

Providing the quality of agro-food products through the research and technological development

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ABSTRACT

The purpose of this paper is to provide a comprehensive and clear picture about the importance and role that the agro-food product has over the research, technical development and food security. The general aspects regarding food safety and security are presented in the CAP framework. Quality of agro-food products and commodity price volatility is a particularly serious problem especially for those states that are dependent on the producers of such raw materials/commodities. In recent years, price trends revealed multiyear extremes that reached up to 100%. About two billion people, about a third of the world's population, depend directly on the production of primary commodities – basic agro-food products such as grain, oil, sugar, rice, meat, cotton. Food insecurity, climate change and price volatility are, more than ever, the three major global challenges that humanity faces. Food Security refers to food access and availability. A family farm or household, or any other form of organization, can be regarded as being safe, as providing safe food, only when all its members do not live in hunger or fear of starvation. Agro-food products always depend by the research and technological development, but this will happen only if the agricultural markets are established as well defined entities. Under the pressure of an increasingly unstable economic environment, the phenomenon becomes more and more dangerous, threatening global food security.

Keywords: agro-food products, research, technological development, food security, climate change, agriculture.

1. Providing the quality of agro- food products through the research and technological development

Several phenomena, which can be divided into 4 basic categories, are considered in the evolution of food commodities production:

- Food commodities implementation and observation, the most important being traceability of agro-food products;
- support innovation , a process in which the most important development is to involve the requests in order to obtain food products when using new conservation , encasement and marking techniques;
- Create new agrarian production systems, the most important being biological and smart agriculture and biotechnologies;
- Enhance the food products supply by sending new items on the market or by developing the already existing products due to the inquiry's new requests, from

which we notice functional food products, dietetic products, items based on genetic modified organisms, traditional and biological products.

The consumer plays an important role in the new product's invention. When a new item is to be released, the companies in the food community industry aim to lessen the risks the consumer's food preferences might bring.

This is the reason marketing is called in; the applied procedure consists of several main stages:

- test the basic concept through a survey which represents the project for a new product or a new spectrum of products:
- create a prototype based on the information gathered in the concept survey:
- organoleptic examination of the product performed by experts in a laboratory, in which they give marks to each main feature;
- a new organoleptic examination of the product which has been modified based on the results from the previous examination.

The fifth European tendency regarding the customers possibility to assess the food items features is based on senses. This is the reason why the package has gained such an importance lately; it is the correspondent between taste, smell, flavor, appearance and the color of the product or package.

Advertising plays an undeniable part in linking producers to customers. Producers do not advertise directly and explicit for they wish to prevent any possible feeling of rejection towards the product.

With respect to the new products, they resort to already known characteristics and analogies in order to determine the customer to purchase the item.

Fresh food products have a more and more important role in every day nutrition. However, as they can only be purchased during a short period of time, consumers have to store them which are the reason why seasonal fruit and vegetables can be used all over the year. This is the moment when consumption methods and techniques are crucial.

1.1 Methods used for Agro- food fresh products

Fresh food is usually threatened by 2 main categories of spoilage agents: microorganisms, which decay the product and enzymes which enhance the spoilage chemical reactions. The best methods to slow the chemical reactions down are freezing, ultra-fast freezing, pasteurization, which is used to eliminate microorganisms through heating, a process that leads to taste alteration due to aromatic molecules` sensibility to high temperature.

To prevent taste modifications, fast pasteurization followed by immediate cooling is used.

The disadvantage of these methods is, that it cannot be used to sterilize certain non acid items that also contain spores, such as: milk or particular vegetables (beans, potatoes, etc). In this case, the only efficient procedure was sterilization with its disadvantages caused by high temperature.

Against these 2 disadvantages methods based on high temperatures, new solutions are being created and used, from which we must mention high pressure submission and pulsed electric fields.

High pressure submission is a method that allows not only fruit and vegetables juices and products conservation but also cold meats conservation. The item will only change its

volume without modifying its shape due to the fact that pressure takes action upon every point. Bacteria are completely eliminated because the method applied.

This method can not be applied to products that contain air, such as: bread, or have a higher degree of acidity, or the food products that can not be packed in vacuum such as: salads or fruit and vegetable mixtures. This method has significant advantages: microorganisms complete elimination by destroying the cells diaphragm, a consequence to lipids crystallizations in normal temperature, vitamins and aromatic substances preservation.

There are, though, some disadvantages: bacteria are eliminated under a 4000 bar pressure while some microorganisms require a 6000 bar pressure, proteins can be modified, thus resulting unplanned consequences or economical disadvantages.

Electric pulsate field method is a more recent procedure than the pressure based one; it requires high enough voltage to fully eliminate bacteria. The items that are to be conserved are put under an electrostatic field with 18000 and 40000 volts per centimeter voltage for an extremely short period of time (a millionth and a billionth of a second).

At the moment, the only products which the electric field method can be used on are liquids, free from gas bubbles and large particles.

This methods advantages are the following: complete elimination of microorganisms, taste preservation, a very low protein modification.

These methods disadvantages are the following: the need to adjust the electric pulsate field due to microorganisms` different sensibility, a lower quantity of vitamin C.

In addition to that, this method requires high costs, being new technologies, the implementation and assembling costs can sometimes be very high, especially for small and medium enterprises. The crisis in the agro-food area determined customers and producers to be very reserved regarding new technologies. In the end, European legislation constrains producers, through “Novel Food” law come intro force in 1997, to obtain a trading authorization for the products upon which new technologies were used.

2. The agro-food products encasement has a crucial role in the promoting strategy.

The main European tendency is to adapt the package to the products particularities. This is mostly taken into consideration for fresh food and vegetables. Air-proof encasements might lead to alteration. To avoid these precise effects several encasement methods are being used:

- penetrable package for CO₂, method already used for fruit and vegetables industrial conservation;
- using oxygen absorbent substances in the package;
- using humidity absorbents that do not allow microorganisms to grow;
- using ethanol encasement to provide protection against molds;

Smart encasement is another European tendency in the package field. These packages can provide information regarding the products condition and can be endowed with freshness parameters or microorganisms indicators which alter the quality of the content.

There are other systems that test the real freshness parameters such as : measuring the fruit flavors intensity and quantity, gases detection resulted from microorganisms` biological reactions, bacteria detection using antibodies placed within the bar code which becomes readable when the bacteria exist.

Food commodities package rise a particular issue: the waste they generate. Therefore, the European food industry producers concentrate on finding the most suitable solution. This is encouraged by the increasing number of concerned customers about the plastic packages and the relation between environment and food consumption. The most inexpensive and the easiest to use biodegradable materials are paper and cellophane, both being based on cellulose.

Plastic biodegradable material utilization is let up by their price 3 times higher than the average plastic material price. Nevertheless, the industrial procedures developments lead to a fast drop of the price.

Some food items also have therapeutic qualities and help treating some diseases.

The so called remedy-food products have got the EU attention. These items are different from other categories of food at the level of composition; their particular qualities result from specific industrial procedures which usually provide these functional characteristics. Functional food products are not remedies, nor have they the ability to cure a disease; they do not require prescription or trading authorizations from pharmaceutical institutions.

The effects depend on the particular substances they contain. Some functional food items might help digestion while others might lower the risk of heart diseases.

Active elements come from more important sources such as: fat fish (tuna or sardine), vegetable oils (sunflower or canola) or a range of edible plants.

The simplest way to convert a conventional food product into a functional one is to fortification it; method through which the natural active substance quantity is enlarged. There are very many dairy products and fruit juices with an enhanced quantity of calcium and vitamins. According to the compatibility degree between food commodity and the desired active substance, the later can either be added in the products natural state or can be chemically modified.

Their production and trading are the effects of a deep knowledge regarding the human organisms' benefactions.

Of course, producers advertising about these items highlight their advantages.

To ensure a fair protection for the customers (nutritionally, sanitary and economically), functional food products advertising is very rigorous in European Union. Authorized advertising which presents a functional food products good effects, is restricted by law: tests must be performed previous to trading. This system was confirmed and reinforced by a norm, published on 30th December 2006 in the EU Official Journal, which establish the requirements availability of these proposals mentions. Functional food products are also aimed at by the legislation voted by the European Parliament in 16th July 2006 regarding enhanced food items.

In European Union, any statements related to the possibility of a food product to help prevent, treat or cure diseases are forbidden.

Is prohibited the various suggesting differences from similar foods that would cover most valuable nutritional intake, and also that any pathology is forbidden because you strictly for the drugs having very different regime authorization, marketing and management.

All these restrictions are meant for producers, but they can sometimes be crossed.

From the point of view of the marketing, these food items are submitted as "light" , "shape" , "litheness" , "fitness" or "0%". According to Codex Alimentarius, an item is

considered to be “light” if it contains at least 25% less certain nutritional ingredient , in relation to the item it is derived from.

Said ingredient can be: sugar, fat, salt, etc. These products can not be seen as dietetic (at least not all). Dietetic food products are items that meet the nutritional needs of customers with particular health issues. ”Light” products can be purchased by all customers who have the freedom to choose the quantity and consumption way.

Regarding industrial producers, ”light” food items contain less fat with negative effects, do not have sugar (especially saccharine) and other similar sweet ingredients. Almost all food products which resulted from industrial processes can be included here.

For example, to lower the sugar quantity, saccharine is usually replaced with sweeteners that have very few calories.

Several methods can be used for fat attenuation: using raw stock with a reduced quantity of fat (yogurt, milk cream), changing the meat/fat ratio for cold meats, replacing fat with modified fatty acids that are not absorbed by the human body, replacing fat with nutritive fibers or vegetable proteins, water addition for obtaining emulsions (butter or margarine), air addition through kneading or emulsifying cream or paste, etc.

Experts say that, in general, these food items are more expensive than the average products. The reason is that large research, development; marketing and advertising investments are required for their production. Raw materials are, however, quite cheap because sometimes only water or air addition is needed.

CONCLUSION

In the end it is the producer who can conclude whether or not the product will be released. Therefore, without diminishing the customers contribution, the producer eliminates a major risk with respect to the products rejection by retaining only those values that are able to fulfill the majority of the costumers.

Another European tendency is to increase the consumers influence upon the food inventions process. Such feature requires identifying distinctive food habits for different categories of customers.

A third European tendency for the current European customer profile is to lessen the time for food consumption. Producers provide several solutions such as:

- expand the items availability term;
- decrease the time needed for food preparation;
- trade food in closed disposables containers;
- sell items in smaller portions, designed for individual consumption regardless of the place and time.

Customers concern for health represents another characteristic. The origins of this phenomenon are in the 1980s starting with sugar-free and non-alcoholic drinks followed by food with a certain amount of vitamins and minerals. Lately, consumers have more and more often suggested products that encompass certain ingredients which would help prevent diseases, have therapeutic character, would help preserve the body or even semi-cosmetics.

Moreover, customers can not consume just any quantity because even if they are sugar-free this does not imply that these items also contain no fats and vice versa. Sugar-free biscuits and chocolate can have the same quantity of fat as the average products.

Research shows that it is difficult to confirm if “light” products` taste and organoleptic features reach the conventional items level or if they surpass them.

There is an important problem regarding the information that reaches customers and especially the confidence that can be put into this information. It can be considered valid if the label is read and interpreted according to comparable elements such as calories, fat and sugar content caloric mase. Cheese area should be analyzed carefully because in 2005 the fat percentage was estimated in relation to the quantity of dry substance and after 2005 the percentage is estimated in relation to the total mass of substance (cheese can have 40% fat in relation to dry substance or 8% in relation to the total substance).

“Light” food products can be another European tendency because, even though they are on every supermarket shelf, the price can be an impediment in certain situation. These items are widely consumed commodities because producers provide them as an answer to consumptions behavior development tendencies. An example is simple sugars excessive consumption to complex ones (present in fresh items). This tendency is valid for the majority processed food products.

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