

Speed Dating in Science

Agriculture and Maintenance of the Territory: parallels and paradoxes



Commercial aquaponics approaching the European market. A consumers' perception on aquaponics products in Europe.

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Abstract:

The paper aim was to estimate consumers' knowledge about aquaponics and their acceptance of aquaponics products in different European regions. An on-line questionnaire was administered to the general public through the aquaponics network of Food and Agriculture COST (European Cooperation in Science and Technology) Action FA1305 "The EU Aquaponics Hub—Realising Sustainable Integrated Fish and Vegetable Production for the EU" in 16 European countries. The methodology includes univariate and multivariate statistical techniques. The results show that, on average, attitudes towards aquaponics were positive, showing no significant differences between those who already knew about aquaponics and those who only heard about it through the survey. More than 50% of respondents had never heard of aquaponics, whilst more than 70% had already heard of hydroponics. No more than 17% of respondents were willing to pay more for aquaponically produced products and no more than 40% more when compared to the price of products from conventional farming. The results confirm three different clusters of potential consumers of aquaponics products.

Keywords:

aquaponics products; consumers' acceptance; willingness-to-pay; consumers' preferences; organic certification; Europe

Presentation topics:

- Introduction and main goals
- Literature review
- Methodology and data
- Results
- Conclusion

Introduction

- Aquaponics is an innovative and sustainable agricultural production system for integrating aquaculture with hydroponic vegetable crops;
- The Food and Agriculture Organization has emphasized aquaponics as a future sustainable food production practice;
- In Europe many startup companies are taking first steps towards commercial aquaponics production;
- However the European food production standards are not available for the integrated production system;
- Aquaponics products still cannot be certified organic, whereas according to the European Commission Regulation N° 889/2008 organic plant production is based on nourishing the plants primarily through the soil ecosystem and therefore hydroponic cultivation is not allowed.

Introduction



Introduction and main goals

- Recirculating aquaculture systems are also clearly prohibited as organic aquaculture according to the European Commission Regulation No 710/2009.
- Since 2008 aquaponics products produced in the USA can be certified organic according to the rules laid out in the Federal law by the National Organic Program of the United States Department of Agriculture,
- That sets out a good starting point at pricing the aquaponics products higher and offers a better competitive advantage on the market;
- In the United States of America the history of aquaponics goes further back and a few medium scale commercial system operate and backyard aquaponics farming has been quite popular in many regions.

Introduction and main goals

- To overcome these limitations: Cost Action FA1305 - The EU Aquaponics Hub - Realising Sustainable Integrated Fish and Vegetable Production for the EU with 27 countries participant members.
- The main aim of the present presentation was to estimate the consumers' knowledge about aquaponics and their acceptance of aquaponics products in different European regions.
- The on-line questionnaire was distributed to the general public through the aquaponics network of COST FA1305 Action;
- In total 635 answers were valid for the statistical analysis.

Literature review

- Nowadays consumer's awareness about the health benefits of locally and organically produced products is on the rise (Falguera et al., 2012; Basha et al., 2015) and they make more conscious decisions while performing the food purchase (Tokunaga et al., 2015), especially in the developed and industrial countries.
- Consumer's acceptance and certification criteria are of special interest for the development of commercial scale aquaponics systems. All available studies about aquaponics mostly focus on surveying the aquaponics producers (Love et al., 2015);
- Besides that, there is a huge consensus among various authors about the importance of the multivariate analysis on consumers' attitudes and values and consumers typologies through multivariate methods;
- These techniques was used successfully by Silva and Berbel (2004) and support the last research developed by, Silva, Marta-Costa, and, Berbel, (2015) for identify and find the objectives and priorities of the Azorean dairy farmer's decision making .

Methodology and data

- A web survey with 10 questions was distributed on the internet from February 20th until August 31st 2016 (in progress);
- Each of the questions included also a set of sub questions;
- It was translated into 5 European languages (English, Dutch, Greek, Spanish and Portuguese) and it was distributed via e-mail to the general public through the aquaponics network within the COST;
- The answers were first analyzed using Microsoft Office Excel 2013 for descriptive statistical analysis and second R version 3.3.1 for the comparison between different variables. For multivariate analysis the SPPSS version 21 was used.
- Univariate analysis; multivariate analysis: Principal Component Analysis (PCA) and the Cluster Analysis (CA).

Results

Consumers' behavior when buying organic or local products

- More than 45 % of respondents actively look for ways to buy food from local farmers either at open markets or directly from farmers;
- Only 25 % of respondents claim that they consider price as the most important decision factor when buying food;
- Although, 57 % of respondents decide for non-organic produce if the price of organic is twice the price of non-organic
- 55 % of respondents when buying in the supermarkets take the locally produced food, even if it is more expensive;
- When buying vegetables 45 % of respondents look for pesticides and herbicides free produce;
- When buying fish, 36 % of respondents would rather pay more for organically produced fish.
- Results of the factor analysis also confirm this results.

Results

Consumers' knowledge about aquaponics and attitudes towards aquaponics products

- More than 50 % of respondents claimed that they have never heard of aquaponics;
- whilst more than 70 % have already heard of hydroponics;
- After reading a positive description of aquaponics the respondents answered a set of questions:
- about their attitudes towards aquaponics food production and aquaponics products;
- More than 45 % agreed or strongly agreed that aquaponics is the answer to a more sustainable food production in the future.

Results

Consumers' willingness to pay for aquaponics products

- When purchasing vegetables, 17 % of respondents would look for aquaponically grown vegetables;
- 38 % would choose aquaponic fish in comparison to conventionally farmed fish, and
- 23 % would choose aquaponic fish even if it would cost more;
- 54 % of respondents would be willing to pay more for pesticides/herbicides or antibiotics free products (58 % for trout, 52 % for tomato and 52 % for lettuce);
- 41 % of respondents would be willing to pay more for locally produced products (44 % for tomato, 42 % for lettuce and 38 % for trout); and
- only 17 % of respondents would be willing to pay more for the aquaponics products (22 % for trout, 15 % for tomato and 14 % for lettuce).

Results

Factors that explain consumers' attitudes about aquaponics products

Factor

Variables

Factor 1 – Personal and socio-demographic characteristics and the previous knowledge about aquaponics

27; 28; 29; 30; 31; 32; 33; 43; 44; 45; 46; 47; and 48

Factor 2 - How much more are the consumers willing to pay in percentage for aquaponics products before we introduce the concept.

7; 8; 9; 16; 17; 22; 23; 24; 25; and 26.

Factor 3 - How much more are the consumers willing to pay in percentage for aquaponics products after knows (we introduce the concept of aquaponics)

34; 35; 36; 37; 39; 39; 40; and 41.


Results

Cluster Analysis

- three groups of potential consumers of aquaponics.
- 1st cluster - *Innovative consumers* - a small group of consumers (less than 17%); age of 35 years; with average income between 2,001 and 3,000 euros, which is employed; is willing to pay more than 19% for aquaponics products, and is relatively familiar with this type of food production.
- The second - *Potential aquaponics consumers* - 23% of the sample; aged between 46 and 50 years with the income of about 4.001 to 5.000 euros per month; only 15 % of consumers know what aquaponics is. After presenting the concept of aquaponics this group of consumers is willing to pay 15% more on average for products produced in aquaponics.
- The third group – *Status-quo of aquaponics consumers*- is the majority of the sample (60%). This cluster has an average between 55 and 60 years; an income between 3.001 to 4.000 euros per month, *never heard about aquaponics* and is not willing to pay more for products produced in aquaponics.
- It should be noted that the present sample is based on “convenience” and not fully represent all of the countries under study.

Conclusion

- Aquaponics is believed to have a future potential as a sustainable integrated food production method.
- The consumers' acceptance is in general positive towards aquaponics.
- The willingness to pay is mainly related to products free of antibiotics, pesticides and herbicides and connected with local well-known producers.
- This provides a valuable opportunity for emerging commercial aquaponics companies with the correct focus on their marketing potential.
- The results suggest the urgent need of education of consumers about aquaponics through the organization of guided tours, thematic workshops and live tastings of aquaponics products in order to raise their awareness about this new technology.

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue, creating a modern, layered effect.

Thanks so much
Suggestions are welcoming!
This research is in progress