Innovative agriculture and sustainable food production: applications of the Acquaponics system

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INTRODUCTION

The present global scenario shows a twofold consumers’ behavior: growing demand for modern food increasing desire for natural foods

We are now observing the consumer reluctance with regard to emerging technologies in processing and producing food, known as Food Technology Neophobia (FDO).

Although, in general, end consumers are aware of the risks associated with food innovations and applications, massive food researches are carried out in order to analyse consumers’ fear of novel food, defined as “food neophobia”, as well as consumers' increasing attention towards sustainable practices along the whole supply chain.

Apart from being a personality trait, food neophobia has also been studied as a form of behaviour; in order to foster new food technologies market success that, in turns, depends on consumers’ behavioural responses, it is essential to focus on population segments that are food technology neophobic as well as early adopters of such innovative technologies. Generally speaking, there are three key reasons for rejection of food by humans: (a) aversion to sensory characteristics, (b) danger, a fear of negative consequences of eating a specific food or (c) disgust, arising from the idea of nature or origin of food.
INTRODUCTION

WHO, WHAT, HOW

Who: ImpattoZero S.r.l. Innovative Start-Up – Biotechnology & Agricultural Engineering
Objectives: A new Agriculture model to Market
What for: Producer’s Network & Farming on demand
How: Digital Market Place – IoT Aquaponics
Materials and Methods

Aquaponics

Is

the combination of aquaculture (raising fish) and hydroponics (the soil-less growing of plants) that grows fish and plants together in one integrated system. The fish waste provides an organic food source for the plants, and the plants naturally filter the water for the fish.
Materials and Methods

Aquaponics: how it works

Benefits
✓ -90% water
✓ - 80% Human labor
✓ Free of chemicals, nutrients and pesticides
✓ 50% Faster than conventional farming
✓ Faster maturity and fruiting time
✓ Crops are 8 to 10 times larger
✓ 1lb of fish produces 15 to 25lb of vegetables
✓ http://www.aquaponicsauthority.com/
Materials and Methods

Food Sovereignty → Biodiversity Market Place

Food Safety

Low Carbon Foot Print

Short Chain → Farming on demand

Virtual Farmer
Materials and Methods
Results and discussion - Open Agri Challenge

The OpenAgri Project from ImpattoZero S.r.l. aims at fostering the diffusion of the Aquaponics technology and sustainable cultivation, all by means of the establishment of partnerships and the participation in regional, national and European initiatives.

The specific objectives are related to:

- building a sustainable food chain that goes from promotion to consumption, in order to respond to the emerging needs of the agri-food sector;
- addressing young entrepreneurs and innovative SMEs in the agri-food sector and supporting experimental solutions that could emerge from their collaboration;
- create an innovative ecosystem, a hub that will connect all the stakeholders at territorial level, in relation to the themes of economic development and social inclusion, and which will favor the creation of new skills;
- contributing to the improvement of urban resilience;
- bringing agricultural policy closer to other innovative policies at local level;
- building a sustainable food supply chain, using innovative approaches along all steps.
Results and discussion - Open Agri Challenge
Results and discussion

In recent years the number of new foods has increased as a result of new advantages food technologies: safer, healthier and more nutritious foods using less energy, water and chemicals and producing less waste, the enhancement of environmental sustainability, and the growth of food productivity.

Nowadays consumers are more and more aware of their food selection, especially novel foods. They are more demanding for the quality of the products and health benefits they produce. Thus food market must create new competitive products, nutrient-enriched, or produced by using new technologies in order to satisfy consumers; future researches on new technologies should include a psychology dimension to investigate and identify the real factors that determine consumer behavior, so as to predict their choice of specific food.
Conclusions

Application and transferability of the technology

Of considerable interest is the possibility that this technology could also be used to cultivate genetically modified organisms to produce a molecule of interest (for example an active ingredient). As a result, the aquaponic technology makes it possible to cultivate different plant species in optimal conditions, in a wide range of applications: in the food sector, for the cultivation of 100% natural food products in manufacturing, for the production of fabrics and raw materials (e.g. Cannabis); in the pharmaceutical field, for the production of organisms with a high concentration of active ingredients; in the construction industry, for the production of plants used for insulation and construction products; in the cosmetic sector, to obtain 100% organic nutrient-rich raw materials. The benefits in terms of food waste reduction are noticeable, thanks to the described creation of an on demand agriculture, characterized by the satisfaction of more stringent and targeted needs and requirements.
Conclusions

Food marketing and food New Product Development face the challenge to find an optimal level of "newness", high enough to induce curiosity and willingness to try the new food, but low enough not to cause neophobia. Future research is needed to set this optimal level and to investigate how market success and performance are related to product newness.
Thank You

Get in Touch

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