SENSES & SENSIBILITY 2019

LOST IN (G)LOCALIZATION

November 27th to 29th

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Faculdade de Design, Tecnologia e Comunicação
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Track

Design for New Materials and New Manufacturing Technologies

Materials have always played a key role in the design process. Through them designers were able to express themselves and give shape, function and meaning to design ideas. If, at one time, materials and technologies were reasonably well known and stable, today, both worlds are characterized by dynamism and fast evolution. Nothing can be taken for granted anymore, and almost everything seems possible. Both yesterday and today, however, materials emerge as cultural expression and details that characterize a society – and therefore any reflection upon them cannot be set apart from a wider (social and cultural) framing. The track "Design for new materials and new manufacturing technology" aims to illuminate the role of materials in the present as well for the nearby future. Focus will be set on a broader scope the planetary social changes highlighting the relation between local and global in the design context. The track would like to explore, but is not limited to, the following topics: (i) materials and technologies for social changes; (ii) local materials and technologies; (iii) alternative sources for future materials; (iv) tools for materials selection; (v) challenges in the design of materials identity.

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Identity, food and culture: "Taste without waste"

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Abstract

Food and the practices related to its production and consumption cover a symbolic value, expression of the local identities in a world witnessing product globalization and taste standardization. Food is realized using the noblest part of precious raw materials wich, according to climate, culture, history and folklore, embody the true essence and spirit of the territory. As in an handmade process, they are transformed by tools and expert hands for obtaining a final product. What in this phase is discarded, rather than becoming a waste, can become a matter for "sustainable making", inspiring designers in the making of new materials and products able to provide a plus of emotional experience. The paper will present the ongoing research project "Taste without waste", which carries out the virtuous process through which matters becomes food, waste and then new materials and products. The food waste is not considered as a filler anymore. Through the exaltation of its sensory-perceptual features, its re-use and re-evaluation is seen as a tool for the valorization of the territory and its uniqueness, as well as a tool for people eco-education. Design joins the relevance of territory valorization thanks to its ability to see and emphasize what materials and product can express, inspiring changes and promoting ethical attitudes and behaviours.

Keywords:
Food Waste, Material Experience, Eco-education

1. FOOD AS EXPRESSION OF LOCAL IDENTITIES

The crisis of modernity has caused a universal need to promote the cultural values as a common thread of human evolution (Dematteis, 2001), and to fight the deterritorialization process. The aim is to increase the growth of local societies respecting the difference and specificity of cultures, through direct actions on territory. Food is one of the few sectors that didn't suffer the effects of globalizations in therm of cancelation of consolidated uses and habits. This is particularly noticeable in Italy, globally known for its biodiversity embodied in the typical food culture. What was before considered natural heritage of different local cultures becomes now driving force for territorial marketing actions, guided by the envisioning and communication abilities of design. The food system is now considered a cultural code, a language that expresses the membership criteria of individuals in a cultural group and consequently the belonging to a particular place (Caldo, 1990). Over time, food culture showed its strong connection with territorial geographies. It allows to understand the reasons behind the employment of a particular resource in a particular environment. In addition to its material dimension, related to typicalness of each place, food is a social construct, vibrant element of the immaterial heritage identified both in processes and systems of its production and sale, and in the practices and habits of its consumption (Banini, 2003). Recognizing this values is the first step for a safeguard process from the cultural and economical homologation and the loss of the "nature" of places.

2. FOOD WASTE AS NEW RESOURCE THROUGH DESIGN

The topic of food waste raises worries as well as targeted actions from governments for re-use and awareness increase on such topic. Food wasting happens at different levels within the food chain. It happens in three main stages: production, and so during farming, harvest and processing or raw matter; distribution, which means during industrial transformations and because of overproduction; consumption, that is to say catering and domestic use. In this last stage we have the most consistent waste, especially in large urban areas with a population of 10 million residents, where the garbage production is about 18% of the national one.
With the alteration of planetary equilibrium in terms of materials and resources, there is today a growing awareness that what was abundant in the past is not anymore abundant in the present, and what is abundant today could not be abundant in the future. As a consequence, designers started looking at waste as a valuable resource for the production of new materials. The aim is to eliminate the concept of waste, and expand the equilibrium condition of natural systems – based on the equivalence "waste equals food" (Braungart & McDonough, 2002) – to artificial systems of human production. As Lohmann says "there is no such thing as throwing away", "away doesn't exist" (2018). Today therefore, issues about production and disposal of materials and products have become a central concern within the design culture. In particular, the ability of design to prefigure future scenarios plays a key role in looking at waste from a different perspective. It is able to make the most of it not only as raw material, but as a vehicle of semantic and sensory features, able to give to the final artifact a strong characterization.

2.1 FOOD WASTE AS A TOOL FOR VALORIZATION OF TERRITORY

Food is realized using the noblest part of precious raw materials, which, according to climate, culture, history and folklore, embodies the true essence, and spirit of the territory. Raw matter is manufactured, processed, and turned into food, just like food waste is manufactured, processed, and turned into material. The transformative action is common to both experiences that come together in the project. The raw material is shaped through manual processes, with a strong symbolic and emotional value given by individual or collective memories and traditions. Therefore, cooking becomes an action on matter aimed at the valorization of the organoleptic properties of the raw materials derived from the territory, which will be appreciated during its consumption. Foods' typicalities lies in the variety other than in the practices used. The uniqueness that each geographical place imprints on the raw material in terms of morphology, colors, odours and flavours, strongly influenced by the landscapes characters. These same properties belong to food waste as well as the valuable raw material used for cooking. Through a similar enhancing process of their sensorial perceptive qualities, they became material, than product, able to narrate its own territorial variety. Waste is often the most external part of a food, the one that relates directly with the environment and acts as a protective shell from elements and environmental factors responsible for its content degradation. For this reason waste can show places' diversity signs even better than the food itself, and those signs are consequently shown in the material derived from them.
Giving new life to an otherwise unexploited resource allows to produce an economic enhancement as well as a cultural one: it means to provide a no-cost usable raw matter; it means activating processes and wheels related to management, transportation and waste collection in a local context in order to capitalize their potential in terms of employment and development.

2.2 FOOD WASTE AS NEW MATERIAL FOR EMOTIONAL MAKING

In the food production raw matter is transformed by tools and expert hands. What in this phase is discarded, rather than becoming waste can become matter for sustainable making. At the same time can inspire designers in the making of products able to provide a plus of emotional experience. The perceptual features of raw matter and ingredients are embedded into materials, and so transferred to the final product, creating artifacts able to stimulate our senses. Starting from studies on synesthesia, it has indeed been demonstrated how our senses work simultaneously, and cross-modal interactions actually happens in every brain, that this is perceived consciously or not (Cytowic, 2018). Therefore, in the real world, we don't live isolated sensory experiences, since each sensory modality is highly influenced by other senses. Perception – result of synthesis and subsequent abstractions which integrate the informations coming from each sense in a space-time continuum (Buiatti, 2014) – is then multi-sensory.
As concerns food, the visual aspect – color in particular – is essential. It is necessary from the evolutionary point of view in order to recognize spoiled foods, and can strongly influence the perception of flavour of the food we eat (pink colorant will result in a sweet strawberry taste, orange colorant in citrus fruits taste and so on). Taste and smell instead, differ from other senses because from the neurological perspective, instead of having a synaptic relay in the thalamus, they synapse directly into the cortex of rhinencaphalon ("smell brain"). This means that they are closer to the hippocampus, a

crucial structure in the memory construction. For this reason they are more likely to evoke multi-sensory memories. Moreover, they constantly interact with one another, resulting in what we call flavour. Therefore the experience of eating, and so the flavour perception, involves different sensory stimulations – smell, taste, trigeminal system, touch, and somehow also sight and hearing – combining them into a whole percept (Auvray & Spence, 2008).
Raw matter employed in the making of materials results then in a synesthetic experience for the user, stimulating touch, sight and smell, reproducing colors, odors and textures of food. When associated to the tasting experience, this can provide a plus of emotional experience. Synesthesia indeed "can be looked on as a shorthand way of attaching meanings to things", and "meaning is intimately entwined with emotion" (Cytowic, 2018). Waste bio-materials have a strong perceptual-sensory connotation which makes them valuable despite their low performance. Combining them with the synesthetic food tasting experience appears to be not only a way to valorize the territory, but also a way to trigger a revaluation process of the material itself, which acquires its peculiarities.

3. "TASTE WITHOUT WASTE": IDENTITY, FOOD, CULTURE

The ongoing research project "Taste without waste" carries out the virtuous process through which matters becomes food, waste, and then new material. It intends to show the potential of the experiential approach to materials in terms of exploration of sensory-perceptual features, as well as in terms of communication and education. The material becomes an essential cognitive and didactic tool which. Through interaction, it pushes to discovery and exploration, involving and stimulating each sensory modality simultaneously. Material tinkering and direct manipulation appears to be essential for the designer in order to identify the most suitable strategies for reevaluating food waste. Craft practice is a means for "logically thinking through senses" (Nimkurlat, 2012), and the experiential approach to materials and design gives life to a continuous hand-mind collaboration. This approach allows to design the sensory-perceptual experience of the material, conveying values and meanings through it. On the other hand, material tinkering as a cognitive tool is important also from the user's point of view, able to build a wealth of experiential knowledge about biomaterials from scraps, and so eco-educate to circularity and re-use of waste.
The project addresses children of primary and secondary school, to show them the possibilities given by Circular Design. Here re-use and re-evaluation of food waste becomes both a tool to evaluate the territory and its uniqueness as well as a tool to eco-educate children and people in general. It is carried out by the PhD students in Design from Sapienza University of Rome and MaterialDesignLab, under the supervision of the scientific director prof. Sabrina Lucibello, and it is funded by Lazio Region through a call[1].

"Taste without waste" focuses its attention on the food culture and the local products of Lazio, a region in the middle of Italy. It aims to re-use and re-evaluate food waste from its typical dishes, in general, derived from the precious part of native raw materials. In particular, it is used for the DIY production of biodegradable bioplastics, used in turn to realize a tableware set. Preserving some of the sensory properties of the waste employed – such as colors, odors and textures –, the tableware is able to give back each food's peculiarity.
The first phase consisted in a laboratory experimentation focused on the do-it-yourself production of material samples using food scraps

1 Call for Events, Lazio Region, n. G13950 – 5 November 2018.

from traditional local delicacies (Fig. 1– 3). The sample produced were bioplastics obtained by a mixture of organic ingredients combined with food scraps from some typical raw materials like the PGI artichoke from Rome, the PDO chestnut from Vallerano; the PGI kiwi from Latina, the PGI potato from Alto Viterbese, the PDO pepper from Pontecorvo, the PDO olive oil from Canino, the homemade bread from Genzano, and so on. A variety of samples has been realized, varying color, thickness, consistency and flexibility for each material category, adding or removing food waste and varying the recipe.

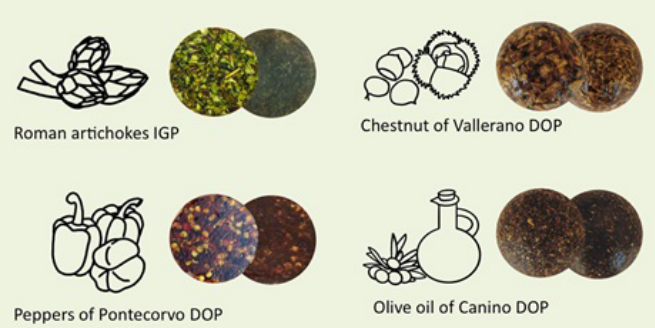

Fig. 1. Examples of DIY bioplastic produced using food scraps from traditional local delicacies of Lazio Region.

Fig. 2 Examples of DIY bioplastic produced using food scraps from traditional local delicacies of Lazio Region.

Fig. 3 Examples of DIY bioplastic produced using food scraps from traditional local delicacies of Lazio Region.

Subsequently, three educational workshops[2] has been organized involving children in the self-production and material thinkering with a dual objective: educate to re-use and circularity and achieve feedback about the sensory qualities of the realized samples (Fig. 4 – 5). Children are a blank slate, free from any conditioning when approaching to materials. For this reason it's been interesting for the research to involve them in activities aimed at gaining experiential knowledge on the sensory and emotional involvement given by the DIY materials. In particular, some games have been organized asking children to interact with the material samples, to evaluate their propertieson "gradient scales"[3] and to imagine the possible uses and applications. As a result, besides imaginative scenarios of possible futures, we got many diagrams and photos of children interacting with materials – capturing their expressions, mirror of their emotional involvement. Moreover, the approach employed in the evaluation of sensory-perceptual features

2 "Possibile se Sostenibile" workshop on July 2017, and "Plastiche @ Bioplastiche. Scopriamo come riconoscerle" workshop on September 2017, in collaboration with Explora – children's museum of Rome; "Bioplastica Preziosa" workshop in collabora-tion with Sapienza Research and Services Center SAPeri&co for "Maggio Museale" 2019. Scientific Director Prof. Sabrina Lucibello, Sapienza University of Rome.

overcomed the traditional methods that wrongly don't account for synesthetic convergences of senses and perception subjectivity.

Fig. 4. "Possibile se sostenibile" Workshop on July 2017, in collaboration with Explora museum.

Starting from a brainstorming on the workshops' results, the third phase consisted in the making of a biodegradable bioplastic tableware set, realized for eating the specific dish from which the food waste was derived (Fig. 6). With some selected biomaterials from the experimentations, almost one for each dish, some tableware, cutlery and packagings were prototyped and realized. Each of them, thanks to the sensory properties of new materials as well as to specific morphologies, is able to give back food's organoleptic properties and to augment its peculiarities. The food waste is not a filler anymore – hidden and not valorized. It is a mean to attribute meaning to artifacts and to stimulate change through design promoting ethical attitudes and behaviors. Shapes instead, were designed starting from the aesthetic-perceptive characterization of the bioplastic produced and observing the gestures, movements and habits of people approaching each specific dish. In this way the final product is able to stimulate one or more senses, augmenting the tasting experience and generating synesthesia.

Then, as dissemination of the research results, a performance event is going to be arranged. Users will be able to immerse themselves in a journey from the raw material to the final product, tasting local delicacies with the tableware realized from their own scraps.The event will consist in a performance, an exhibition and a lecture, and will involve the participants in an immersive experience that unites the food tradition of Lazio Region and Design. Il will provide the understanding of how to design with and for food, developing at the same time innovation and tradition.
In particular, the performance aims to realize a "Taste Experience", characterized by the reinterpretation of some dishes typical of Lazio region by the starred Chef Andrea Fusco. It is going to be organized with the advice of Foodhouse, a Roman society nationally established which deals with Experience Design and Eating&Tasting Design. It will be based on local raw products and wines and will present some evolutions "possible if sustainable" of the traditional food, tasted in the tableware set derived from their own scraps. In conjunction, the exhibition aims to realize a "Taste Floor", namely a real scenery able to help people understand how the raw material can be at the same time new material. It'll show the virtuous process through which the matter become food, waste and then a new bioplastic, useful for new biodegradable products able to provide a plus of emotional experience. Thus, to eat a plate of PGI potatoes from Alto Viterbese with tablewares derived from their skins can become a very interesting experience. Moreover it can foster reflections

3 In order to facilitate the evaluation of sensory-perceptual festures, some gradient scales have been realized. It consisted in diagrams including the traditional categorization of senses – sight, hearing, taste, touch, smell – as well as cross-modal interactions – chemo-reception (smell-taste-sight), thermos-reception (touch-taste-hearing), pleasant-ness, and so on. For each category have been identified the specific properties and their opposites, located at the two ends of the gradient scale, allowing to quantify the percep-tion of the material.

and critical thinking on the environmental issues, inspiring changes, and rising awareness about the impact that our everyday life has on the environment. The culinary performance aims at creating a small circular process: waste from dish preparation become themselves raw matter for the making of the tableware. In addition, the catering industry considerably contributes to food waste production, and is an activity which closely involves the community. In this way we want to instill the awareness that is possible to act individually everyday, instead of passively delivering change to large production and distribution industries.
Finally, a lecture will talk about the potential of biopolymers derived from food waste, thanks to the contribution of academicians, entrepreneurs and food designers. It will be also the occasion to discuss with them how food waste can be push to reread in a contemporary key the identity of the territories and their materials.

Fig. 5. "Possibile se sostenibile" Workshop on July 2017, in collaboration with Explora museum.

Fig. 6. Prototypes of a tableware set made of bioplastic derived from food waste. Each piece is shaped in order to enhance the sensory properties for a more involving taste experience.

4. CONCLUSION: RELEVANCE OF THE PROJECT

The project fits into a set of strategic actions aimed at promoting new productive and cultural models in the field of Circular Economy. From the European Commission's guidelines indeed, emerges how the effectiveness of the proposed actions requires local communities' participation and protagonism. Concrete measures about issues as recycle, biodegradability and waste reuse, appears to be effective only if they interface an informed, active and aware population. In order to achieve the Circular Economy goals so, is necessary to start a virtuous path based on three key points: an Industrial Revolution, of processes, technologies and resources consumption; a Legal Legislative Revolution; and a Cultural Revolution, through environmental education and active participation.

The goal of "Taste Without Waste" project, part of Sapienza research " *Design & Territorio. Tra memoria, tecnologia e "saper fare"*[4], is then to contribute to the Cultural Revolution, eductating to reuse, waste reevaluation and reflection about food waste. It does this turning mainly to children, but also to adults, through an active and engaging experience. Design assumes the role of catalyst, able to let the productive models implemented by the companies spread through a familiarisation process, and in this way penetrate in a capillary manner into everyday life.
Designers have the ability to influence behaviors and thought patterns through the aesthetical-perceptual features of materials and products. This appears to be essential today for diffusing new values into society, raising awareness about the impact that our everyday life has on the environment. Thanks to their envisioning skills and the ability to find alternative ways to face the contemporary complexity, designers act as catalysts of innovation. Their action reaches also fields far from the most advanced technology, as the ones of food and territory uniqueness.
In particular, it is able to display tangible alternatives to the current development model, stimulating users' interest and engaging them in the envisioning of future scenarios to shape a conscious and responsible world.
In this research project, the emotional and physical involvement has been employed in order to encourage attention and memory. As Kolb says talking about what he defined the "learning cycle" (Kolb, 1984), the experiential learning is based on the principle whereby our brain is able to acquire concepts, ideas and relations more effectively when driven to put them into. Consisting in four phases – concrete experience, reflective observation, conceptualization and active experimentation, such approach provides for the cyclical turnover of practical activity and theoretical processing. Therefore, its application in eco-education entails the engagement of senses which, as preparatory activity for knowledge construction, represents the key element for learning.
The project goes from the material production to the evaluation of its sensory qualities – exploring smells, tactile surfaces, colors and textures, and establishing a hierarchy of the more influential features over the material appreciation – up to the experience originated from its use through tasting. In this way it acts as a "learning cycle" allowing individuals to discover how the historical and agronomic memories of a territory can become an added value. At the same time, it allows to conceptualize the potential for change of behavior patterns, providing a practical demonstration of how this changes can represent a pleasant plus for users' experiences.

4 "Design & Territory. Among memory, technology and "saper fare". PI: Sabrina Lucibello, that investigate the effects that new technologies are holding on material culture, with respect to design, technological and material "memory" of Italian territories: from the modification that investigate the effects that new technologies are holding on material culture, with respect to design, technological and material "memory" of Italian territories: from the modification of languages and advanced techniques for the products produced in our tradition, to a rereading of the disciplinary comparison that has always existed between artisan culture and design culture.

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