

# Processing Tomatoes in 2009: Research, Innovation and Total Quality to Compete

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# Food processing scenario 2009

- Spotlight upon world crises:
  - economy and environment.
- Lisbon Strategy has identified science (research) and innovation as guideline themes for the economic competitiveness of the European Union in food sector to tackle the competitions related to emerging fast growing economies
- Global supply and total quality standards
- Sustainable agriculture and environmentally friendly practices will become or (better) still are unavoidable.
- Awareness of health benefits coming from diet (despite currently regulations) will be a noteworthy marketing tool.



*“Salus Populi Suprema Lex”*

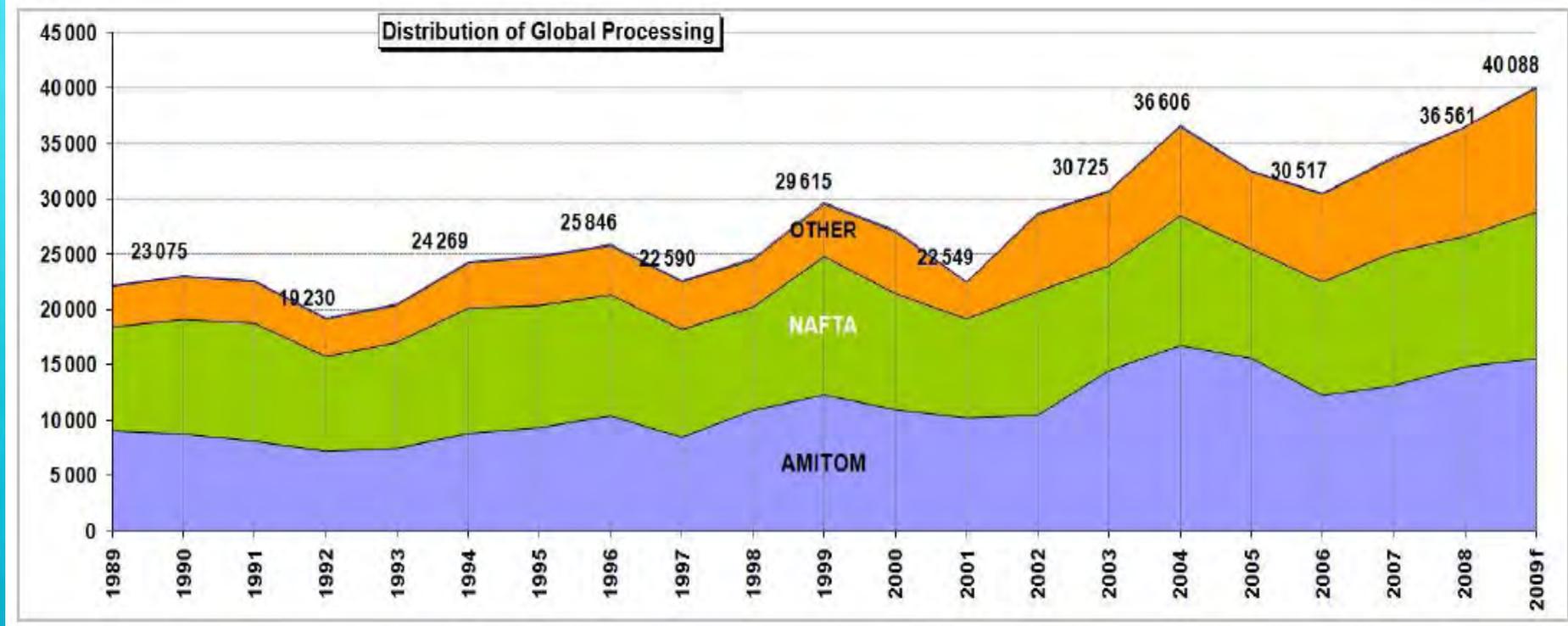
*Marcus Tullius Cicero*

# Themes Treated

- THEME: International World Market and Global Crises – Campaign 2009
- THEME: Total Sustainability
- THEME: Social and Demographics Changes and new consumption trends
- THEME : New processing technologies and novel tomato products (Nutraceutical products)
- THEME: Assessment of traceability and Certification of Origin (fingerprints of Italian processing high quality processing Tomato)
- THEME: Worldwide standardization of quality evaluation data and market parameters.



# Match between tomato global processing and consumption volumes



Theme: International World Market and global Crises – 2009 Season

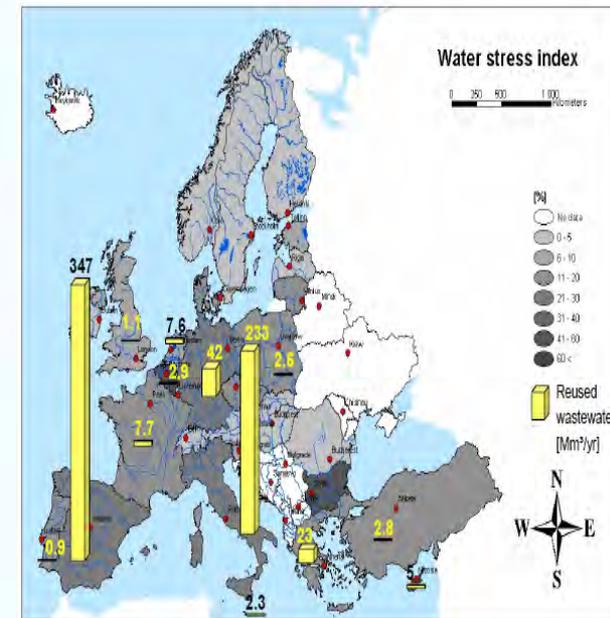
**THEME: Sustainability and Global Warming Challenge**

Fresh food production with use of reclaimed treated waste water and water saving irrigation - a sustainable future?

**SAFIR Project - work in progress -**

- **Technological development of water saving irrigation systems and management for use of low quality water resources.**
- **Technological advances has been made in the field of cost effective tertiary water treatment technology for on-farm use. Irrigation equipment for sub-surface irrigation systems have been tested in the field and developed to facilitate a new water saving strategy.**
- **Impact of the technology on product quality and safety, production system and the environment as well as a risk assessment from farm to fork.**
- **Financial and economic aspects have been investigated and institutional and consumer barriers have been identified.**
- **PARTIAL RESULTS available on WEBSITE:**

[www.safir4eu.org](http://www.safir4eu.org)



**THEME: Sustainability and Climate Change Challenge**

Fresh food production with use of Organic Farming - a sustainable future?

- **Theme Sustainability:**

*Consumers have been becoming progressively conscientious to the contribution of agriculture to issues like sustainability, climate change, biodiversity and so on.*

**ORGANIC FARMING and ORGANIC PROCESSING TOMATOES:**

***New production systems for produce organic processing tomatoes with high sustainability, traceability and new competitiveness characteristics:***

***Preliminary Results :***

***The results were studied of two different systems of cultivation, an integrated system (Lotta Integrata) and an organic system (Agr. Biologica) to verify whether and which destinations the fresh matter obtained (tomato for processing) showed the eligibility requirements for industrial quality standards.***

Results available on : **INDUSTRIA CONSERVE** ,Anno LXXXIII,  
numero 4, ottobre-dicembre 2008



## THEME: Sustainability of production and re-use of by-products

Recycling by-products is of interest both for the environmental viewpoint (reduction of amount of digested product) and for the health benefits derived from their bio-active compounds. These bio-products may be used:

- as such for extraction of bioactive compounds (Nutraceuticals) or
- as starting materials for the preparation of innovative tomato based products (Hi-value ).

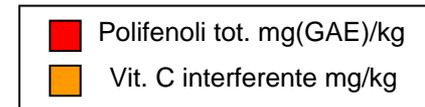
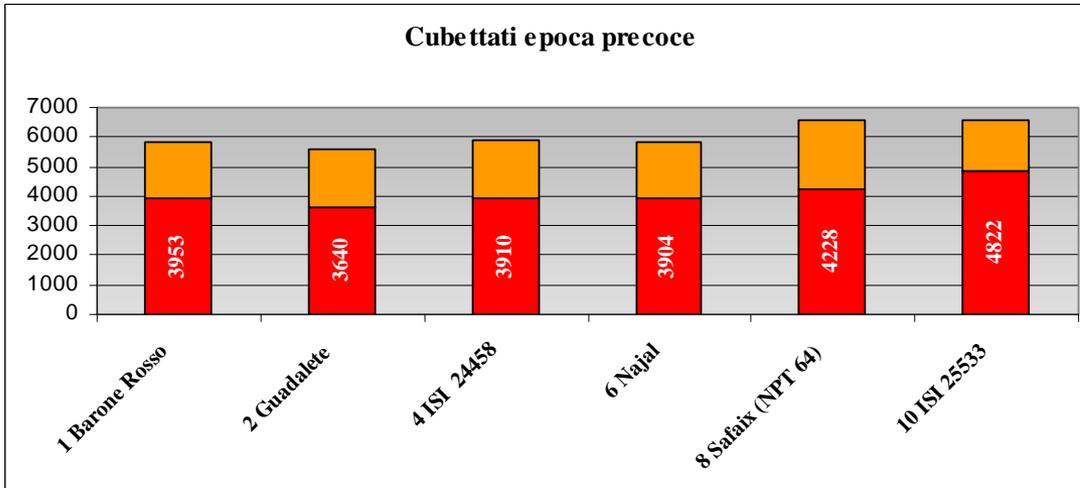


# THEME: Social and Demographics Changes and new consumption trends

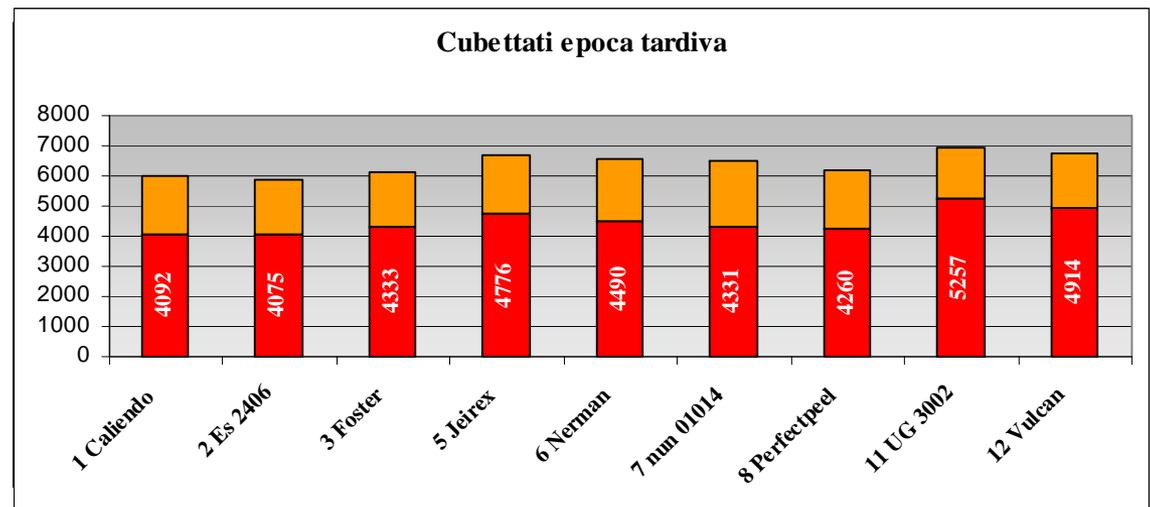


- ***Development of “Nutraceutical novel products”***
- **Antioxidants extraction from Tomato Solid Wastes:**
- *Studies and characterization of resources for primary health-nutritional interest coming from solid waste produced by tomato processing industries are investigated, through use of innovative extracting techniques with low environmental impact.*
- Tomato Skins holds high concentration of Carotenoids and Polyphenols more than pulp; it is well recognized that the bioactive substances are concentrated in the insoluble fiber fraction close to the peel.
- Tomato seeds holds high concentration of unsaturated fatty acids; production of tomato seeds oil.
- Tomato fibers : used for feeds and for alternative energy power source.

# Polyphenols Content in Tomato Puree and Diced Tom. (mg/kg D.M.)



Polifenoli tot. = lett.spettrofot. - 0,62x[vit. C]



# THEME: Social and Demographics Changes and new consumption trends

## ***Development of “Nutraceutical novel products”***

- Tomato Processing industry might optimize productions with added value new products in terms of higher consistency and higher color intensity.
- Tomato by-products (solid wastes) could become a very cheap fresh matter for the formulation of new nutraceuticals, pharmaceuticals, and cosmetically rich new products.
- And could become obviously “supernatural” colorants for better color results in tomato products and for additives industry ; moreover could increase the content of natural fibers into finished products or could become bio-natural substance for new packaging biocompatible material .



## THEME: Social and Demographics Changes and new consumption trends

### *The search for chemical-free food additives*



- Chemical additives occupy a central place in food production, and are linked to a growing number of health concerns; the EU has set limits on their use.
- “The Southampton study “continues to affect industry attitudes towards synthetic colors in the last two years. The study concluded that certain mixes of artificial food colors can aggravate hyperactivity in children. It received much media coverage and caused a stir among consumers and food manufacturers globally.
- The UK Food Standards Agency (FSA) and the European Parliament said foods containing colors listed in the Southampton study (Southampton colors) must be labeled with the relevant E number and with warning label: “may have an adverse effect on activity and attention in children”. The UK ministers also agreed to an FSA proposal on voluntary phasing out of the Southampton food colors by the end of 2009.

# THEME : New processing technologies and novel tomato products (Nutraceutical products)

**A Nielsen study in 2007 found that 69% of consumers prefer natural foods and beverages. Up from 50% in 2000, this figure signals significant momentum in the natural movement.**

**Advanced technologies for processing tomato PASSATA (puree) and diced tomatoes and its novel packaging quality assurance, antioxidant addition and high traceability profile**

The project aims to:

- 1) exploit advanced technologies to obtain innovative tomato-based products (tomato puree - passata) preserving the characteristics of hi-value Italian selected tomato varieties with the added value coming from the pre-treated natural antioxidants added.
- 2) Apply innovative packaging scheme with engineered package providing better shelf life and evolutes traceability system;



# THEME : New processing technologies and novel tomato products (Premium Quality products)

## **New products with high nutritional value and excellent quality:**

Novel technologies application for the preparation of new concept tomato-based food products, with high nutritional characteristics, hi-quality taste, with the guarantee of origin completely traced : possible Industrial application of P.D.O. and P.G.I. products (D.O.P. - I.G.P.) Protected Denomination of Origin - Protected Geographical Identification at more larger scale.

Application of latest analytical methods for Total Antioxidant Activity evaluation (from fat soluble and water soluble compounds) and guarantee traceability. For example evaluation of the canned tomato products Vs. single or synthetic tomato lycopene activity.



## THEME: Assessment of traceability and Certification of Origin (fingerprints of Italian processing high quality processing Tomato)



- Country of origin of the products as a way of certification of authenticity:  
According with Reg. (EC) 1234/2007 for some typical production (olive oil), the indication of origin country is compulsory on the label of the processed products (mix of EC products, mix of non-EC products).

- Thanks to the last analytical tools it will be possible to trace the origin of products (From Fork to Field).

Studies and applications of:

Multi-elements analysis ICP/MS det. REEs (Rare earth elements) – FAAS, NMR , HPLC/MS, Amino acids pattern; analytical characterization for molecular markers, genomics and proteomics content, Isotopic Ratio  $^{18}\text{O}$  –  $^{16}\text{O}$  of water .

Requirement of data-base creation fulfilled with discriminate parameters.

# THEME: Worldwide standardization of quality evaluation data and market parameters.

Necessity of standardize quality parameters measured in processed products for clear and correct world market exchanges:

- Univocal Analysis of NTSS (°Brix) in Hot Break concentrated samples.
- Color evaluation (use same equipment and dilution).
- Natural carotenoids evaluation (Lycopene and other).
- Agro-chemicals and pesticides evaluation.
- Measure of xenobiotics residuals and evaluation of ingredients not allowed.



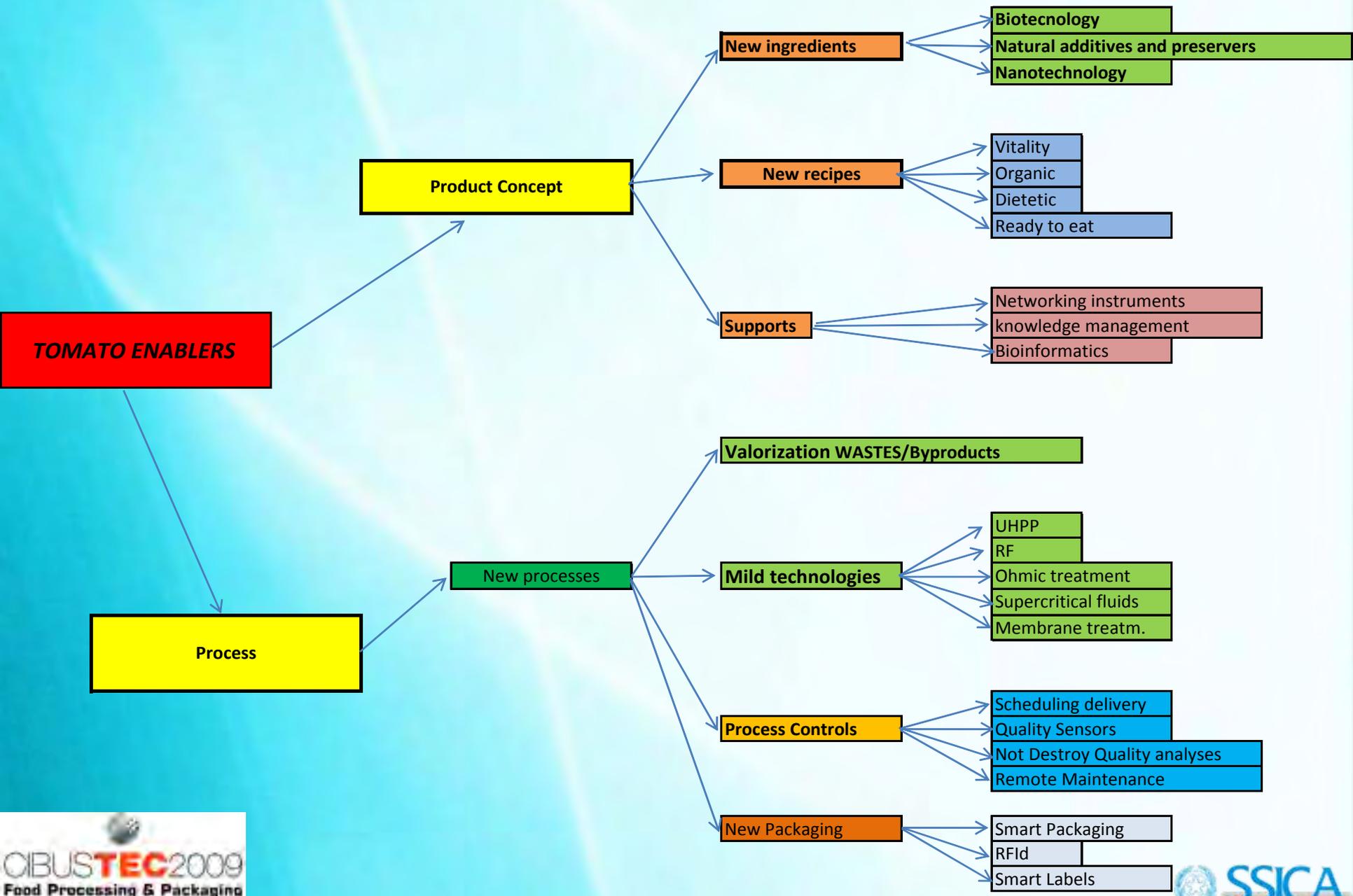
# THEME: Worldwide standardization of quality evaluation data and market parameters.

Example of application of innovative rapid analytical method for quality assessment:

- Carotenoids analytical determ. with ASE (Accelerated Solvent Extraction).
- SSICA Tomato department has developed a new method for the extraction and determination of lycopene and all the tomato carotenoids in tomato products (from fresh matter, juices, purees, pulp, to concentrates and complex sauces).
- SSICA want to offer to all the tomato world components its expertise and partnership for the organization of international collaborative studies (official ring tests) with the aim to fix international standardized analytical methods, useful for new global exchanges requirement.



# TOTAL QUALITY TOMATO MANAGEMENT SCHEMA



# Conclusions

- Economy and Financial Crises push consumers towards more conscious spending.
- Italian processing tomato industries usually harvest, picked and process best quality processing tomato, in an integrated “from farm to fork” concept, counting on all the food chain players in distinguished and controlled protocols.
- Despite the existing economic crisis, investment in research, innovation and pre-competitive studies will be essential to maintain the currently world leadership of the Italian tomato quality processed products and to guarantee strategic new tailored made products rich in healthy nutrients for the modern society.

*SSICA offer its expertise and its structures to pursue the mission that has always marked:*

*Food safety, Food Quality, Research, Development and Innovation.*



THANKS for your attention.

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