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# Contradictions and controversies in contemporary nutrition

## *Contradicţii şi controverse în nutriţia contemporană*

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**Abstract**
The role and the importance of food in health status conditioning and in disease prevention and treatment have been mentioned for a long time. Over the years, information about food has much evolved, notably in the last two centuries, but also nutrition discussions and presentations. Consumers are increasingly interested in their health status, and hence, in their food. Nowadays we are surrounded by a real food/nutritional/dietetic cacophony, which is defined by this agglomeration of many messages which are frequently incoherent, inconsistent or contradictory. Some highly recommend certain food, others contraindicate it, considering it toxic. With no intention of offering an exhaustive presentation, the paper only reviews some of very debated and controversial foods during the last years: milk, eggs, and meat. After the presentation of the main advantages and disadvantages of these foods, it could be said that a miracle/ideal food does not exist, and that the only healthy diet is a balanced and moderate diet, which respects traditional food patterns as part of the national cultural patrimony and of national food identity.
**Keywords:** food, nutrition, milk, meat, eggs, cacophony of food.

**Rezumat**
Rolul şi importanţa alimentaţiei în condiţionarea stării de sănătate şi în prevenirea sau tratamentul unor îmbolnăviri au fost menţionate de mult timp. De-a lungul anilor, cunoştinţele despre alimentaţie au evoluat mult, mai ales în ultimele două secole, dar la fel au evoluat şi discursurile şi reprezentările nutriţionale. Consumatorii sunt din ce în ce mai interesaţi de starea lor de sănătate şi, deci, de alimentaţia lor. Astăzi asistăm la o adevărată cacofonie alimentară/nutriţională/dietetică, care defineşte omniprezenţa, coabitarea mai multor mesaje sau recomandări, adesea incoerente, inconstante sau chiar contradictorii. Unii recomandă cu încredere anumite alimente, alţii le contraindică, considerându-le chiar nocive. Fără pretenţia sau intenţia de a face o prezentare exhaustivă, lucrarea trece în revistă doar câteva dintre alimentele foarte dezbătute şi controversate în ultimii ani : laptele, ouăle şi carnea. După prezentarea principalelor avantaje şi dezavantaje ale acestor alimente, se poate concluziona că nu există niciun aliment miraculos sau ideal şi că singura dietă ce poate asigura o bună stare de sănătate este dieta variată, moderată şi echilibrată, fără excese, care respectă modelele alimentare tradiţionale ce definesc identitatea naţională şi fac parte din patrimoniul cultural naţional.
**Cuvinte cheie:** alimentaţie, nutriţie, lapte, carne, ouă, cacofonie alimentară.

## General considerations

The role and the importance of food in health status conditioning and in disease prevention and treatment have been mentioned for a long time. Functionally, food is "substance taken in to maintain life and growth" (***, 1997).

About 2500 years ago, Hippocrates established the principles of healthy eating, and said "Let your food be your medicine" (Ionuţ et al., 2004).

Over the years, information regarding food and nutrition has progressively developed, especially during the last two centuries.

Nowadays we live a paradoxical period: food availability is greater than ever; on the other hand, in a world of plenty, accessibility (the second dimension of food security) is pretty low. The United Nations Organization reported that the number of persons suffering from chronic hunger re-increased in 2016 after a declining period lasting more than a decade, reaching 815 million people (11% of the global population, up 38 million people from the previous year) (***, 2017a). The main causes are conflicts, floods and droughts. Hunger and malnutrition kill like cancer, especially among children. Almost half of the deaths by cancer of the world's children aged less than 5 years (46%)

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are caused by malnutrition (1 child every 6 seconds, an increase from 41% in 2000) (***, 2017b); (1); (2).

In this situation, the objective of sustainable development to "end hunger, achieve food security and improved nutrition" is far from being achieved.

Currently, the food - health relationship is very present in almost all debates and represents a veritable public health challenge. Consumers are increasingly interested in their health and consequently, in their nutrition. Rapid advances in science as well as the short life of certain foods end up in fleeting, fluctuating, inconsistent or even contradictory nutrition messages and speeches.

Facing the more and more complex food universe, the wide supply of foods, and an omnipresence of incoherent scientific or pseudo-scientific messages/speeches, consumers are lost and disoriented.

Many nutrition speeches and food images are often subject to controversies or contradictions. As our knowledge of nutrition has become more sophisticated, the image, recommendations and guidelines of certain foods have changed.

*Milk*

Milk is at the same time a food and a drink of very high nutritional value (Ionuţ et al., 2004). It is an exclusive food for newborns, excellent for children and adolescents, very good in pregnancy/lactation, and good in almost every period of lifetime (with some exceptions, of course).

The main *advantages* are protein intake (of a high value, containing all the essential amino acids) and the presence of calcium and vitamin D (which reinforce bones and teeth, preventing osteoporosis and fractures). Due to calcium and to prebiotics and probiotics of dairy, milk and dairy products could be considered as foods having the force of medicines (Ionuţ et al., 2004).

Milk also has many *disadvantages*:

- the absence of iron (generating anemia) and vitamin C (especially in winter);
- the presence of natrium/sodium (which is why milk is not recommended in cardiovascular diseases)
- the presence of lactose (which can result in milk intolerance in people suffering from lactase insufficiency)
- some milk proteins are likely to be allergenic (casein, α-lactalbumin and ß-lactoglobulin)

Milk is *contraindicated* in some conditions: hypochlorhydria and achlorhydria, fermentation enterocolitis, and ulcerative colitis.

Over the years the image of milk has changed, and milk and dairy are nowadays among the most contradictory subjects. *The anti-milk campaign* that has emerged in recent years is intended as a warning for consumers not to consume excessive, useless or even dangerous amounts of milk. The cons are:

- *Milk is simply an agribusiness conspiracy*. Almost all recommendations about milk would be based on scientific research requested and sponsored by milk industries, and doctors would not have any option in their conclusions (Souccar, 2007).
- *Milk is considered a dangerous/toxic food because:*

*a) Milk accelerates cancer?*

Besides other pollutants, milk contains a growth factor for calves - insulin-like growth factor (IGF-1) - a protein which stimulates the development of all human cells, including tumor cells, and generates breast cancer, prostate cancer and pulmonary cancer. From the point of view of milk carcinogenicity, studies are controversial. Some specialists have proved that cow milk has protective effects against colorectal cancer, by two nutrients: calcium (which prevents the development of polyps in the colon), and vitamin D (which inhibits the development of tumor cells in the colon) (***, 2007; Grau et al., 2003; Pufulete, 2008; Huncharek et al., 2009).

*b) Calcium does not prevent osteoporosis and fractures?*

Some researchers have shown that in countries where milk consumption is very high (Sweden, Norway, United States, Germany, Ireland, United Kingdom, Finland, Australia, New Zealand), the incidence of hip fractures is the highest. In China, on the other hand, where milk consumption is about 10 kg/person/year, the number of hip fractures is the lowest in the world. In Togo (less than 10 kg of milk/person/year), osteoporosis is extremely rare. This is a phenomenon called the "calcium paradox" (Bolland et al., 2010; Hess & Manson, 1984; Michaëlsson et al., 2014; Souccar, 2007).

*Eggs*

Eggs have an impressive nutritional profile. They contain proteins of the highest value, being used by the World Health Organization (WHO) as the reference when assessing the biological quality of *proteins* (Ionuţ et al., 2004).

Egg is a treasure of water-soluble and fat-soluble *vitamins:* B2 - equally distributed in egg yolk and egg white, B12; vitamin A - 19% of the daily value (DV), vitamin E - 50% of the daily value, vitamin D, choline - 60% of DV, folic acid (fat-soluble vitamins are only present in yolk), and *minerals* (mainly phosphorus and zinc) (Kiple, 2007; Howe et al., 2004).

Egg yolk contains *carotenoids* (lutein and zeaxanthin), which give its color and have an antioxidant effect, protecting against cardiovascular diseases and degenerative illnesses (cataract and macular degeneration).

The consumption of an egg results in no more than 70 calories, so it is a good choice to manage weight. An egg laid by a well nourished hen (which is fed a diet containing polyunsaturated fats from sources such as fish oil, chia seeds or flaxseeds (Coorey et al., 2015) has *omega-3 fatty acids* that promote good vision in infants and stimulate cerebral functions and memory. Pasture-raised free-range hens, which forage for their own food, also produce eggs that are relatively enriched in omega-3 fatty acids compared to cage-raised chickens (Anderson, 2011; Karsten et al., 2010).

Egg white can be used as an *antidote* to irritant or toxin poisoning (ovalbumin, the protein in egg white, having sulfhydryl groups in its structure, can bind and sequester heavy metal ions (Pb2+, Hg2+, etc.) and stop them from harming the body); it contains 2 natural antioxidant fluorescent substances (lumichrome and lumiflavin) which, along with sulforaphane, restrain the multiplication of cancer-inducing viruses; some of the proteins (globulins

G1, G2 and G3, ovomacroglobulin, IgY antibody) could extend the lifespan of people with AIDS, due to their nutritional value and to their antimicrobial properties; white egg also prevents ulcer formation (Narahari, 2009).

In yolk and chalaza, there is sialic acid used in microbial infection (Helicobacter pylori and others) causing diseases such as ulcer, gastritis, enteritis or colorectal cancer.

Despite the high nutritional value of eggs, there are some disadvantages of egg consumption:

- Vitamin C is absent from eggs (Ionuţ et al., 2004).

- Some proteins (especially from egg white) are responsible for allergic reactions (Cantani, 2008).

- Another potential health issue arises from the saturated fatty acid and cholesterol content. During the 70's to 90's, saying "no to cholesterol which gives us cardiovascular stroke" was in fashion; as a result, eggs were banned. Later, it was established that, in fact, there are two kinds of cholesterol (HDL- and LDL-cholesterol), and, actually, egg contains good cholesterol. Other researchers have shown that the level of blood cholesterol is less influenced by food cholesterol intake (Qureshi et al., 2007), and that egg proteins even reduce stroke risk by 12% (Alexander et al., 2016). Consequently, egg was rehabilitated and was reintroduced in daily diet (Rong et al., 2013). The new American Dietary Guidelines (***, 2016; ***, 2015) no longer limit dietary cholesterol, but limit instead saturated fatty acid, salt and sugar intake. In order to benefit from all the advantages and to minimize the disadvantages of eggs, these must be cooked (the protein of a cooked egg is almost totally bio-available - 91%, whereas that in raw egg is only 51% bio-available). In over-cooked eggs, proteins are much less digested, so slight cooking (3 minutes) or poached eggs are recommended (Evenepoel et al., 1998).

- Eggs can be contaminated with salmonella enteritidis or tiphymurium, pathogenic bacteria (Little et al., 2007; Stephens et al., 2007), or with insecticides such as fipronil (in 2017, a great scandal starting in Netherlands has blocked millions of eggs from sale and has raised the price of eggs) (Boffey, 2017; Anderson, 2011; Karsten, 2010).

*Meat*

Meat is a prestige food having a great symbolic value, used as a life standard indicator. It used to be an expensive and rare food, only consumed during Sundays or feasts. Currently, it is an everyday food in some of the world's countries. It has a great *nutritional value* due to the *protein* content (rich in essential amino acids), the high amount of *iron* (especially in red meat and organs), and *vitamin B group* (Ionuţ et al., 2004).

The main *disadvantages* are:

- Muscle tissue can be rich in *saturated fatty acids* (Sacks et al., 2017).

- Some proteins from meat are digested to uric acid responsible for uric *lithiasis and gout* (Kenny & Goldfarb, 2010).

- Meat does not contain *dietary fibers* and is very low in *carbohydrates*.

- On October 26, 2015, The International Agency for Research on Cancer (IARC) and the World Health Organization (***, 2015c), as a result of more than 800 studies, announced that red meat is "probably *carcinogenic* to humans (Group 2A)", and processed meat (e.g., bacon, ham, hot dogs, sausages) is "carcinogenic to humans (Group 1), based on sufficient evidence in humans that the consumption of processed meat causes colorectal cancer» (Campbell & Campbell, 2005; Bradbury et al., 2014). The risk is higher for colorectal, pancreatic, and prostate cancer, as well as for stomach cancer (***, 2015). Red meat (more myoglobin in muscle fibers) includes beef, veal, pork, lamb, mutton, goat, horse meat. White meat, which is not considered carcinogenic, includes chicken and turkey (poultry). According to IARC, 50 g of processed meat raise the risk of colorectal cancer by 18% (***, 2015c). Although meat has been classified as a Group 1 carcinogen, the same category as tobacco smoke and asbestos, WHO does not conclude that meat should be banned, and recommends to avoid any paranoia or psychosis, because even though the risk increases with the amount, bacon or hot dogs are much less carcinogenic than smoking (1 million deaths/ year caused by tobacco, 34.000 deaths/year caused by processed meat) (***, 2015c). Many hypotheses of the carcinogenic effect of meat are advanced: a) disruption of gut microbiota/microbiome by protein excess (Gagnière et al., 2016); b) meat is a pro-inflammatory food by heme iron (Hammerling et al., 2016; Guéraud, 2015), and arachidonic acid, an essential omega-6 fatty acid - the origin of many pro-inflammatory factors (cancer is related to inflammation in all phases) (Harris et al., 2009); c) the fat from meat needs bile acids for digestion, because gut bacteria turn these bile acids into cancer-promoting factors called secondary bile acids (e.g. lithocholic acid) which are very aggressive for the colon, and, secondly, meat fosters the growth of bacteria that cause carcinogenic secondary bile acids to form (Ayouz et al., 2014); and d) heating meat at high temperatures produces many highly toxic end products. The pollutants from cooked meat are: more than 20 *heterocyclic aromatic amines* (HAAs), linked to cancer, present in the blackened section of grilled and charred meats; *polycyclic aromatic hydrocarbons* (PAHs), such as benzo[a]pyrene; *advanced glycation end products* (AGEs), responsible for disease, aging, and death; *acrolein* (by fat breakdown); *acrylamide* (causing cancer and neurotoxic damage); and *N-nitroso-compounds* (NOC) (Jägerstad & Skog, 2005; Sinha et al., 1995; Butler et al., 2005).

However, the results are very controversial; some studies suggest that UK vegetarians do not have a lower risk of colorectal cancer (Key et al., 2009; Fraser, 2009). Meat can be eaten if accompanied by a large portion of vegetables (rich in antioxidants, anti-inflammatory, anti-proliferative and detoxifying agents). So, it is recommended to reduce the amount and the frequency of consumption of red and processed meat, and to use aromatic herbs, spices and marinade sauces without sugar. Antioxidant marinades of chili pepper, thyme, rosemary, garlic, and ginger can reduce HAAs by 74%. Acidic marinades containing lemon juice and/or vinegar could reduce AGEs. It is also important not to add sugar or honey into marinade sauces. Commercial marinades containing sugar, honey or corn syrup create 3 times more HAAs than grilling without marinades (Yu et al., 2015; Hernandez et al., 2015; Stone & Darlington, 2017).

At the same time, other researchers have proved that meat has only a minor role in promoting cancer (Alexander et al., 2009; Chao et al., 2005; Gehlhar & Coyle, 2001; ***, 2007; Murtaugh et al., 2004; Norat & Riboli, 2001).

There are opinions sustaining that, although beneficial, eating dietary fiber from fruit and vegetables has less or no benefit in reducing cancer risk (Gehlhar & Coyle, 2001).

As could be seen, nutrition messages and speeches are often contradictory. When speaking about a particular food, one can be told "it's carcinogenic", or "it isn't", or "it's good", or "it's bad"; so, one cannot know who is right and what to believe. This is a situation called "cacophony of food" (gastronomy), which means the coexistence of plenty of incoherent, more or less contradictory messages, which determine cognitive dissonance, responsible for the loss of guidelines. The cacophony of food is an expression of modernity and represents a source of fear for consumers who are less and less certain of their nutrition; the composition of the dish is increasingly inadequate.

## Conclusions

1. There is no ideal, miracle, or super food.
2. There are no totally good or totally bad foods.
3. The "forbidden" culture and the binary or dichotomous classification of foods into secure/insecure, white/black should be avoided.
4. Foods are not responsible for all bad things in our lives.
5. Some foods are more nutritious, and these must predominate in diet, but less nutritious foods, which have an affective, cultural, or gastronomic value, should not be excluded.
6. In order to protect our health, it is indicated to eat a variety of less processed foods, a diet rich in vegetables.
7. The only healthy diet, with no side effects or contraindications, is a balanced and common sense diet.
8. It is very important to preserve traditional food patterns, rich and diverse, as part of the cultural heritage, of national food identity.
9. Having a broad view of nutrition helps to avoid excesses, calm down anxiety, allowing everyone to define/ build their own highlights according to their personality, personal history, biological uniqueness, pleasure and desires.

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