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Limits of the HACCP for the Food Safety System

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ABSTRACT

The HACCP (Hazard Analysis and Critical Control Points) method is a universally adopted method for the prevention of the risks of contamination of food with harmful substances. Although this method ensures that there are no pollutants within the strict limits set by international regulations, it cannot be ruled out that contamination of food with potentially harmful substances will not occur. This depends on the current method of food production, which throughout the production chain, from primary production to packaging, involves the addition of numerous substances and additives to preserve the integrity of food. Since the HACCP system not only has concerned food production, but in general all the productive activities used to produce the aids for the prevention or the therapy of the diseases, or for dermo cosmetic use, the relevance and impact of such a system on health is understood. In this work we are going to examine all aspects and procedures used to produce food, highlighting the risks associated with the improper use of additives and preservatives.

Keywords: HACCP method, Food hygiene, risks and contaminants in food, food additives

INTRODUCTION

Food is the primary source that ensures the survival of the living, for the human species it also represents natural medicine for the primary prevention of many diseases. Hippocrates of Koos (460 BC) [1] recognized first the therapeutic value of foods and coined the famous motto: "let food be your medicine". For it to fulfil its fundamental mission, food must be genuine and free from potential dangers that may produce harmful effects on the health of consumers. Over the centuries, food has been undergoing a profound evolution from primitive methods of collecting and hunting food sources, and their direct consumption, to modern intensive industrial production, by which the food undergoes numerous manipulations and is processed before being consumed. From its origin to its consumption, food is subjected to a complex industrial processing method that includes several stages of processing, each of which can represent the route of introduction of chemical, physical or biological substances harmful to health. The research and experience gained over the years has led to the introduction of appropriate procedures to eliminate or at least minimise the risks present during food production. These

procedures have been collected and codified in the Hazard Analysis and Critical Control Points (HACCP) method [2].

THE HACCP METHOD, HISTORY, MEANING AND VALUE FOR FOOD SAFETY

The HACCP method was born in 1960 in the Pillsbury Company, the United States Army and the United States National Aeronautics and Space Administration (NASA) and was developed and introduced by NASA to adopt methodologies that could counteract the spread of pathologies of food origin and to ensure, at the same time, food safety. Since the eighties, the HACCP method has spread all over the world to become the only universally accepted method for guaranteeing food hygiene. Over the years the method has undergone numerous changes, based on the experience gained during the production of foodstuffs, by specific information for each type of production. Numerous norms and legal provisions have been produced and introduced, the adoption of which has become mandatory internationally for every company operating in the food sector, or in the production of substances to be administered to humans and animals.

BASIC SYSTEM HACCP

The 7 basic system principles of the HACCP system are the following:

1. Identify any hazard to be prevented, eliminated, or reduced to acceptable levels
2. Identify critical control points (CCPs) at the stage or stages where the control is essential to prevent or eliminate a risk or reduce it to acceptable levels
3. Establishing critical control points as critical limits differentiating acceptability and unacceptable for the prevention, elimination, or reduction of identified risks.
4. Establishing and implement effective surveillance procedures in CCPs
5. To determining the corrective action to be taken if the monitoring shows that a certain critical point is not under control
6. Establishing procedures to be applied regularly to verify the effective functioning of the measures taken.
7. Preparing documents and records appropriate to the nature and size of the food business to demonstrate the effective application of the measures referred to in points 1) to 6)

It follows from the above that the method referred to as HACCP consists in identifying all the stages which may cause a potential risk of introduction of substances harmful to health. Once these steps have been identified, measures should be taken to contain the harmful risk. In general, the greatest risks are represented by the stages of food handling by health professionals or by contact with surfaces and tools used for its processing and not properly cleaned and sanitized. The use of aids and clothing recommended by this method for the containment of bacterial infection during the handling of instruments and substances used in production is one of the nerve points that may compromise the result. The principals used are all disposable clothing, to be worn before starting food processing such as gloves, lab coats, headgear, masks, shoe covers that must be worn to reduce bacterial contamination. These are not sterile garments, therefore they cannot guarantee the absence of bacteria, they only have the task of reducing the risk of their presence, if they are kept in closed containers that can be sanitized and that they are made of good quality materials. The same measures adopted for the containment of risks, have ephemeral value, and if they are carried out in an impeccable way,

their validity and reliability is only temporary. For example, it is impossible to ensure continuity of effectiveness in sanitizing procedures, and thus potential risks of bacterial contamination.

ENVIRONMENTAL POLLUTION

A second crucial aspect concerns the quality of the raw materials used in food production. Whether it is chemical elements and substances, or plant extracts used in the production of food supplements, whether it is meat or fish or vegetables used in the catering or food industry, it is impossible to exclude the presence of chemical pollutants or heavy metals and pesticides inside them, because they cannot be eliminated. This happens because there is an upstream stage of food production, which is the stage of production and collection of raw materials and food substances, during which natural or man-made environmental factors intervene that could irremediably pollute the quality and safety of nutrients. The sources of primary natural pollution are toxic substances such as heavy metals, microplastics, parasites, weeds or other naturally occurring elements that occasionally enter food Fig. 1.

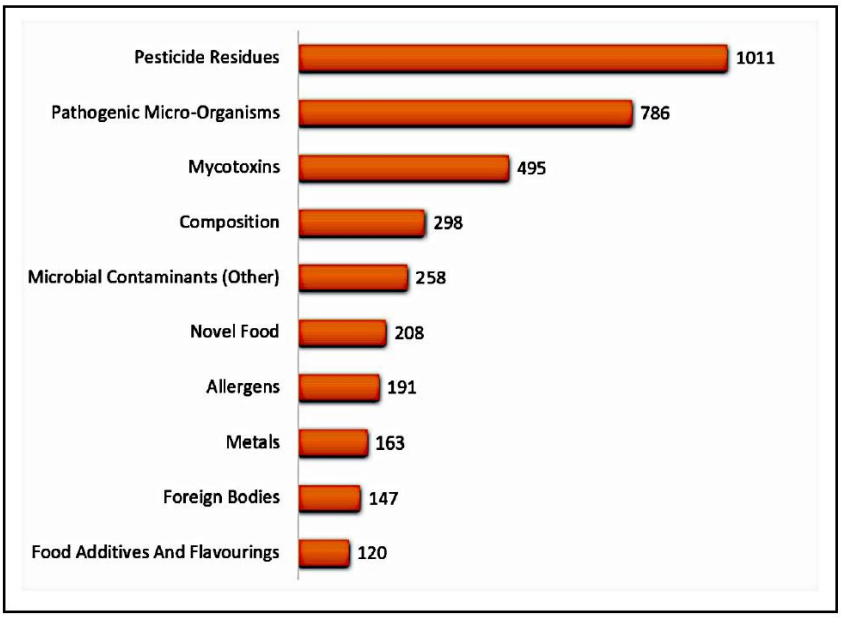


Figure 1: The main hazards notified through the RASFF in 2022 From RASFF 2022, EU food safety report https://www.greatitalianfoodtrade.it/en/safety/rasff-2022-report-on-food-safetyin-the-eu/

The sources of artificial pollution of food are caused by substances and drugs introduced by man to preserve them from deterioration and increase the amount of production of raw materials. They are pesticides, dioxin, pesticides, antibiotics, and hormones. All these substances enter the food chain and are concentrated in food. Most, if not all, of these substances are impossible to eliminate and maximum permissible concentration limits are established [3]. No better is the situation in the production of wine and beverages, where the use of dyes and preservatives is essential, and their constant presence.

THE SCANDALOUS CASE OF DRINKING WATER

For some years now, there have been reports of the disturbing presence of perfluoroalkyl PFAFS in drinking water, well beyond the limits set by health authorities. They are chemical compounds used in industry since the 50s, for their ability to make products impermeable to water and grease. The most common classes of PFAS are PFOA (perfluorooctanoic acid) and PFOS (perfluorooctane sulfonate): the latter is used for example in fire-fighting foams.

PFAS and Human Health

Today these substances have been found in the environment and have produced over the years a persistent accumulation because of their thermal and chemical stability, which make them resistant to degradation processes existing in nature. In addition to the tendency to accumulate in the environment, PFAs also persist in living organisms, including humans, where they are toxic at high concentrations. The European Environment Agency (EEA) https:///www.eea.europa.eu/ represented in a diagram the consequences for our health produced by the intake of these substances figure 2:

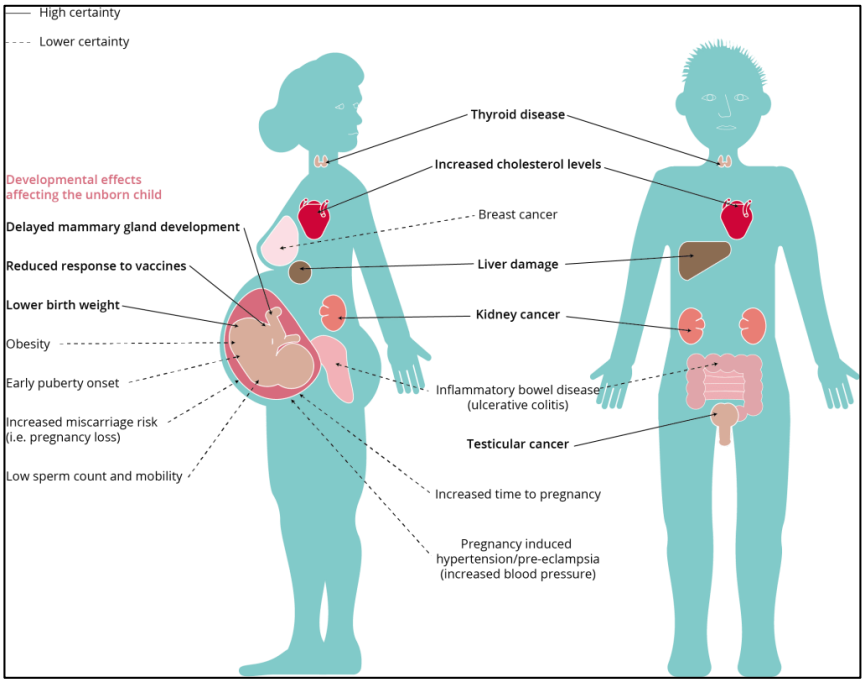


Figure 2: Sources: US National Toxicology Program, (2016); C8 Health Project Reports, (2012); WHO IARC, (2017); Barry et al., (2013); Fenton et al., (2009); and White et al., (2011).

Of this information is not found in the manuals of HACCP, only the widespread mobilization of public opinion, is trying to stem the spread of these substances, but to date no health authority has ordered the absolute ban on these deadly pollutants. While adopting the most scrupulous applications of the HACCP method, all these substances are found in variable quantities in the finished product and cannot be eliminated because they are an integral part of the parenchymal or food matrix. It is true that there is a hoc legislation governing the permitted levels of substances foreign to food [4-6]. Another aspect of hygienic relevance concerns packaging, and containers that come into direct contact with nutrients. Whatever measures are taken in the

selection of packaging materials, the possible presence of chemical or microbiological pollutants within them cannot be eliminated, and even the release of substances from which they are formed directly to the nutrients they must contain and protect [7-8]. This adds a second source of chemical and biological contamination to that present in raw materials. Also, drinks are not exempt from issue, both extractive drinks, and functional drinks. Meanwhile there is to be reported the indiscriminate use of dyes and exciting substances, added to improve the organoleptic aspect, and increase the euphoric effect, then we must consider the health qualities boasted by these, because the presence of essential vitamins and mineral salts is negligible and devoid of any nutritional effect [9]. To complete the alarming picture of the state of the food we consume, we must mention the large chapter of deliberate adulteration, which have the sole purpose of increasing profits with the use of cheap substances, and of dubious origin. An emblematic case is that of oil, so-called extra virgin olive oil. Here we experience the most daring mixtures of oils obtained from various types of seeds, where the olives are not the protagonists, but they aim to be able to assert by the producers their presence!

PERMITTED LIMITS FOR ADDITIVES

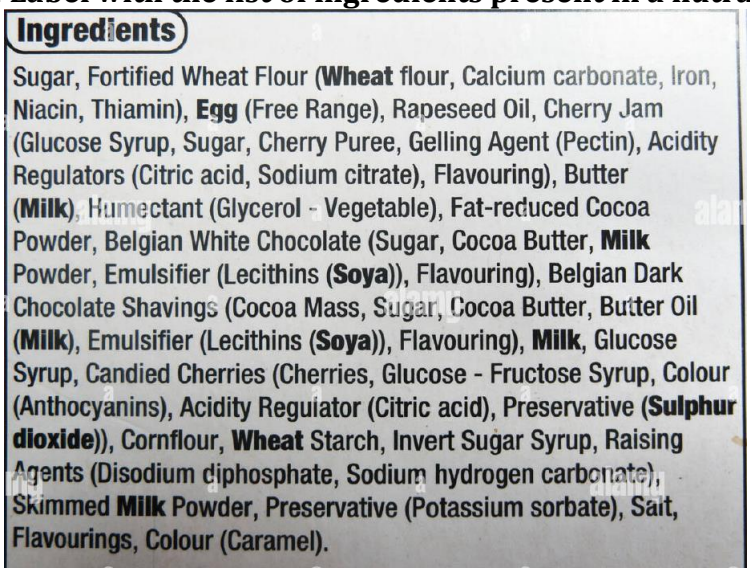
The adoption of permissible limits for additives is an extremely dangerous compromise, which does not ensure the total elimination of the food risk because the foods taken are different by type and are consumed simultaneously, so that you cannot exclude the intake of quantities of additives that exceed the limits imposed by law. The maximum intake limits allowed by the health authorities are indicated in appropriate tables where an impressive number of additives are listed. These are the substances already mentioned above dyes, preservatives, emulsifiers, thickeners, flavor correctors, etc. that enter daily in our diet, despite the strict controls carried out by the HACCP method, with peace of the unsuspecting consumers. For example, the following table shows the antibiotics normally used in food preparation Tab. 1.

Table 1: Antimicrobial food additives with their ADI quantities (mg/kg bw) (Carocho *et al.*, 2014)

Name	E number	ADI	Legislation
Benzoic acid	E210	5 mg/kg bw	Code of Federal Regulations 21 Sec.184.1021 EU Regulation No. 1129/2011
Sodium benzoate	E211	5 mg/kg bw	Code of Federal Regulations 21 Sec.184.1733 EU Regulation No. 1129/2011
Ethyl-p-hydroxy-benzoate (paraben)	E214	10 mg/kg bw	Code of Federal Regulations 21 Sec.175.105 EU Regulation No. 1129/2011
Sodium ethyl p-hydroxybenzoate (parabens)	E215	10 mg/kg bw	Code of Federal Regulations 21 Sec.175.105 EU Regulation No. 1129/2011
Methyl p-hydroxybenzoate (parabens)	E218	10 mg/kg bw	Code of Federal Regulations 21 Sec.150.141 EU Regulation No. 1129/2011
Sodium methyl p-hydroxybenzoate (paraben)	E219	10 mg/kg bw	Banned in the United States EU Regulation No. 1129/2011
Sorbic acid	E200	25 mg/kg bw	Code of Federal Regulations 21 Sec.182.3089 EU Regulation No. 1129/2011
Sodium sorbate	E201	25 mg/kg bw	Code of Federal Regulations 21 Sec.182.3089- Not approved in the EU
Potassium sorbate	E202	25 mg/kg bw	Code of Federal Regulations 21 Sec.182.3640 EU Regulation No. 1129/2011
Sulfites	E220-E228	0.7 mg/kg	Code of Federal Regulations 21 Sec.182.3616, 3637, 3739, 3766, 3798 EU Regulation No. 1129/2011

The failure of the system of control of food hygiene and safety is evident when we buy food in shops and supermarkets. It is enough to read the labels of the various foods to realize that we are buying not the nutrients, but the containers of chemicals allowed by the health system, in which the list of additives, dyes and preservatives is terrifying. For example, a list of ingredients indicated on the label derived from a nutraceutical product Tab.2 is provided.

Table 2: Label with the list of ingredients present in a nutraceutical



Ingredients

Sugar, Fortified Wheat Flour (**Wheat** flour, Calcium carbonate, Iron, Niacin, Thiamin), **Egg** (Free Range), Rapeseed Oil, Cherry Jam (Glucose Syrup, Sugar, Cherry Puree, Gelling Agent (Pectin), Acidity Regulators (Citric acid, Sodium citrate), Flavouring), Butter (**Milk**), Humectant (Glycerol - Vegetable), Fat-reduced Cocoa Powder, Belgian White Chocolate (Sugar, Cocoa Butter, **Milk** Powder, Emulsifier (Lecithins (**Soya**)), Flavouring), Belgian Dark Chocolate Shavings (Cocoa Mass, Sugar, Cocoa Butter, Butter Oil (**Milk**), Emulsifier (Lecithins (**Soya**)), Flavouring), **Milk**, Glucose Syrup, Candied Cherries (Cherries, Glucose - Fructose Syrup, Colour (Anthocyanins), Acidity Regulator (Citric acid), Preservative (**Sulphur dioxide**)), Cornflour, **Wheat** Starch, Invert Sugar Syrup, Raising Agents (Disodium diphosphate, Sodium hydrogen carbonate), Skimmed **Milk** Powder, Preservative (Potassium sorbate), Salt, Flavourings, Colour (Caramel).

Child Products Are No Exception

The same fate endures the dermo cosmetic products, and for the care (it is an understatement) of the body, where the active substances are the exception, while we find an endless list of chemicals that have unpronounceable names and very complicated formulas and have the sole purpose of improving the organoleptic characteristics, such as color, smell, viscosity, etc. rather than producing the promised aesthetic improvement.

EXCIPIENTS AND ADDITIVES IN MEDICINES

But the incredible is achieved with drugs intended for therapy. If you take any drug, belonging to any therapeutic class and in any pharmaceutical form present: capsules, tablets, ampoules, or syrups, and you read the composition, it turns out that the active ingredient is present in very low quantities, All the rest consists of the so-called excipients, preservatives, dyes, thickeners, etc. which form 90% by weight of the overall product.

In recent years, the increase in dysmetabolic diseases and food intolerances, such as obesity, diabetes, celiac disease, metabolic syndrome, etc., have been reaching levels of a pandemic, with negative repercussions on costs and on social and health prevention policies. There is a close correlation between the intake of additives through the consumption of junk food and the explosive development of metabolic diseases [10-14]. The situation does not improve if we consider the therapeutic devices par excellence, which are used for preventive purposes, we talk about vaccines. These substances are an emblematic example of the misinformation that is given to us about these aids. Let us examine the case of the so-called vaccine for Covid-19. Some

authors have examined the content of these products and found chemicals that are difficult to classify as drugs or excipients [15]. Yet these devices were the only treatment option imposed by the health authorities to combat the pandemic by SARS-COV2. Even today, three years after the start of inoculations of substances improperly defined as anti-Covid-19 vaccines, we gather the terrifying statistics of the numerous side effects produced by these substances [16-17]. Many international organizations and scientific publications denounce genocide, the Big Pharmas that produced them and the health authorities that endorsed them. In this case there has been a twofold disastrous effect, an unprecedented economic recession that has affected the weakest social strata, and the decimation of the world population, with a constantly increasing number of deaths. It will go down in history as the worst humanitarian and economic catastrophe of all time, the responsibility of which is totally attributable to the insatiable desire for domination and economic overpowering of pharmaceutical multinationals and business banks [18].

CONCLUSION

All this suggests to us the legitimate doubt about the real scientific content and the effective effectiveness in the prevention of the HACCP method, it is a method devised to legitimize and impose on unsuspecting consumers the lucrative trade in foodstuffs with questionable nutritional value and pharmaceutical products with a very small therapeutic margin. The HACCP method is like a prodigious medicine that cures all the defects in food from extraction to consumption. If it has been performed correctly then, as if by magic, it has eliminated all impurities and foreign substances present in food, and certifies their complete suitability for consumption, and the absence of defects and free from any risk of contamination with substances dangerous to the health of the consumer. It is the harsh cynical reality of industrially but not civilly advanced societies, in which the law of economic profit prevails over everything else. No matter what it takes.

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