

## GASTRONOMIC BIOHARMONISM

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**Abstract.** *The paper underlines the gastronomy orientation towards science and equilibrium, compulsory under the conditions of today's world changes and legitimate desires to improve food quality, with impact on increase of longevity. The idea of gastronomic bioharmonisation is approached, having as declared aim the increase of food health generating capacity. The multiple integration with its effects is analyzed at environment "macro" level, as well as at "micro" level of the body. The paper makes reference to biostructural processes of biochemical and genetic nature. There are analyzed aspects of nutrigenomics by emphasizing food impact focused on the body genetic heritage. The bioharmonisation processes emphasized in this study have as landmark the concept of integronic food applied for an approach of the techniques concerning personalized gastronomy. The solutions of the study linked to gastronomic bioharmonisation show that, in order to avoid the paradoxical situation (of disharmony) when people will eat quantitatively enough, but will be hungry by using "diluted" nutrient food (especially micronutrients), the approach of multiple integrations (integrionic alimentation) becomes necessary in order to harmonize the food quantity-quality ratio.*

**Keywords:** alimentation, bioharmonization, food, gastronomy, nutrigenomics

### 12. Introduction

**THE BIOHARMONIZATION** of the living systems and of the planetary system in its whole is the method that pursues optimized balance of alternation (vibration) of ergo-material structures of these systems (informationally encoded), between **DYNAMIC EQUILIBRIUM** with steady tendency to reverse the trajectory to a certain systemic estate (namely the living system *homeorexia* and respectively *georexia* on a planetary scale) and the moments of previous **EQUILIBRIUM OF STATIC STATE**, at initial conditions (namely the *homeostasis* of living systems in general and especially of man and, respectively, *geostasis* at planetary scale). The game of oscillating interconnections of this "georexia-geostasis" dynamic of states *de facto* generates "systemic harmony". Given the living systems specific to the planetary model, we are speaking about the „**complex biologic harmony of the living Planet**”, what we have named briefly the **BIOHARMONISM** phenomenon. Thus, it becomes possible to rediscover the unitary, balanced and

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harmonized way of the reality of the 3<sup>rd</sup> Millennium world, especially characterized by the convergence of the *Biologic Revolution* with the ubiquitous *Informational Age*. Another characteristic of the present epoch is the rationality of resource consumption in relation to (sustainable) mankind development. All these are elements of complexity, they are systemic directions, largely revealed in **The Bioharmonism Theory** [13].

Obviously the *General theory of bioharmonism*, appealing to a number of scientific, but also empiric observations, may be applied and may solve different disharmonies at the level of and system, on the exes from general to particular and vice versa. In this general context we consider that an important field, beneficiary of the bioharmonic approach, is the agri-food system and the food manner characterized by the integral dimension of the *act of eating*. In the present paper we propose a study that approaches the third step of the food act, namely, after agriculture and food industry, we are referring to certain aspects of bioharmonization in the specific field of gastronomy.

Gastronomy orientation towards science is not only sensory opportune (as before), but compulsory in the conditions of today's world changes on multiple plans and legitimate desire of improvement of life quality and increase longevity

## 2. Materials and Methods

The paper studies the topics from the perspective of objectives and also based on methodological principles.

From this perspective, the proposed OBJECTIVE refers to *gastronomic bioharmonization in order to increase food health generating capacity*.

METHODOLOGICALLY, a direction concerning „bioharmonization” that we are approaching in the paper is on the line of *integronic food concept*, as well as the solution based on the idea and techniques regarding *personalized gastronomy*.

## 3. Results and Discussions

In the act of eating, food is the carrier of „*utilities*” that assist or serve man by: entries of sustenance -**S**- (with plastic role and one of body growth and restoration), by energy [**E**] entries (energy brought by food being in fact an essential element of metabolism, but also of the energy necessary to the individual and society), as well as receiving information [**I**] (by food sensorial values and others). Otherwise said, for the body “machine” food constitutes providers of bioenergy, of constructive substances and of useful information coming through sensorial channels that ensures a psychological satisfaction of food needs.

In the idea of counteracting disharmonies, such as, for instance, metabolic decompensations are, practically there is combined nutrition with metabolism,

especially from **epigenetic** perspective (genes achieve their phenotypical effects, that is the perspectives at AND level), aspects that are directly or indirectly influenced by environment factors [14], especially through the **food profile** both at alimentary level and at the level of integration on the axes „*Man-Food-Environment*”. These ones are possible in the conditions when, in fact, man is an informationally open system, with self-regulation, self-reproduction and antientropic evolution, that processes exogenous and endogenous information [1, 2, 4, 9, 10, and 15].

### 3.1. Elements of Intergonic Alimentation Concept

In this context, starting from the idea of the relation between **nutrition and metabolism**, there may be analyzed the totality of biochemical and energetic transformations that take place in the body biostructures [17] by the complex process of nutrition, in relation to **multiple integration with emergent effect (integronic process)**: with environment factors and, respectively, with the body itself. The taken into consideration “actors” are the main biochemical groups of macro and micronutrients, having as a “common factor” energy, all these being in interconnection between them, but also with the environment. The natural result is **bioharmonization**, i.e. *nutritive equilibrium and emergent dynamics* [6] in order to maintain life, estimated and analyzed at level of FOOD MATRIX [18].

We are talking about a system of nutritional processes, of different types of food, of multiple integration, of metabolism, respectively about catabolism and anabolism that goes on through a succession of a number of chemical reactions: hydrolysis, hydrogenation, desiccation, decarboxylation, deamination, transamination, esterification, condensation, polymerization and others [3,18]. The direct connection between all these and between food and the disharmony by the stress phenomenon, as well as between alimentation and incidence of degenerative metabolic diseases become, in fact, “civilization diseases”, such as: cancer, cardiovascular diseases, diabetes, rheumatism etc. [1, 3].

Thus, in the bioharmonism process, the **food nutritional profile** becomes necessary, which may be expressed by different **indicators**: of nutritional density, of thermal density, glycemic index or load, antioxidant score, atherogenic index, Alkaline or acidifying biochemical profile [18]. What we are emphasizing by this study is the fact that, in case of processed, composite or complex food (dishes or menus specific to gastronomy), nutritional profiles are completely modified and different face to the nutritional profiles of integral natural food. This fact presupposes another type of analyses, based on matrix structure with components of nutritional and environment factors.

*The food matrix represents the means by which alimentation is structured and is defined from the perspective of nutritive integration and harmonization. At*

the basis of **alimentary matrix** analyses nutritive factors are grouped in order to ensure life, respectively: proteins, lipids, carbohydrates, mineral salts and vitamins. If we take into account that these ones are formed from simpler substances, the number of compounds individually well characterized and necessary to the body raises to approximately 70 – 80, from which 23 – 25 amino acids, 20 fatty acids, 6 “oze” substances, 15 – 20 mineral elements, 12 – 13 vitamins [3, 11, 12]. There are nutritive factors that exist **NEITHER** in pure form **NOR** single in nature, but only in certain associations that constitute **food**.

It becomes thus extremely important to study these associations necessary to provide population with covering foods in terms of nutrients. Their *harmonization* may be therefore analyzed by the alimentary matrix specific to every type of food, matrix of ever larger complexity, beginning with agricultural food, then the composite industrial ones up to the most complex ones from gastronomy. We are referring to the **integrronic dynamics** of the food act processes, taking into account its nutritive, metabolic, genetic and ecologic components specific to complex systems such as avoiding pollution (the known example being linked to the high level of CO<sub>2</sub> that may increase crops with about 10 %, but that reduce nutritive elements with 5-10 %).

**THE CONCEPT OF INTEGRONIC ALIMENTATION** is the scientific demarche that studies integrate food systems (due to their coexistence) and processes of *multiple integration in the idea of dynamic equilibrium*, having in view epigenetic elements (phenotypic modifications due to the environment) and of alimentary profile at individual or population level, considering *synchronic and syncretic* the dynamics of the act of eating, based on *synergic* effects and finally on *emergent integration*, leading to food quality of a superior order [12].

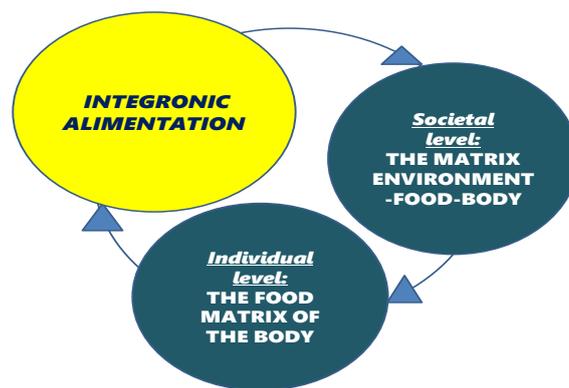


Fig. 1. Action levels in integronic alimentation, i.e. successive integrations in an emergent process, with emergence of new aspects of a superior order in the dynamics of nutrient metabolism (source: Own concept).

There may thus be defined a series of processes of nutritional bioharmonization: nutrition of holistic type, particularized nutrition and different impacts of the food process, by a unitary and coherent concept of integronic alimentation, which obviously has forms of manifestation both at super individual level and at organic level (Figure 1).

The connections between food biochemical elements in relation to the interaction between environment, food and body induce the idea of multiple systemic integration, forming what we might call an **integronic matrix** necessary in nutritive equilibrium in order to keep alive animal bodies, by harmonizing processes of fundamental metabolism. In other words, this matrix may have different (multiple) integration levels, both at super individual level, where it takes the complex form of the *environment-food-body integronic matrix* and at individual level, where it constitutes itself in an *organic alimentary matrix*. These ones indicate the fact that there have been registered major progresses in understanding system biology, in the impact of environment factors and especially of the nutritive ones upon the body, mainly of the complex interaction between its components: genome, transcriptome, proteome and metabolome [1, 5, 7, 16, 19, 20].

### **3.2. Biostructurality - component of the concept of gastronomic bioharmonization**

Within the **concept of integronic alimentation** and of biostructurality, there may be observed that individual variations, as a result of the impact of integronic dynamics, are mainly completely given by environment [*E*], the genotype [*G*] practically remaining unchanged [8,15]. The nutritive equilibrium especially changes because temporary environment changes. Thus, the *environment-food-body integronic matrix* may be altered and sometimes ended with severe disharmonies because of a number of environment factors, among which those linked to the intensity of the activity, to age, gender, health estate, the size of the analyzed group and, of course, to the type of food considered are more important (example: agricultural or primary food, industrial food or resulting from processes specific to food industry, composite food or complex dishes or drinks).

In gastronomy, in order to harmonize all these elements, with impact on every body, it is known that making a **menu** corresponding to the principles of scientific alimentation in fact means to find the modality to cover the physiological requirements at super individual level for a certain category of consumers [12]. The menu is thus achieved by nutritive corresponding food products or preparations, varied ones, with psych sensorial characteristics that may attract the

consumer by *taste harmony*, with satiety power and that may prevent the onset of hunger for 4-5 hours. Menus are addressed to a human population, respectively either to a *type group* of consumers (for ex. school canteens, restaurant canteens), or to *adult* consumer with average physical effort, as reference type [11].

The amount of culinary preparations consumed daily must include all groups of food in certain proportions in order to achieve nutritive equilibrium. There may be made *isocaloric* substitutions (between the same group of food) and *isotrophin* ones (between food from different groups, but equivalent concerning the nutritive value). The *recommended* percentage weight for different groups of food in the daily necessary energy is given in Table 1 [12].

**Table 1.** The structure of daily necessary energy of a **type menu**, on groups of food and macronutrients

No.	Group of food	Weight in menu (%)	Carbohydrates (C)	Fats (F)	Proteins (P)
1	Cereals and abducted	35	35	-	-
2	Fats	18	-	18	-
3	Vegetables - fruit	17	17	-	-
4	Milk and dairy products	2	-	-	2
5	Meat and meat products	8	-	-	8
6	Sugar and sugar products	8	8	-	-
7	Eggs	2	-	-	2
TOTAL		90	<b>60</b>	<b>18</b>	<b>12</b>

It is observed, as are commendation of *bioharmonization on integronic principles* that the share between macronutrients should be of „**C.60-F.18-P.12**” form (from table) as a landmark, respectively a standard menu with 60 % carbohydrates, 18 % fats and 12 % proteins. In fact we find again the traditional diet: 60-30-10, with recommended limits towards: 50-30-20.

It is obvious that, in function of numerous known factors, the proportion in the “*macronutrient trinomial*” (being in a permanent dynamics) has as effect the fact that shares “*slip*” towards one or another of the previously given and considered landmarks. This variation is also in function of the requirements of the consumer target, it is in relation to micronutrients (vitamins and minerals), but especially in relation to food energy drifted from dishes recipes or to the convergence of dishes from the whole of a menu. This well-known variability imposes to make different *food matrixes*, as a „complex system” to cover the integronic dynamics of all nutritive requirements (Fig.2) [12].

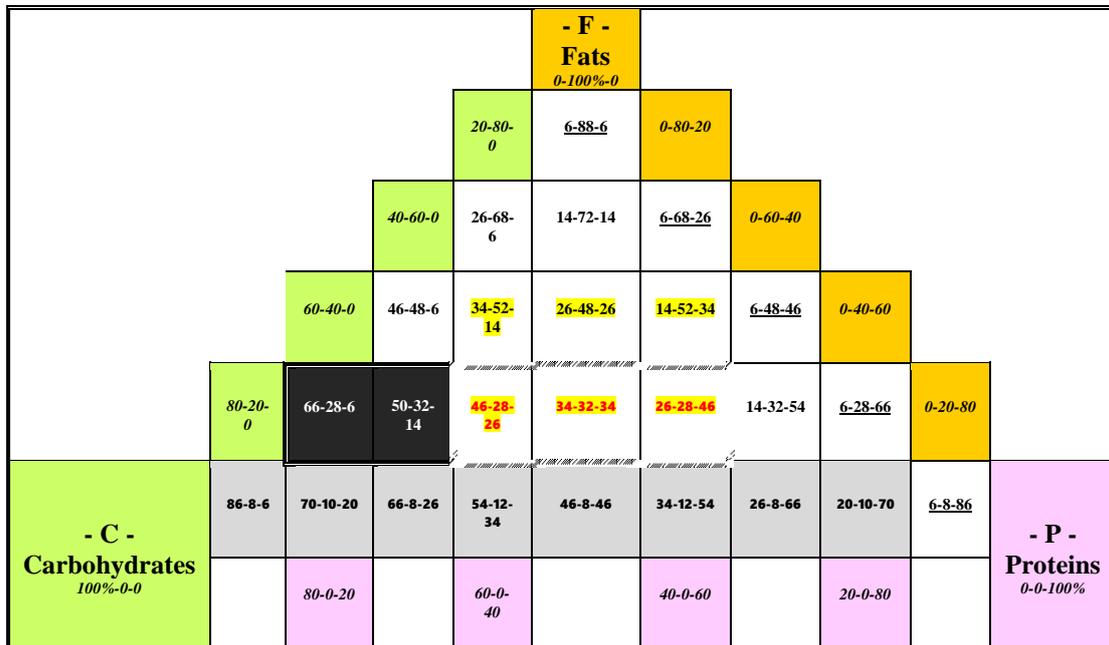


Fig. 2. The matrix of the complementarity of „the macronutrient trinomial C-F-P”,  
With integrated result of energetic dynamics specific to the given food ration

From Figure 2 it results the pyramid that lays at the calculation basis of the caloric ratio of recipes and menus, as well as the location of the recommended report (the zone marked with three lines). On the other hand, alimentation bioharmonization may have multiple directions of action and integration, in function of the sustained alimentary philosophy.

Among these there may be reminded the most known directions, both bioharmonized and disharmonized (unbalanced, unhealthy ones) from figure 2:

- the philosophy of balanced menus (diet): landmark 40-30-30 (dashed zone);
- avoiding “hard” carbohydrate and fat menus (triple line zone on black background);
- hypolipidic diets, with reduced fat (on grey background):

86-8-6	70-10-20	66-8-26	54-12-34	46-8-46	34-12-54	26-8-66	20-10-70
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- hypoglucidic diets with low carbohydrates (the underlined ones):

<u>6-88-6</u>	<u>6-68-26</u>	<u>6-48-46</u>	<u>6-28-66</u>	<u>6-8-86</u>
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There must be mentioned that the model becomes more complicated in case that it is taken into consideration the micronutrient group, which implies in fact further research.

### 3.3. Gastronomic bioharmonism aiming personalized feeding

As a result of latest research, it seems that alimentation, as a main environment factor, has a much bigger role than it was thought on the body. That is why a basic side of gastronomic engineering that is growing at present is to keep in mind the *food impact focused on the genetic patrimony* of the body. In our opinion, this problem represents the starting point or the deepest manner to explain the other concepts that lay at the basis of the scientific and technologic demarche of gastronomic engineering on the direction of the metabolism bioharmonization for every organism apart.

The roots of the relation between genetics and alimentation are to be found even from the classic ratio established between genotype and environment, in the sense that the feeding manner is decisive concerning the environment impact on the genotype. A number of “invisible” effects of the feeding manner are noted and their consequences on long term upon human genotype.

Taking into account the fact that any organism represents the result of the *interaction* between its hereditary basis and the environment conditions, and among the ones first of all alimentation, this premise allows to make a basic division of the phenotypic value. On this basis it is more correctly understood the genotype notion and the environment one that represents a landmark in personalized gastronomy. Thus, we remind that genotype *[G]* is all genes possessed by an individual and that determines the appearance of a certain character, and *environment [E]* represents all the conditions that influence and determine transformation of the genotype in phenotype *[P]*. Therefore, the genotype gives a certain value to the individual and, concomitantly, the environment produces a deviation of this value in one direction or another direction. From here also the formula known for its phenotypic value, but applied here to food impact:  $P = G + E$  [8].

In the sense of those shown, the genetic body patrimony reacts and is depending on the **type and quality of the food consumed**, implicitly on their specific concentrated energy. The simplified relation refers to the fact that food with high caloric density lead to growth of the body entropy (degradation of the system energy, measure that indicates the degree of organization of the system, in fact disorganization of the body), which in principle represent the element that leads to the appearance of diseases.

Without entering into details of nutrigenomics, we are mentioning in this context that there may be achieved the control of the genetic expression by a *single nutrient*, component of food and, as a rule, this control is complex, exercising by *interconnections* between nutrients (ex: retinoid and fat acids), or between nutrients and hormones (ex.: thyroid hormone and fat acids). Taking into account *synergy, equilibrium or ingredient counteraction* from **complex food (dishes)** or even from **menus** (i.e. all dishes served at a meal, practically representing **unitary hypercomplex food**), bioharmonization has in view variants for healthy consumers, or variants of *diets* (recommended diet for health recovery and maintenance) for consumers with certain diseases. Because of these reasons, the approached problems are very complicated, but with an immense potential in the realm of research and applications in research from Gastronomic Engineering.

### Conclusions

(1) It is observed the tendency of evolution of present food towards menus poor in nutrients, i.e. dishes and raw food lacking more and more nutritive quality, so adding nutritive supplements becomes necessary. In order to avoid the paradox situation when people will eat quantitatively enough, but will be hungry by using nutritive “diluted” food or dishes (especially in micronutrients), the idea of **integronic alimentation** lays conceptual bases for the harmonization of the quantity-quality proportion.

(2) **Gastronomic bioharmonization** aiming to increase food health generating capacity in essence is based on the concept of integronic alimentation (i.e. multiple integrations with emergent effect) that may then generate technologies that lead towards the bioharmonization of the relation of food production, both concerning the impact with nutritive equilibrium and satiety, and the impact with the environment, by avoiding pollution.

(3) Operationally, gastronomic bioharmonization may be made especially on the direction when environment really enters the food equation and has as target personalized feeding (genome level) through the **integronic matrix** of achieving nutritive equilibrium necessary to maintain quality life, by harmonizing the processes of fundamental metabolism in relation with multiple integration at population level, complementary to the intraorganic level one.

(4) **Food biostructurality** is a component of gastronomic bioharmonization both concerning food and raw materials in culinary production and the menu in its whole, practically leading to the achievement of a combined texture of the *macronutrient trinomial*, which constitutes food (as hypercomplex food) with major impact on metabolic equilibrium.

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