The role of the Italian research in food science and technology in knowledge transfer

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University of Reggio Calabria
Sistal – Italian Society of Food Science and Technology

The Society wants contribute to scientific development of preservation, processing, packaging, quality management and other topics related to food.

The members of the society are researchers and teachers belonging to “Food Science and Technology” academic discipline of Italian Universities

146 members of The Society
28 universities represented
Research Areas of SISTAl

Products subject matter
- Fresh vegetables, Minimally treated vegetables,
- Canned vegetables
- Fats and olive oil
- Wine, Brew and Distilled
- Milk and Dairy products,
- Meat, Canned derived meat, salami,
- Fish and Canned fish
- Ready meals
- Cereals, Bread, baked, pasta
- Functional foods
- By-products of food industries

Food Operations/technologies/methods
- Unit Operations of Food Industry
- Packaging and shelf life
- Thermal treatments and Cooking
- Non-conventional technologies: dielectric, Radiofrequencies, Microwaves, High Pressures, Ultrasounds, Pulsed Electric Fields, others.
- Extraction, fractionation and separation technologies.
- Hurdle technology
- Plant sanification
- Nanotechnologies

Evaluation of starting materials and derived food
- Chemical and physical evaluation
- Sensorial analysis and consumer science
Food product requirements

• nutritional, healthy, hedonistic and social.
• Respect other necessities food products are highly distinguished by:
  • Consumption
  • Quality
  • Life cycle and seasonality
Economical Importance of Food (Agri-food) sector in EU

• Sales volume of 1109 billion of € (- 0.5 % compared to 2015)
• 294 000 enterprises (20 % with more than 9 employees) (2016)
• 4.57 million people employees (dati 2016)
• 15 is the average of number of persons employed per company (2015)

(Data from FoodDrink Europe 2018)
Economical Importance of Food (Agri-food) sector in Italy

• Sales volume of 140 billion of € (+ 2 % compared to 2017)
• 58 000 enterprises (6.850 with more than 9 employees) (2017)
• 385 000 employees (dati 2017)
• 32.9 billion exported (+3 % compared to 2017)
• 21.8 billion imported (- 1.8 % compared to 2017)

(Data from Federalimentare reports, 2018)
Made in Italy: the numbers of the food quality productions

Italy measures the highest number of certified foods (Geographical Indications such as PDO, PGI and Traditionally Specialties): 822

Total Economical value of PDO + PGI ≈ 15.2 billion €

Food (no wine) 299 products PDO and PGI : 7 billion €
Cheeses and salami are the 85% of the total value of PDO/PGI productions.

Wine (523 registered): 8.3 billion €
PDO / PGI wines correspond to 2/3 of the whole Italian production.

More than 500 wines certified and registered.
Quality of made in Italy foodstuff

Tied to territory
- Typical
- Mediterranean diet

Food from new processes and new formulations
Drivers of innovation in Europe

Adapted from FoodDrinkEurope, Data & Trends, 2018

Variety of senses
Sophistication
Fun
Exoticism

Natural
Medical
Vegetal

Slimness
Energy
Well being
Cosmetics

Ecology
Solidarity

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FOOD SCIENCE AND TECHNOLOGY RESEARCH IN ITALY

WHAT

- New processes
- New ingredients

FOR

- Valorizing traditional foods
- Developing new foods
- Preserving Food quality

FOOD PROPERTIES TO BE SATISFIED

Tied to territory/Typical
Meeting the Mediterranean diet requirements
Healthy
Convenient
Hedonistic
...
(in other words, responding to actual consumers demands)
Number of scientific articles published per year with the search of words “Innovative food processing/technology” refine in Food science and technology

Web of Science, Thomson Scientific
Academic missions and Knowledge transfer

**RESEARCH**
Produce and spread knowledge

**EDUCATION**
Train highly qualified technicians, managers and researchers.

**KNOWLEDGE TRANSFER**
Assist to socio-economical, and cultural development
The Italian Network of the PhD Courses in Food Science, Technology

- The network is participated by 28 PhD courses of 26 Italian Universities
- Annual workshops, (XXIV, 2019)
- PhD students present their PhD activities as poster or oral presentations (3rd year)
- At the annual workshops about 30-35 of 3rd year students and about 120 of the 1st and 2nd.
The Italian Network of the PhD Courses in Food Science, Technology

“What for” Award organized (4th edition this year)

• The award aimed at 3rd-year students:
  • favoring the orientation of training courses towards issues of industrial interest;
  • attracting knowledgeable and motivated young researchers in food industries.

• Promotes awareness among young researchers of the effects of the application of the research carried out by them and the ability to communicate (by mean of a short video), in a synthetic and effective way, how to promote technological transfer.

• Participants highlights the innovative relevance and the practical impact of the PhD research for the industry;
Italian research in FS&T contribution to knowledge: examples
an research in FS&T contribution to knowledge: examples

GLUTEN FRIENDLY™

University of Foggia (Lamacchia; Di Luccia; Gianfrani)

Italian Patents: N° 0001414717, N°. 102015000084813
European Patent: EP3389400
Spin-off: New Gluten World (Researchers UniFG & Industrial Label)

Chemical-physical process applied to wheat kernels before milling.
The patented formula is a precise pacing of water, high heat, and resting times.
The process apply to wheat kernel, where gluten proteins shape into a new molecular structure, without any denaturation.
GLUTEN FRIENDLY™ FLOUR CONTRASTS FOODBORNE PATHOGENS

GLUTEN FRIENDLY™ FLOUR BOOSTS THE EFFECT OF PROBIOTICS

GLUTEN FRIENDLY™ BREAD STIMULATES MUCUS PRODUCTION IN THE INTESTINE

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METHOD TO MAKE FAT SUBSTITUTE AND/OR FAT IMITATOR COMPOUNDS

The invention deals with a method for production of a fat substituted with low content of saturated fats.

The novel fat has rheological properties comparable to that of palm containing margarines, widely applied in the production of laminated products (e.g. croissants).

<table>
<thead>
<tr>
<th>Saturated fat %</th>
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<tbody>
<tr>
<td>Palm oil</td>
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<tr>
<td>Butter</td>
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<tr>
<td>IUD Patent</td>
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INULIN-BASED COMBINATION AND USE AS SUBSTITUTE OF FATS IN FOOD COMPOSITIONS AND FORMULATIONS

An emulsion of inulin, water and fat with a low content of saturated fatty acids and cholesterol (EVOO).

It can be used as substitution of animal or hydrogenated fats, since it can be obtained in different degrees of viscosity and therefore applicable to different food formulations.

University of Foggia (Severini, Fiore, Derossi) Patents: IT 102016000097941 / EP 3300611A1 Hong Kong 18111212.9
METHOD OF PRODUCTION AND STABILIZATION OF V GAMMA FISH FILLETS

A method of production and stabilization of V gamma fish fillets by the use of marinating solution, vacuum packaging and partial cooking by microwave.

Method of production and stabilization that avoids the problems related to a marked sensorial impact in terms of taste, texture and color of the final product.

Italian Patent IT 0001394882

University of Foggia (Severini – Fiore)

Marinated Anchovy fillets:
MT = (traditional marinating 10% salt 12% vinegar)
MI = (innovative marinating)

Marinated salmon fillets:
MI = (innovative marinating)
MT = (traditional marinating 10% salt 12% vinegar)
VALORISATION OF CACAO BY-PRODUCTS

Source of Bioactive Compounds

- Fatty acids
- Minerals (Mg, K, P, Fe)
- Fiber
- Polyphenols

Industrial Residue – by-product

- 523 thousand of tonnes (2013/2014)
- Environmental impact
- Find new strategies of recycling

RECOVERY AND VALORISATION

Pharmaceutical industry

- Cosmetic

Food industry

- Food
-主动包装
- 保健食品
- 功能性食品
- 保存(抗氧化剂，抗微生物)

Chemical industry

- 面包
- 奶酪
- 冰淇淋
- 奶酪
- 饮料
- 果仁
BIO-MATERIALS FROM EXHAUSTED CAFFE’

University of Foggia (Severini, De Pilli, Derossi) Italian patent N. 102014902305083
In cooperation with Italian Industry of Caffè

Exhausted cake Caffè

Caffè shop

Caffè capsules for automatic machines
An research in FS&T contribution to knowledge: examples

Infrastructural lab for active and sustainable packaging application

Application of advanced technologies to obtain active and co-friendly packaging

EcoPackLab
RESEARCH
Food processing optimization and innovation

EDUCATION
Innovative learning

KNOWLEDGE TRANSFER
Patent development
Communication
Patent exploitation

The case of the Vegetable boiled egg
EDUCATION
Innovative learning

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August 2017: Italian patent «Prodotto alimentare innovativo e relativo processo produttivo»

PROPERTY: The University of Udine

INVENTORS: 4 students of the master course in food science and technology of the University of Udine
Students Develop Vegan Replica of Hard-Boiled Egg

By Anna Starostinetskaya | September 16, 2017

University of Udine master’s students obtain a patent for the cholesterol-free, ready-to-eat egg that features a wholly plant-based white and yolk.
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KNOWLEDGE TRANSFER
Patent exploitation
Thank you for your kind attention