet, A.; Radwan, M.M.; Wanas, A.S.; Eid, A.M.; ElSohly, M.A. Chemical constituents, Antibacterial and Acetylcholine esterase inhibitory activity of *Cupressus macrocarpa* leaves. *Nat. Prod. Res.* **2020**, *34*, 816–822. [CrossRef]
118. Raymond, L.G.; Sandquist, D.; Hill, S.J.; Meder, R.; Behr, V.C. Tree species identification via 1H NMR fingerprinting of supercritical carbon dioxide wood extractives. *BioResources* **2020**, *15*, 2371–2384. [CrossRef]
119. Attallah, N.G.M.; Negm, W.A.; Elekhnawy, E.; Elmongy, E.I.; Altwaijry, N.; El-Haroun, H.; El-Masry, T.A.; El-Sherbeni, S.A. Elucidation of Phytochemical Content of *Cupressus macrocarpa* Leaves: In Vitro and In Vivo Antibacterial Effect against Methicillin-Resistant *Staphylococcus aureus* Clinical Isolates. *Antibiotics* **2021**, *10*, 890. [CrossRef]
120. Elmongy, E.I.; Negm, W.A.; Elekhnawy, E.; El-Masry, T.A.; Attallah, N.G.M.; Altwaijry, N.; Batiha, G.E.-S.; El-Sherbeni, S.A. Antidiarrheal and Antibacterial Activities of Monterey Cypress Phytochemicals: In Vivo and In Vitro Approach. *Molecules* **2022**, *27*, 346. [CrossRef]
121. Andersen, N.H.; Syrdal, D.D. Terpenes and sesquiterpenes of *Chamaecyparis nootkatensis* leaf oil. *Phytochemistry* **1970**, *9*, 1325–1340. [CrossRef]
122. Cheng, Y.S.; Von Rudloff, E. The volatile oil of the leaves of *Chamaecyparis nootkatensis*. *Phytochemistry* **1970**, *9*, 2517–2527. [CrossRef]
123. Jamieson, G.R.; Reid, E.H. The leaf lipids of some conifer species. *Phytochemistry* **1972**, *11*, 269–275. [CrossRef]
124. Constantine, G.H.; Karchesy, J.J.; Franzblau, S.G.; LaFleur, L.E. (+)-Totarol from *Chamaecyparis nootkatensis* and activity against *Mycobacterium tuberculosis*. *Fitoterapia* **2001**, *72*, 572–574. [CrossRef]
125. Thai, T.H.; Bazzali, O.; Hien, N.T.; The, P.V.; Loc, P.K.; Hoi, T.M.; Tomi, F.; Casanova, J.; Bighelli, A. Chemical composition of leaf and stem oils from Vietnamese *Cupressus tonkinensis* Silba. *J. Essent. Oil Res.* **2013**, *25*, 11–16. [CrossRef]
126. Barreto, H.; Enzell, C. The chemistry of natural order Cupressales 39. Heartwood constituents of *Cupressus torulosa* Don. *Acta Chem. Scand.* **1961**, *15*, 1313–1318. [CrossRef]
127. Padalia, R.C.; Verma, R.S.; Chauhan, A.; Chanotiya, C.S. Essential oil compositions of branchlets and cones of *Cupressus torulosa* D. Don. *J. Essent. Oil Res.* **2013**, *25*, 251–256. [CrossRef]
128. Lohani, H.; Kumar, A.; Bhandari, U.; Haider, S.Z.; Singh, S.; Chauhan, N. Effect of Seasonal and Tree Girth Size Variation on *Cupressus torulosa* D. Don Leaves Essential Oil Composition Growing in Uttarakhand. *J. Essent. Oil-Bear. Plants.* **2014**, *17*, 1257–1267. [CrossRef]
129. Bhandari, U.; Gwari, G.; Naik, G.; Pant, S.; Lohani, H. Chemical Profiling and Antifungal Activity of Volatile Oil of *Cupressus torulosa* against Pathogenic Fungi. *Int. J. Pharm. Biol. Sci. Arch.* **2015**, *6*, 27–31.

130. Khulbe, K.; Urvashi, V.; Pritee, P. Determination of phytochemicals and in vitro antioxidant of different extracts of Himalayan Cypress (*Cupressus torulosa* D. DON) needles. *Int. J. Adv. Biol. Res.* **2016**, *6*, 259–266.
131. Gupta, S.; Bhagat, M.; Sudan, R.; Rajput, S.; Rajput, K. Analysis of chemical composition of *Cupressus torulosa* (D.Don) essential oil and autobiography guided evaluation of its antimicrobial fraction. *Indian J. Exper. Biol.* **2018**, *56*, 252–257.
132. Padhaya, R.R.; Bhandari, S.; Manandhar, M.; Khanal, A.; Maharjan, S. Investigation of anti-bacterial activity of *Cupressus torulosa* leaf extract. *World J. Pharm. Res.* **2020**, *9*, 1220–1231. [CrossRef]
133. Ncube, B.; Finnie, J.F.; Van Staden, J. Quality from the field: The impact of environmental factors as quality determinants in medicinal plants. *S. Afr. J. Bot.* **2012**, *82*, 11–20. [CrossRef]
134. Neugart, S.; Baldermann, S.; Hanschen, F.S.; Klopsch, R.; Wiesner-Reinhold, M.; Schreiner, M. The intrinsic quality of brassicaceous vegetables: How secondary plant metabolites are affected by genetic, environmental, and agronomic factors. *Sci. Hortic.* **2018**, *233*, 460–478. [CrossRef]
135. Gottlieb, O.R.; Kaplan, M.A.C.; Zocher, D.H.T.; Kubitzi, K. A chemosystematic overview of Pteridophytes and Gymnosperms. In *Pteridophytes and Gymnosperms*; Kramer, K.U., Green, P.S., Eds.; Springer: Berlin/Heidelberg, Germany, 1990; pp. 2–10.
136. Lebreton, P. The chemotaxonomy of gymnosperms. *Bull. Soc. Bot. Fr.* **1990**, *137*, 35–46.
137. D'Angelo, J.A. Implication for chemotaxonomy and assessment of kerogen formation. *Org. Geochem.* **2010**, *41*, 1312–1325. [CrossRef]
138. Faegri, K. Some fundamental problems of taxonomy and phylogenetics. *Bot. Rev.* **1937**, *3*, 400–423. [CrossRef]
139. Bowe, L.M.; Coat, G.; de Pamphilis, C.W. Phylogeny of seed plants based on all three genomic compatments: Extant gymnosperms are monophyletic and Gnetales' closest relatives are conifers. *Proc. Nat. Acad. Sci. USA* **2000**, *97*, 4092–4097. [CrossRef] [PubMed]
140. Azmin, N.F.N.; Ahmat, N.; Syah, Y.M.; Zawawi, N.K.N.A.; Yusof, M.I.M. A new stilbenoid compound from the lianas of *Gnetum microcarpum*. *Nat. Prod. Commun.* **2014**, *9*, 1743–1744. [CrossRef]
141. Salehi, B.; Venditti, A.; Frezza, C.; Yücetepe, A.; Altuntaş, Ü.; Uluata, S.; Butnariu, M.; Sarac, I.; Shaheen, S.; Petropoulos, S.A.; et al. *Apium* Plants: Beyond Simple Food and Phytopharmacological Applications. *Appl. Sci.* **2019**, *9*, 3547. [CrossRef]
142. Frezza, C.; Venditti, A.; Serafini, M.; Bianco, A. Phytochemistry, chemotaxonomy, ethnopharmacology, and nutraceutics of Lamiaceae. *Stud. Nat. Prod. Chem.* **2019**, *62*, 125–178. [CrossRef]
143. Mohammadhosseini, M.; Venditti, A.; Frezza, C.; Serafini, M.; Bianco, A.; Mahdavi, B. The Genus *Haplophyllum* Juss.: Phytochemistry and Bioactivities—A Review. *Molecules* **2021**, *26*, 4664. [CrossRef]
144. Mohammadhosseini, M.; Frezza, C.; Venditti, A.; Mahdavi, B. An overview of the genus *Aloysia* Paláu (Verbenaceae): Essential oil composition, ethnobotany and biological activities. *Nat. Prod. Res.* **2021**, *in press*. [CrossRef]
145. Mohammadhosseini, M.; Frezza, C.; Venditti, A.; Sarker, S.D. A systematic review on phytochemistry, ethnobotany and biological activities of the genus *Bunium* L. *Chem. Biodivers.* **2021**, *18*, e2100317. [CrossRef] [PubMed]
146. Sadgrove, N.J.; Padilla-González, G.F.; Green, A.; Langat, M.K.; Mas-Claret, E.; Lyddiard, D.; Klepp, J.; Legendre, S.V.A.-M.; Greatrex, B.W.; Jones, G.L.; et al. The Diversity of Volatile Compounds in Australia's Semi-Desert Genus *Eremophila* (Scrophulariaceae). *Plants* **2021**, *10*, 785. [CrossRef] [PubMed]
147. Oza, M.J.; Kulkarni, Y.A. Traditional uses, phytochemistry and pharmacology of the medicinal species of the genus *Cordia* (Boraginaceae). *J. Pharm. Pharmacol.* **2017**, *69*, 755–789. [CrossRef]
148. Frezza, C.; Venditti, A.; De Vita, D.; Toniolo, C.; Franceschin, M.; Ventrone, A.; Tomassini, L.; Foddai, S.; Guiso, M.; Nicoletti, M.; et al. Phytochemistry, chemotaxonomy, and biological activities of the Araucariaceae family—A Review. *Plants* **2020**, *9*, 888. [CrossRef] [PubMed]
149. Lebouvier, N.; Lesaffre, L.; Hnawia, E.; Gou, C.; Menut, C.; Noura, M. Chemical diversity of Podocarpaceae in New Caledonia: Essential oils from leaves of *Dacrydium*, *Falcatifolium*, and *Acmopyle* species. *Chem. Biodivers.* **2015**, *12*, 1848–1861. [CrossRef] [PubMed]
150. Naikoo, M.I.; Dar, M.I.; Ahmad Khan, F.; Ansari, A.A.; Rehman, F.; Nousheen, F. Gymnosperm Diversity of the Kashmir Himalayas. In *Plant Biodiversity: Monitoring, Assessment and Conservation*; Ansari, A.A., Gill, S.S., Abbas, Z.K., Naeem, M., Eds.; CABI: Boston, MA, USA, 2017; pp. 228–239.
151. Hammiche, V.; Maiza, K. Traditional medicine in Central Sahara: Pharmacopoeia of Tassili N'ajjer. *J. Ethnopharmacol.* **2006**, *105*, 358–367. [CrossRef]
152. Ueda, J.Y.; Tezuka, Y.; Banskota, A.H.; Le Tran, Q.; Tran, Q.K.; Harimaya, Y.; Harimaya, Y.; Saiki, I.; Kadota, S. Antiproliferative activity of Vietnamese medicinal plants. *Biol. Pharm. Bull.* **2002**, *25*, 753–760. [CrossRef]
153. De Filipps, R.A.; Krupnick, G.A. The medicinal plants of Myanmar. *PhytoKeys* **2018**, *102*, 1–341. [CrossRef]
154. Njimoh, D.L.; Assob, J.C.N.; Mokake, S.E.; Nyhalah, D.J.; Yinda, C.K.; Sandjon, B. Antimicrobial activities of a plethora of medicinal plant extracts and hydrolates against human pathogens and their potential to reverse antibiotic resistance. *Int. J. Microbiol.* **2015**, *2015*, 547156. [CrossRef]
155. Ogoche, J.I.J. Toward a clinical research framework for collaboration among selected stakeholders in traditional herbal medical practice in seme and gem sub-locations in Nyanza province, Kenya. *J. Med. Plant Res.* **2014**, *8*, 144–157.
156. Roger, T.; Pierre-Marie, M.; Igor, V.K. Phytochemical screening and antibacterial activity of medicinal plants used to treat typhoid fever in Bamboutos division, West Cameroon. *J. Appl. Pharm. Sci.* **2015**, *5*, 34–49. [CrossRef]
157. Megersa, M.; Jima, T.T.; Goro, K.K. The use of medicinal plants for the treatment of toothache in Ethiopia. *Evid. Based Complement. Alternat. Med.* **2019**, *2019*, 2645174. [CrossRef] [PubMed]

158. Tsobou, R.; Mapongmetsem, P.M.; Van Damme, P. Medicinal plants used against typhoid fever in bamboutos division, Western Cameroon. *Ethnobot. Res. Appl.* **2013**, *11*, 163–174.
159. Pratiwi, R.; Nurlaeni, Y. Screening of plant collection of Cibodas Botanic Gardens, Indonesia with anticancer properties. *Biodiversitas* **2020**, *21*, 5186–5229. [CrossRef]
160. Chekole, G.; Asfaw, Z.; Kelbessa, E. Ethnobotanical study of medicinal plants in the environs of Tara-gedam and Amba remnant forests of Libo Kemkem District, northwest Ethiopia. *J. Ethnobiol. Ethnomed.* **2015**, *11*, 4. [CrossRef]
161. Patharaj, J.; Kannan, R. Medicinal plants used by thoriya ethnic (Sub tribe of baduga) in Nilgiris, India. *J. Med. Plants* **2017**, *5*, 30–38.
162. Rivero-Guerra, A.O. Uso tradicional de especies de plantas en trece provincias de Ecuador. *Collectanea Bot.* **2021**, *40*, e002. [CrossRef]
163. Macía, M.J.; García, E.; Vidaurre, P.J. An ethnobotanical survey of medicinal plants commercialized in the markets of La Paz and El Alto, Bolivia. *J. Ethnopharmacol.* **2005**, *97*, 337–350. [CrossRef]
164. Bussmann, R.W.; Zambrana, N.Y.P.; Huanca, L.A.M.; Hart, R. Changing markets–medicinal plants in the markets of La Paz and El Alto, Bolivia. *J. Ethnopharmacol.* **2016**, *193*, 76–95. [CrossRef]
165. Bhattarai, S.; Chaudhary, R.P.; Taylor, R.S.; Ghimire, S.K. Biological Activities of some Nepalese Medicinal Plants used in treating bacterial infections in Human beings. *Nepal J. Sci. Technol.* **2009**, *10*, 83–90. [CrossRef]
166. Al-Mouhajer, L.; Chabo, R.; Saab, A.M.; Saade, K.; Makhlouf, H. Antibacterial activities of essential oils isolated from two species *Cupressus arizonica* Greene and *Cupressus sempervirens* L. (var. *horizontalis* and *pyramidalis*). *Eur. J. Biomed. Pharma. Sci.* **2017**, *4*, 430–435.
167. Hasibi, A. Effect of Cupressus Arizonica Essential Oil on Two Spotted Spider Mite (*Tetranychus urticae*) on Alii Fig (*Ficus maclellandii*). *J. Agric. Sci.* **2019**, *5*, 10–14.
168. Mannai, Y.; Dhahri, S.; Jama, M.L.B.; Hamrouni, L. Insecticidal activity of essential oils of *Cupressus arizonica* greene and *C. sempervirens* L. on *Tortrix viridana* (Lepidotera, Tortri-cidae). *World J. Microbiol. Biotechnol.* **2021**, *6*, 1–5. [CrossRef]
169. Bouhlali, E.D.T.; Derouich, M.; Ben-Amar, H.; Meziani, R.; Essarioui, A. Exploring the potential of using bioactive plant products in the management of *Fusarium oxysporum* f. sp. *albedinis*: The causal agent of Bayoud disease on date palm (*Phoenix dactylifera* L.). *Beni-Suef Univ. J. Basic Appl. Sci.* **2020**, *9*, 46. [CrossRef]
170. Srinivasa, B.; Desu, R.; Suresh, B.; Elango, K.; Ramanathan, M.; Mn, S.K.; Sa, D.; Vijayan, P. Anti-bacterial, anti-fungal and infected wound healing activity of *Cupressus glauca* Linn. *Pharmanest* **2011**, *2*, 24–27.
171. Ndossi, B.A.; Chacha, M. Comparative antibacterial and antifungal efficacy of selected Tanzania medicinal plants. *Eur. J. Med. Plants* **2016**, *14*, 1–10. [CrossRef]
172. Yaouba, A.; Kemmoe Ndomshe, R.; Nchoutnji, I.; Ntsomboh Ntsefong, G. Antifungal potential of *Eucalyptus saligna* and *Cupressus lusitanica* extracts against post-harvest fungi of green bean (*Phaseolus vulgaris* L.) pods decay in Dschang Western highland of Cameroon. *Cameroon J. Biol. Biochem. Sci.* **2019**, *27*, 29–37.
173. Zahran, H.E.D.M.; Abou-Taleb, H.K.; Abdelgaleil, S.A.M. Adulticidal, larvicidal and biochemical properties of essential oils against *Culex pipiens* L. *J. Asia-Pac. Entomol.* **2017**, *20*, 133–139. [CrossRef]
174. Joshi, S.; Sati, S.C.; Kumar, P. Antibacterial potential and ethnomedical relevance of Kumaun Himalayan Gymnosperms. *J. Phytopharmacol.* **2016**, *5*, 190–200. [CrossRef]
175. Bhat, K.A.; Viswanath, H.S.; Bhat, N.A.; Wani, T.A. Bioactivity of various ethanolic plant extracts against *Pectobacterium carotovorum* subsp. *carotovorum* causing soft rot of potato tubers. *Indian Phytopath.* **2017**, *70*, 463–470. [CrossRef]
176. Joshi, S.; Parikshit, K.; Prabha, P.; Sati, S.C. A comparative evaluation of Kumaun Himalayan gymnosperms for their antifungal potential against plant pathogenic fungi. *Int. J. Phytopharm.* **2018**, *7*, 230–241. [CrossRef]