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STUDY ON INTERFACE ENVIRONMENT - FOOD WITH CHANGE OF PARADIGM TOWARDS HEALTH GENERATING GASTRONOMY

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Abstract

The study performs an approach to the "environment - life quality - biotechnological molecular gastronomy" direction, an axis with consistent theoretic and practical potential in offering attractive and pleasant culinary products for the consumers, with the same effect on health as supplementary under pharmaceutics format. The paper proposes a change of paradigm, in order to develop certain excellence gastronomic preparations, based on incorporating functional and/or nutraceutic food, with hedonic characteristics and with the same health generating effect (or "sanogenesis" effect) through different bioactive substances, as an alternative for medicinal food, adapting ancient empiric ideas of the oriental food manner.
In this paper there is underlined the fact that, through the new paradigm, culinary preparations effectively become innovative composite foods which, through their diversity, equilibrium and in relation to environmental factors, open new research directions, towards conceptual coherence and diversification of gastronomic products aiming to a multifunctional energetic, nutritional, psycho-sensitive efficaciousness, having also at the same time a punctual metabolic action of a prophylactic type.

Key words: composite food, functional food, health-generating gastronomy

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1. Introduction

In the relation between nutrition, food and environment, the majority of researches generally aims exogenous agents (of environment) which also are the most numerous, often toxic ones, among them being also those with cancer potential. They may be found in man's nutrition products under different stages: production, harvest, selection, preparation, conservation, distribution and sale, as well as through other manners to directly or indirectly get to population alimentary consumption.

At all these there is also added food accidental pollution, already harvested or stocked, with substances coming from different sources, sometimes noxious ones. The lack or addition of certain biochemical compounds, of certain nutritive substances, of microelements, leads to metabolic lack of balance, which impose ***counterpoise with the help of certain engineered foods***. We are referring to innovative food (functional, nutraceutic aliments etc.), as well as to complex foods (culinary semi preparations, food and drinks based on current scientific and gastronomic menus, recipes, principles and processes).

In this context, we propose ourselves o contribution on the "environment-life quality-biotechnological molecular gastronomy" direction, axis with consistent theoretic and practical potential. The projection of new innovative health generating food of the additive type, supplements etc, but also of culinary preparations (excellence composite foods), must be carefully done in order to optimally answer the demands of the mentioned axis, as well as to prevent the pathogenetic impact. On this direction there have been developed the research and then the

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application of the medicinal food type, functional food type or nutraceutics.

The nutritional idea we are pleading for is to offer qualitative, attractive and pleasant culinary products for the consumers (health generating gastronomy), with the same effect on health as with supplements of medicinal foods (under a pharmaceutics form). There are thus also largely avoided conceptual interferences and controversies of a legislative order. This objective essentially imposes a change of paradigm, aiming to develop certain gastronomic preparations (food), based on functional foods, with hedonic characteristics and with the same health generating effect, through different bioactive substances, with an alternative for medicinal foods.

At present, at global level, especially at the level of the countries disposing of advanced analytic instruments, there are quicker and quicker discovered new bioactive compounds from numerous natural sources, as well as their potential to stimulate basic and/or counteraction physiologic functions of being taken ill risks. At the composition level, there have been put into evidence in graminaceaes compounds of the polycosanole type (respectively octacosanole) and carbohydrates with slow absorption, which really intensify the mentioned effects (Mitmesser, 2007). In recent research it is described the separation of different compositions from mushrooms with an energizing role and of effective stimulation of certain vital functions (Qi et al., 2012).

A great number of flavoring compounds of lipophilic and hydrophilic type which, for immemorial times, have represented the spicy bases of culinary preparations (especially of those of oriental origin), prove nowadays their importance under the aspect of interactions with nuclear modules implied in energetic metabolism regulation and in antioxidant bio protection (Goto et al., 2010; Kontogianni et al., 2013; Rachad et al., 2012). In maintaining health through nutritional therapies there have been implemented and scientifically proved (obviously at empiric level) concepts of holistic type, concretized by the approach to alimentary act, in tight correlation with environment factors of pedoclimatic type and with individual characteristics of certain human typologies (Swami, 2005).

The main idea is that one, the alimentary regime shouldn't remind the ill person of his suffering. In order to get the curative effect aimed to, “man should **enjoy the food** he is eating, otherwise his estate might get worse” (Culda and Culda, 1995). An example is the Chinese authors 'patent (Ma et al., 2007), in which there is presented a health generating alimentary product, with high nutritive value, with attractive sensorial characteristics, with effects to promote the blood circulation and with advantages to maintain the sensorial and therapeutic characteristics for a long period of time. The product is based on mixtures of and leguminous plant powders (wheat, rice and pea flours), beef, mutton, pork or chicken dehydrated meat, powders of medicinal mushrooms (*Ganoderma* and *Cordyceps Sinensis)* and spicy powders of pepper, fennel, clove, *radix glycyrrhizin*, etc.

In the same approach of a holistic type, there is to be taken into consideration also the author's patent (Doug, 2006) of a stabilized product with characteristics to prevent cardiovascular affections and diabetes, respectively with antihypertensive characteristics, based on red rice, polysugar powders, extracted from therapeutic fungicide, vegetal oils and flavors from chicken meat.

2. Material and methods

From methodological perspective in technologically advanced countries, priority preoccupations have been axed on individualized isolation, concentration and characterization of bioactive compounds (King and Gabriel, 2007). In the last decades, cumulating an impressive data base in this direction, at the same time with the thoroughgoing study of interaction mechanisms at molecular level between these natural compounds and their potential to stimulate basic physiologic functions of the human organism (Goto et al., 2010; Kim et al., 2010; Prasad et al., 2009; Sandeep et al., 2011).

The accomplished progress in the mentioned directions have allowed the emergence and extension of numerous alternative products faces to allopathic medicine remedies, the most generalized in this direction being nowadays the products from the category of food supplements and of certain functional foods, but also tendencies with valences of a holistic type at the level of the year 2013, in receipts aiming to promote eye health (Zhang and Hayek, 2013). These one integrates a pluralism of extracts with high antioxidant potential, respectively extracts from officinal rosemary, cranberries, green tea, coffee, curcuma, grape seeds, carotenoides from green plants: salad, green pea, spinach, broccoli, pigments such as licopen and bixin, also amino, lizin, taurin, histidin, carnosic acid, alanin, cistein.

The same orientations to extend the utilization of different natural resources are also to be found at the level of the year 2010, in the composition of certain health generating products with potential to generally promote "cell health", and as remedies to prevent and treat tumor affections and diabetes (Bartunek, 2012).

From what has been exposed, it is to notice a constant evolutionary trend in explaining correlations between the aliment and health promotion. This evolutionary aspect has been facilitated by the development of frontier sciences (nutrigenomic, transcriptonic, metabolomic, etc.) through which there have been thoroughly studied and scientifically proved molecular mechanisms, respectively the manner in which freed bioactive compounds from natural resources may influence physiologic functions of the human organism, as for example: energetic homeostasis equilibration (Coll et al., 1999), multifunctional antioxidant bio protection (Koepler et al., 2012), immunity stimulation (Can, 2012) etc.

Considering the thorough study of molecular bases as a first stage in sustaining nutraceutic products, the second perspective stage is sustained by the implementation of advanced procedures of spared processing of resources detaining bioactive compounds and/or their interference with traditional food substratum or with the new nutritionally modified substratum. This stage is at present and in the future sustained by enzymatic biotechnologies, non-conventional processing procedures in electro physic fields, and, lately, by procedures generically defined as "metabolic engineering" (Cutaia et al., 2016; Kabir et al., 2013).

In synthesis, the working methodological and experimental model for the consolidation of the new paradigm towards health generating gastronomy is described in the block schema from Fig. 1.

3. Result and discussions

The analyses of the interface environment-food are made through a series of comparative methods on biotechnological stages, processing and adequate technical adaptations and interpretations based on emergent integration principle are used in the analyses. There is analyzed the plurality of intrinsic and extrinsic energetic flows of the organism (the Man-Environment interface), based on physic laws, sustained by chemical energy and interpreted through mathematic models.

In this context, it is put into evidence the harmonization module of energetic flows, of chemical energy and of implicit biogeochemical cycles, through ***the systemic process of eco emergent integronics*** (Gruia, 2009). This process explains the coexistence of systems and the study of processes of their integration having as a result the accomplishment of something totally new and the appearance of certain new properties, of a superior, as, for example, health generating gastronomy in relation with *environment - food*.

Analyzing these models in relation with nutrition, we can make a series of observations of paradigmatic type that can largely elucidate the evolution on ***engineered food*** (or ***projected aliments)*** direction, respectively of *composite food* (culinary semi cooked, food and drinks based on menus, receipts, principles and current scientific and gastro technical processes) and of *innovative food* (- excellence composite food/based on molecular gastronomy, culinary building etc.; - the medicinal-food of the functional food type, of nutraceutics etc.; synthetic and pseudo synthetic food).

3.1. Eco-biotechnological model

The connection of principles specific to ecologic and biologic technologies led to the crystallization of an integrate model, i.e. the eco-biotechnology one. The model presupposes, as a coexistence for all biologic systems and living organism's participant in processing techniques, the impact of the environment, respectively ecologic affordability of applied biotechnologies, in relation with integrated energetic resources (Gruia, 2011).

For a high quality culinary production, the most important example of the eco-biotechnology model is that one of **sustainability and agro-food health generating system** in its whole, as a reference point in the ***modular agriculture*** to come (Gruia, 2010).

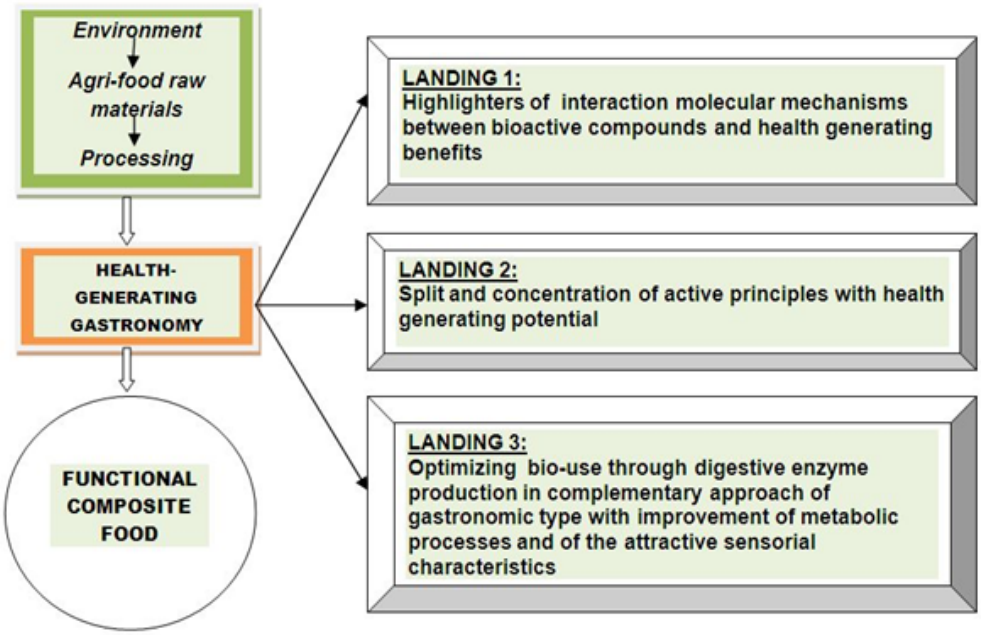

Fig. 1. Metabolic landings of the paradigm change in the *Environment-Processing-Food* integrated system towards health generating gastronomy

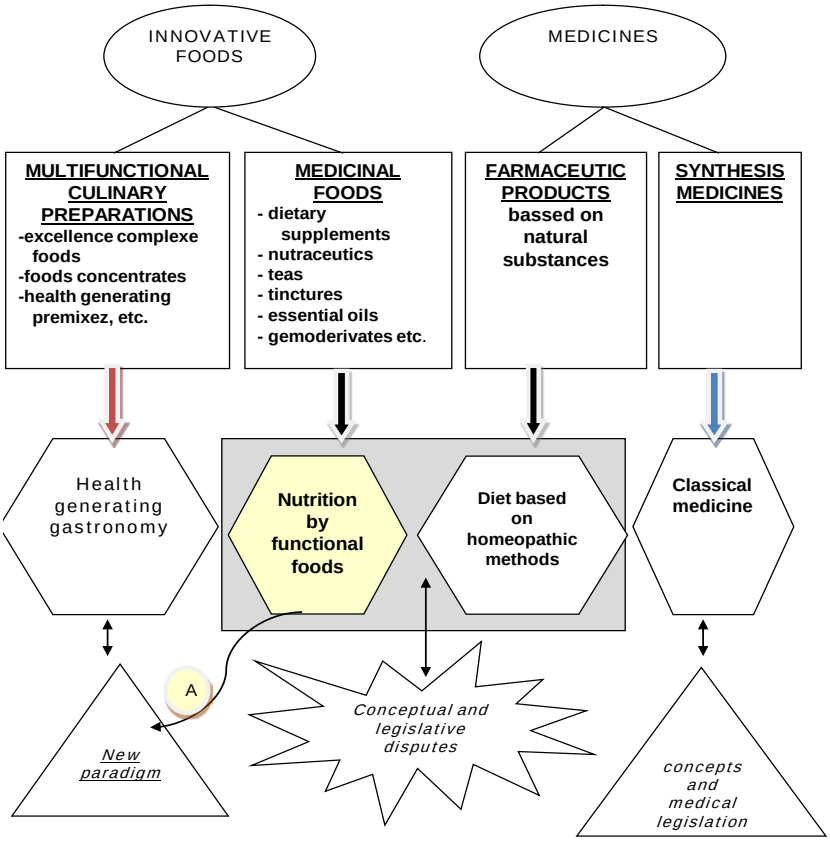

Fig. 2. Change of paradigm (*arrow A = dishes based on functional food*) necessary to emphasize the conceptual differentiation between innovative foods and medicines and to increase the hedonic characteristic emerging integration principle

This practically means the fulfillment of qualitative raw matter for gastronomic preparations, respectively the obtaining of agricultural and food products with superior ecologic and biologic qualities. This results consequently to the application of technologies specific to sustainable agriculture, to minimum food processing (non-destructive) and to testing the health generating capacity of these products (Gruia, 2008; Zhou et al., 2016).

Concretizing the enumerated methodological principles and elaborating the pre-established objectives one may make observations concerning the so much discussed relation between innovative aliments and medicines. Thus, synthesizing, we propose to place the analyzed elements in a scheme where the different concepts may find their place and logical dynamics in their interrelations (Fig. 2).

The new paradigm wishes to avoid the dispute between food supplements benefic upon health, that processors say products that contain or are made of different vegetables are (such as pills, capsules, liquids etc., that may prevent, treat or cure different illnesses), and pharmaceutical preparations sustained by producers of aliments (known example: antocyanins have anti-inflammatory properties and, as considered by American Chemical Society, the consumption, for example, of 20 bitter cherries, or the equivalent of concentrated juice, may relief pains as aspirin or ibuprofen do and other similar examples related phytonutrients (Drewnowski and Gomez-Carneros, 2000). At the same time, the new concept refers to the fulfillment of culinary products with addition of concentrated and stabilized **extracts**, especially from vegetable resources (arrow A, Fig. 2). These ones may be gradually, but also differentiated incorporated, in certain technologic stages, extracts that may induce food the same therapeutic characteristics that would have also induced medicinal foods under the form of pills, capsules etc.

It is in fact achieved "intelligent" foods, of the type of *excellence composite foods*, with much more attractiveness, where creativity associates raw substances from all over the world (from extremely different geo climatic environment) with ingredients having a therapeutic effect (example bioactive substances resulting from lipo and hydro soluble extracts). These excellence composite foods are based on the principles of molecular gastronomy and culinary constructivism, i.e. design with a remarkable psycho-sensorial impact (Gruia, 2008).

Consequently, the new paradigm solves two problems: (a) it is avoided the conflict on the problem of similitude/superposition of certain food products with medicines and, from here, all the consequences concerning clinical testing and disputes with the interests of pharmaceutical industry; (b) it is increased the food or drink attractiveness by the use of functional foods (or possibly nutraceutics) incorporated in the receipts of culinary preparations, which become thus multifunctional foods of excellence gastronomic type, with punctual health generating action.

3.2. Biotechnological processing in health generating gastronomy

Gastronomic engineering has at its basis the science of composite food products (the food complexity and diversity), the technology of culinary products and preparations and the management of catering. The impact of the development of scientific gastronomy has a benefic effect for a series of important sectors, with complementarities on direction of gastronomy, namely the tourism industry, the restoration system, the catering industry and others, but also directly, in relation with the consuming population. The interest to discover the food and exquisite drink **taste,** as well as new sensations and culinary experience, entails the development of research in this field.

All these impose higher and higher qualitative standards, as for example the direction of ***health generating gastronomy.*** This one aims to the health generating impact of functional composite foods, through diversity and equilibrium. The new paradigm opens new research ways that will lead to conceptual coherence and depth, to culinary technologies scientifically verified, as well as to the diversification of composite food with multifunctional energetic, nutritional and psycho-sensorial efficiency.

The research/innovation flow in the field of health generating gastronomic biotechnologies, as a conceptual forerunner for technologic flows, is characterized by the following principia steps, synthesized in Table 1. Innovative potential of paradigm change orientated towards health generating gastronomy is practically based on holistic reevaluation: environment - agro-alimentary products - processing technologies - food, through which may be assured related benefits (Fig. 3).

From what has been presented it results that the three landings (Fig. 1) lead to bio-use maximization (Fig. 2 and 3), where the third landing consolidates the new paradigm necessary to metabolic optimization of basic nutritional products and of trophins, under the conditions of satisfying hedonic attributes.

3.3. Examples of new paradigm applications

So that this paradigm may be as indicative as possible, of passing from nowadays consecrated functional food to health generating gastronomy producer of composite functional food, i.e. dishes, complex drinks etc. with tridimensional benefits - nutritional, therapeutic and hedonic ones-, we will briefly refer to a series of examples and applications.

- ***Example 1***

The maximization of food phytotherapeutic and sensorial potential of composite food through optimization of gastronomic type, based on antocianinic resources stabled through adds of molecular constituents with sulphihydrilic groups (Eidenberger, 2013; Zijia Zang et al., 2009), with relevant impact in bio protection of cell membranes especially at brain level. The present technological contribution is represented by athermal extraction, either at subcritical pressure, or through processing with pectolitic enzymes, as well as adding flavoring natural extracts from spicy resources (extracts of clove, cinnamon, cardamom, coriander etc.), or additions of foliar macerated from flavoring plants (Basil, Melissa, lavender, jasmine and others) or from conifers (pine and fir tree buds, rosemary and others). There is stimulated by gastronomic operations the antioxidant, antibacterial, antifungal, antiviral etc. capacity, as appropriate, with mentioning the stimulation of carbohydrate and lipids metabolism (prototyping dishes that also facilitate weight loss). Beyond syrups and jams, the new paradigm expands the objective towards gastronomic research.

- ***Example 2***

The maximization of phytotherapeutical and nutritional potential of cereal resources, by optimization of gastronomic type (Gruia, 1996; Tuluca et al., 1998) through enzymatic treatments with phytases, integration of flavoring additives, of essential oils or additions of cold pressed oils, of triglyceride type, additions of concentrated extracts and prototyping different mixtures obtaining dishes, as for example from the category of salty or sweet snacks, or gastronomic receipts of „*haute gastronomy*" type with high synergy in potentiating of hedonic characteristics.

- ***Example 3***

Alimentary and/or therapeutic mushrooms with optimization through gastronomic processes, that are considered as „*Pharma - Nutrition*" interface (Leal et al., 2013), have a high immune-modular potential, and the mushroom extracts present health generating relevance, being anti-inflammatory, anti cholesterolemic, antihistaminic, anticancerigeneous etc. Gastronomically, these extracts have a flavoring capacity (especially those from spontaneous micro flora), but also a „high gastronomic potential" (tens of recipes), fact that has led to the extension of biotechnologies of advanced cultivation of different species of mushrooms. These characteristics, through the new paradigm, sustain the mushroom integration in different nutritional and/or spicy substrates, as for example pastry and butchery products, mixtures of cereals (rice), pasta, oily soaks etc., with a wide utilization of innovative gastronomic type, through recipes of composite food with potential of immuno modulation.

4. Conclusions

It becomes obvious the necessity of a complementary paradigm, respectively of approaches of gastronomic type at the interference between environment and food through advanced nutritional sciences and culinary art, as a basis of life quality, respectively of health and "well-being", by scientific justification of molecular mechanisms with contribution of bioactive nutrients and their processing with housekeeping biotechnical methods.

Table 1. Conceptual and operational stages in health generating gastronomic biotechnologies

Work stage	*Name of stage*	*Content of stage*
Step 1	Obtaining vegetal/animal extracts	- primary processing of vegetables, fruit, certain flowers (ex. chopping, controlled drying etc.) - idem - aromatic plants - idem - medicinal plants and others - mixed decoctions plants/animals
Step 2	Biotechnological processing	- stabilization - cryogenation/sphericization/jellification - emulsifying - restructuration in nano particles
Step 3	Gastronomic prototyping	- sensorial mixing and equilibration - physic-chemical parameterization - elaboration design with psycho-sensorial potential

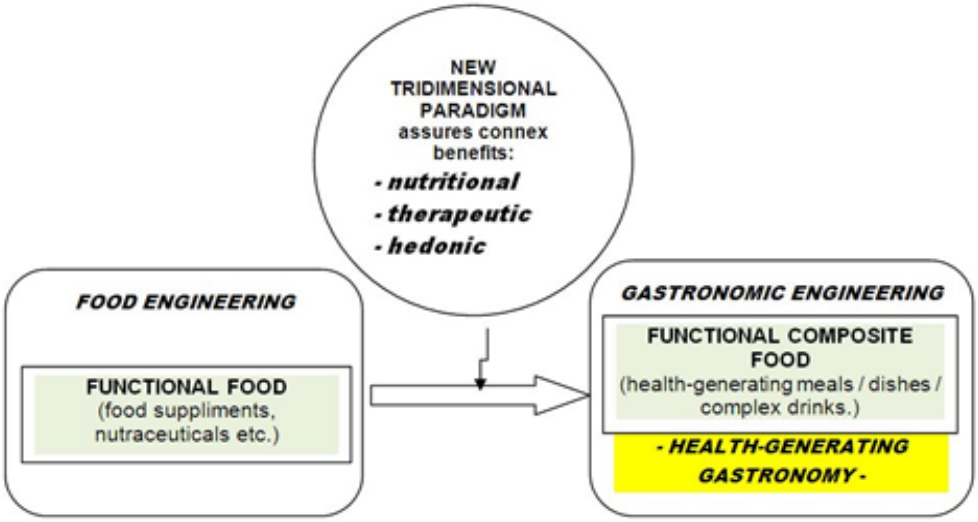

Fig. 3. Tridimensional biotechnologic dynamics of the new paradigm passing towards a health-generating gastronomy

Health generating gastronomy as a new paradigm, aims to a benefic impact of functional composite foods, through diversity and equilibrium, opening new research ways that will lead to conceptual coherence and depth, to scientifically verified culinary technologies, as well as to diversifying culinary preparations with multifunctional efficiency: energetic, nutritional, psycho-sensorial etc., also having punctual metabolic action of prophylactic type.

The 3 landings lead to bio-use maximization, where the third landing consolidates the new paradigm necessary to metabolic optimization of basic nutritional products and of trophies, under the conditions of satisfying hedonic attributes.

Applications of the new paradigm show the phytotherapeutic potential of different cereal species, indicating, since ancient times, the consumption of cereals with specificity for differentiated treatments (respectively decoctions, mashes, dough for baked products and/or fried in oils etc.), as well as natural flavoring extracts or different species of mushrooms, may be correlated with gastronomic practices. There appear directions that may constitute an objective of innovative gastronomic research in order to obtain functional composite alimentary sorts, with maximized health generating and hedonic potential.

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