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FOOD INDUSTRY FORENSICS: SAFETY AND QUALITY ISSUES

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Food Industry Forensics: Safety And Quality Issues

Lacramioara BALAN[1]

Abstract

Taking into consideration its importance to life in general, food will stay the most fundamental of our necessities, as it represents the source of all the energy needed to carry out daily activities, including those which delineate the very specifics of life. Authorities have reinforced strict regulations for certain information to be outlined in the labels and labeling, which should comply to the rules and regulations set by describing properly the geographical provenance and authenticity of all that is claimed in terms of quality and composition on the packaging labels. The rules, guidelines and regulations that have been set utter extensively about the legality of the whole issue on food provenance and fingerprinting, with laws being enacted to prosecute the culprits, offenders and transgressors. This sort of fraud is termed as "crude fraud" and in many cases it involves expensive, highly moveable items such as alcoholic beverages. Another type of fraud that takes place within the food industry is known as "sophisticated fraud", in which some food components are manipulated by either replacing a quality ingredient with inferior ones or the entire food product is subjected to dilution (e.g. addition of water to milk, brine to frozen meat, glycerol to wine, etc.). Urbanization and globalization encourage a specific trend of food supply chain to sustain the large population concentrated in urban areas. To control such a complex food supply chain in the current global economy in the presence of limited resources, creates room for transgressors to perform unethical business deals with food products. As time goes by, they come up with new ways of committing fraud, which leads to more challenges in dealing with this issue.

Keywords:

Food composition; crud fraud; sophisticated fraud; quality ingredients.

JEL classification: L60, K22

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Nowadays, forensic science, as it is used in a diverse number of fields, makes use of a highly sensitive and selective range of methods and techniques in examining evidence obtained from crime scenes, even where the sample presented as evidence is at the trace level. Among the disciplines which rely on the scientific principles to investigate foul play are in foods and foodstuffs.

Considering its impact on life in general, food will stay the most fundamental of our necessities, because it represents the source of all the energy needed to carry out daily activities, including those which delineate the very specifics of life [4].

Food is essential for our physical well-being and it is the main item that all the cares of the day are invested towards. Food is the source of energy needed in tissue reconstruction, muscle movement also playing a crucial role in the process of growth. One may dare to say that without food there can be no life! On the reverse side of the same coin, food which is unfit for human consumption may be used to target and end life. This is one of the reasons why food is one of the items prone to be used or abused to threaten life. There are various ways and instances where food composition has been compromised or tampered with, leading to negative effects upon consumers [1]. Typically, the introduction/ incorporation of either microbial (bacterial, fungal or viral) metabolites or chemical agents compromises the safety of food as it is meant for consumers and this represents a food fraud case. There are two major types of fraudulences as far as food is concerned.

Consumers of various foodstuffs and food products demand to be provided with clear, accurate, precise and succinct information and data about the origin and characteristics of the food products they use for consumption [6]. Authorities have implemented strict regulations for such information to be outlined in the labels and labeling which should adhere to the rules and regulations set by describing accurately the geographical origin and authenticity of everything that is claimed in terms of quality and composition on the packaging labels. The rules, guidelines and regulations that have been implemented speak largely about the legality of the whole issue about food provenance and fingerprinting, with laws being enacted to prosecute the culprits, offenders and transgressors.

One of the examples implicates a total replacement of the whole authentic food product with a substitute. This sort of fraud is termed as "crude fraud" and in most cases, it involves expensive, highly moveable items such as alcoholic beverages. Another type of fraud that occurs within

the food business/industry is known as "sophisticated fraud"; here, some of the food components are altered by either replacing quality ingredients with inferior ones or the entire food product is subjected to dilution (e.g. addition of water to milk, brine to frozen meat, glycerol to wine, etc.) [5]. Furthermore, there have been plenty food scares, scandals and fraud cases reported widely that not only pose a considerable risk but have also caused loss of life at global level. For instance, the advent of genetic engineering technology in food as well as in food industries has opened the path to genetically modified foods/organisms (GMO), which could pose a potential risk to human existence, though it has not been scientifically proved yet. Apart from the GMO issue, there have been a multitude of other incidents, such as the outbreak of bird/ avian and swine flu (H1N1, H5N1, H7N3, H7N7, H7N9, H9N2, etc.) and the outbreak of foot-and-mouth disease and bovine spongiform encephalopathy (BSE), also known as Mad Cow Disease. Other microbes, such as the strain of Escherichia coli (E. coli O157), are harmless resident flora in the gut of cattle but can induce disease in humans through the consumption of meat and meat products containing this bacteria strain. [4] Clostridium botulinum, a spore-forming bacterium, produces botulism toxins that are fatal to consumers of food items containing this toxin. There have also been numerous reports linking the incorporation of illicit food additives (which sometimes are not specified on the labels properly) in food products as well as various other malpractices by food producers and food industries.

These reports have alarmed the public and raised the awareness regarding the composition of food products and therefore, the higher demand for tighter scrutiny, guidelines and regulations concerning additives in foods. Incidences related to foul play in foods in terms of processing, labeling, distribution, food poisoning and intoxication, etc., have signaled law enforcers, nutritionists and health bodies to develop several laws, set new regulations and draw up guidelines to safeguard the health and well-being of consumers. [3]

Due to this, foodstuffs and food products are nowadays analyzed and investigated to see if they comply with the provisions set for quality, nutritive contents, adulteration, compliance against legally set guidelines and regulations, and also whether the labeling specifications are accurate. These considerations are also meant for research and development purposes to improve the quality of food products. All governments, as well as national and international agencies, have developed and implemented regulations, guidelines and recommendations to ensure the quality and safety of foods

and food products. Such regulations, guidelines and recommendations have to be observed and adhered to by all suppliers and food industries responsible for providing consumers with foods [5]. The enforcement of rules and regulations ensure the wholesomeness and safety of foodstuffs, and satisfy the public need which insists that food suppliers and food industries inform consumers about the state and nutritional composition of their food products, to enable individuals make their choices with regard to their preferences or to provide an environment with fairness, in cases where there is more than one competing company or entity, to avoid any possibility of economic fraud. Food regulatory bodies, and national and international agencies, have specified some standards to be observed by food suppliers and food industries with regard to quality and compositions of food products. Some of these standards are legally extremely strict and it is mandatory that they are adhered to by all responsible parties, while some others tend to be more flexible [6]. The strict standards which are mandatory include the quality standards in which quality specifications regarding stability, types and classes of color, mass/or volumes, tenderness, etc are being considered. Standards of identity are also mandatory by regulations and specifications regarding type, composition, ratio and amounts of various ingredients required for a specified food product, which must be made known so that where a threshold limit is set, the guidelines should be clear that it has not been violated. For example, in some foodstuffs, levels of fats are controlled by law and should not exceed certain specified levels. The standards of fill-of-containers are also mandatory, in which case a measure of fill/mass has to be known to avoid fraud or treachery of any sort. In this category of standards, the means or how to ascertain the fill/mass has to be made known as well [2]. Flexible standards may as well include grading of food products. Authorities responsible for food regulations also enforce a requirement that the origin and authenticity of food products be correctly included in the labeling, together with the labeling specifying food ingredients and their composition. This information is vital for the prevention of economic fraud and for ensuring that the correct type of food is supplied to the target people. For example, people of a particular religious group, or those who need food with certain ingredients, for instance, fat, sugar, salts, etc., at certain amounts. For this reason, food and food products need to be analyzed and ascertained for their safety and quality. In some cases, microbial attack on food not properly stored leads to the presence of toxic metabolites. Therefore, storage conditions and techniques are some of the issues that are scrutinized, especially for the types of foods and food

products that need to be transported to distant places or those which are not to be consumed immediately. Urbanization and globalization encourage a special trend of food supply chain to sustain the huge population concentrated in urban areas. To control such a complex food supply chain in the current global economy with limited resources, creates room for criminals to practice unscrupulous business deals with food products. As time goes by, they come up with new ways of practicing fraudulence, which creates more challenges to deal with the problem.

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