

EVALUATION OF TEA AND CONDIMENTS BY FOOD MICROSCOPY: LEGISLATION AND CASE STUDIES

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Abstract: The main objectives of food microscopy are the identification of food products, the detection of fraud and the investigation of dirt and foreign matter. The identification through microscopy of foods of plant origin used in natura or as raw material for food products is characterized by being a fast methodology, relatively low cost and extremely satisfactory in the desired identifications. Through this type of analysis, we can provide subsidies to government health surveillance agencies to verify the quality of food and, this way, help protect the health of consumers. Knowledge of current regulations is essential for proper analyses. RDC 716/2022 recommends that tea is a product consisting of a plant species authorized for its preparation, which may be of a single species or mixed (two or more species). This product must be called “tea” followed by the common name of the plant species used, which may be added by the process of obtaining it, specific characteristics or names consecrated by use. However, not all plant species, nor any part of the plant, can be used to prepare teas. Another concern is the addition of dyes. Despite improving product presentation, studies have shown that colorants are not completely innocuous additives. Furthermore, these additives can be added to mask fraud related to the composition of foods, particularly teas and spices, requiring integrated microscopic and chemical analyses. Thus, the present study seeks to review the literature, analyzing the main biological contaminants found in forensic analysis of foods, providing reference materials that address diagnostic aspects, particularly in focal food species. The results of the present work can serve as an aid for carrying out food analysis work carried out in public health and food health surveillance laboratories and other inspection and research centers. Regulatory authorities must be properly prepared to detect flaws in

hygiene processes, as inspection can still be considered the most reliable way to keep food that has been improperly handled away from the final consumer.

Keywords: Health surveillance, food analysis, teas, infusions, condiments.

INTRODUCTION

Food microscopy can be defined as a set of analytical methods, which is based on microscopic observation, identifies food, and at the same time shows the presence of fraud and/or dirt (OLIVEIRA et al, 2015). Microscopy allows us to elucidate cases of foreign matter harmful to human health, indicative of non-adoption of good manufacturing practices, as well as highlight a series of frauds, which would be difficult to reveal by other analyses, which are often time-consuming and expensive.

Food microscopy proved to be an efficient tool in the fiscal analysis of foods by providing data that would not be possible through chemical analysis. In addition, it is a quick, inexpensive method, does not require expensive equipment and must be considered as a fiscal instrument (OLIVEIRA et al 2015). It is an applied science that employs knowledge of botany (morphology, anatomy and taxonomy), analytical chemistry and entomology, given the possibility of identifying fraud and foreign matter that could harm the consumer. Thus, it is the method usually used by government agencies in tax analyzes in disclosing fraudulent and/or poorly preserved food (RODRIGUES et al, 1999; OLIVEIRA et al, 2015).

Given the above, the objective of this study was to carry out a literature review, analyzing the difficulties and legislation encountered by technicians in food microscopy on the analysis of contaminants and issues related to the labeling and safety of teas and condiments. Furthermore, such evidence raises questions

pertinent to food analysis, such as the lack of specific reference material on food microscopy and how Brazilian legislation governs the development and standardization of analytical methods in food microscopy for teas and condiments.

DEVELOPMENT

On March 9, 2022, Anvisa approved Collegiate Board Resolution (RDC) Number 623, which “Deals with the tolerance limits for foreign matter in food, the general principles for its establishment and the methods of analysis for conformity assessment” (BRASIL, 2022). Within the scope of foods contemplated by this legislation, fragments of foreign matter indicative of failures in good practices (not considered risk indicators) are included, such as: insects typical of culture or storage, fungi, hair, bones, whole dead insects, barbules, mites, sand, in addition to undesirable parts (impurities).

Good Manufacturing Practices (GMP) bring together several measures to be applied throughout the food production chain, with the intention of guaranteeing product safety in relation to hygiene and handling conditions throughout production.

In a study carried out in Pouso Alegre (MG), three flavors of teas (mint, chamomile and fennel) from four different brands of the same batch and expiration date were analyzed. All samples were rejected due to the high number of insect fragments, the presence of barbules and the presence of a high number of mites and mealybugs. In this study, the analyzes indicated more than 800 insect fragments, in total, demonstrating failures in the cleaning process of the products according to RDC Number 14 of March 28, 2014, in force at the time, or even according to the current RDC Number 623/2022 (BLACK, 2020).

RDC n° 623 also highlights foreign matter indicative of risks to human health, detected

macroscopically and/or microscopically, capable of transmitting pathogenic agents to food and/or causing damage to the health of the consumer, such as: indications of the presence of some types of insects (such as cockroaches, ants and flies), rodents, bats, pigeons, animal excrement other than arthropods typical of culture or storage, parasites at any stage of development, rigid, pointed or cutting objects, glass fragments and plastic films.

According to RDC 716 of July 2022 (BRASIL, 2022), tea is a product consisting of a plant species authorized for its preparation, which may be of a single species or mixed (two or more species). This product must be called “tea” followed by the common name of the plant species used, which may be added by the process of obtaining it, specific characteristics or names consecrated by use. However, not all plant species, nor any part of the plant, can be used to prepare teas.

Normative Instruction (IN) Number 159 of July 1, 2022 (BRASIL, 2022) establishes the list of species and parts authorized for the preparation of teas, the presence of any structure other than those mentioned must be considered foreign matter. For this, the samples need to be analyzed by comparison, identifying the anatomical characteristics of the samples with reference works, such as monographs, books and atlases, or, in their absence, adequate standards created by the analyst himself. However, in the context of expert analyses, the verification of the vegetable raw material, with the proper identification of the constituent and adulterant species, becomes an enormous challenge, requiring the qualification of the technical staff.

ANVISA, in its Resolution n° 18, of April 30, 1999 (BRASIL, 1999), declares that every functional food offers, in addition to basic nutritional functions, when it comes to nutrients, it produces metabolic and/or physiological effects and/or beneficial

effects to the health and must be safe for consumption without medical supervision. Green tea, for example, is rich in polyphenols, mainly catechins, and is widely used to combat obesity and its comorbidities (LAMARÃO, 2009). According to Ordinance 716/2022, however, which provides for the sanitary requirements of coffee, barley, teas, yerba mate, spices, seasonings and sauces (BRASIL, 2022), such product cannot contain indication of medicinal or therapeutic purpose or indication for infants.

The Consumer Protection Code (Law 8078 of September 11, 1990) (BRASIL, 1990) declares products that are deteriorated, altered, adulterated, damaged, counterfeit, corrupted, defrauded, harmful to life or health, dangerous or, even those in disagreement with the regulatory norms of manufacture, distribution or presentation. Also unsuitable are products that, for whatever reason, prove to be unsuitable for the purpose for which they are intended. The presence of foreign matter with the aim of increasing volume or weight, replacing the product declared on the label, not only constitutes fraud but can also pose risks to the health of the consumer if this is a toxic species.

Consumer acceptance of a food product is directly related to its sensory characteristics. Manufacturers use technologies, such as the use of additives, to result in a better appearance of processed food. The assessment of food additives worldwide is based on the Acceptable Daily Intake (ADI) control established by the World Health Organization (WHO) and the FAO expert committee on food additives (JECFA). If the IDA was not specified, it does not mean that its use is unlimited. The guidance of these bodies is that their use must be the minimum to meet the desired effect, as long as they do not cause harm to health. Therefore, the type and quantity of these compounds must be in accordance with the

values recommended by current legislation, as this is based on safety studies of their consumption. Among the additives allowed in Ordinance Number 554 of November 3, 1997, there are some natural or identical natural acidulant and flavoring agents. In the case of the addition of flavorings, Article 14 of Decree-Law Number 986 of October 21, 1969, which establishes basic rules on food, requires that food labels containing natural or artificial essences be added, with the aim of reinforce or reconstitute the natural flavor of the food must bring the statement “Contains Flavoring ...”, followed by the corresponding code and the statement “Artificially flavored”, in case artificial flavoring is used.

The addition of dyes helps to enhance the visual characteristic of the product, tending to attract the consumer and inducing him to believe that it is a better quality product. Despite improving product presentation, studies have shown that colorants are not completely innocuous additives. The consumption of food additives must serve as a basis for the development of food and nutritional surveillance strategies, with the aim of promoting healthier eating habits (POLÔNIO; PERES, 2009). Furthermore, these additives can be added to mask fraud related to the composition of foods, particularly teas and spices, requiring integrated microscopic and chemical analyses. Among the additives allowed in Ordinance Number 554 of November 3, 1997, no type of dye is on the list.

Despite being popularly consumed as an alternative to medication, the product cannot show indications of therapeutic properties. A recent study evaluated possible drug interactions and sample labeling of compound teas (PAULA et al, 2018). The authors found disagreements with ANVISA's resolutions regarding the labeling of teas, emphasizing the importance of studies on the teas consumed

by the population, in order to avoid problems related to drug interactions and adverse effects in the use of these products.

METHODOLOGY

This is an integrative review, in which studies with different methodologies were searched, in order to integrate the results, expanding the possibilities of literature analysis (MENDES; SILVEIRA; GALVÃO, 2008). As the main guiding question for the review, the following was established: "What are the main difficulties and legislation encountered by technicians in food microscopy in the identification and analysis of teas and condiments."

For the elaboration of this review, works, articles, books, official reports, epidemiological bulletins and resolutions obtained through research with the terms: dirt, foreign matter, food, microscopy, contaminants, teas, condiments and RDC in the Scielo databases were used. periodicals portal Capes and Ministry of Health. Finally, studies were used that elucidated the situation in Brazil with regard to the safety of food offered to the final consumer and that reported legal aspects related to the subject.

CONCLUSION

Microscopy analyzes in food are of great importance to ensure quality and safety of products exposed to consumers. The results of these analyzes indicate when there are failures in good manufacturing practices, poor quality of raw materials, inadequate storage and storage of inappropriate packaging. Constant inspection by competent bodies is necessary at all levels of the process, but laboratory analyzes are essential for monitoring products subject to sanitary control, as they detect foreign matter that would not be verified by other traditional techniques.

Applied studies and materials with images that serve as a reference for identification

facilitate access and speed of interpretation of analyses. Since it is a science that involves multidisciplinary knowledge, it is necessary to constantly update the technical staff in relation to current legislation for the efficient monitoring of products subject to sanitary inspection.

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