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Food processing technologies on food alkaloids and food allergenic: Bioactive and toxicological aspects

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Abstract

Alkaloids are a class of naturally occurring chemical compounds that mostly contain biologically important amine structures and include some related compounds in plants and animal foods. Alkaloids show greatly diverse matrix and origins as well as pharmacological and/or nutraceutical action that often demonstrate a marked physiological action. The only thing that unites all these natural compounds under the term 'alkaloids' (alkali-like) is the nitrogen atom that is present in all of them. They are known to be adrenergic, antibiotics, poisons, stimulants, diuretics, astringents, anti-inflammatory, anti-hypertensives, anti-mydriasis, analgesics, anti-gout, expectorant, emetic, anti-spasmodic and many others. Food alkaloids can be take part in chemistry, food industrial applications, food supplement and medical drug fortifier. Chemical alkaloid taxonomy in plants and animal foods, originating from protein and amino acids like this xanthine alkaloids, phenolic based alkaloids, originating from plant cell cultures, pseudoalkaloids, ergot alkaloids and tropane alkaloids in plants and cereals, glycoalkaloids in potatoes, their properties, nutraceutical and pharmaceutical effects. It has been carried out methyl xanthine alkaloids including caffeine, theobromine and theophylline in most consumed non-alcoholic beverages such as tea, coffee, and cocoa majorly and chocolate and herbal teas as less. Phenolic alkaloids containing piper dine alkaloid from black pepper with pyridine structure and sanguinary, Marcaine alkaloids from pomegranate fruits with isoquinoline based structure are also important compounds. Alkaloids are usually derivatives of amino acids, many have a bitter taste and are found as secondary metabolites in plants (including potatoes glycoalkaloids as sol nine, clonidine and their derivatives and tomato glycoalkaloids as Tomatina), animals (such as shellfish neurotoxic alkaloids and marine alkaloids; sax toxin and its analogy), and fungi alkaloids. Many plant and marine based alkaloids are poisonous at dose over, but some are used medicinally as analgesics (pain relievers) or aesthetic, particular morphine and codeine; some as vinblastine are used to treating certain cancer types. Taxol is an anti-cancer (antineoplastic or cytotoxic) chemotherapy drug and Taxol is classified as a plant alkaloid, a tisane and an ant microtubule agent. As others, phenethylamine alkaloid ephedrine is also used as stimulant, decongestant and appetite suppressant in diet processed foods and nutraceuticals. A specific alkaloids in foods can alter after food processing. In this point; toxicity, carcinogenic, toxigenic structure and cancer formation should be dealed. Food sensitivity is an adverse reaction to a food which other people can safely eat, and includes food allergies, food intolerances, microbial toxicities, and chemical sensitivities, whereas food allergy is an abnormal response to a food triggered by body's immune system. Foodborne allergic reactions can sometimes cause serious illness and death. Food allergy is a reaction of the body's immune system to a certain food or beverage. In this context, food allergy is a very specific reaction involving the immune system of the body. At this point, distinguishing food allergy from other food sensitivities is the most important. Whereas food allergies are rare, food intolerances, which are the other classification of food sensitivities, are more prevalent. Several specific foods are responsible for the majority of food allergies, even though any food can stimulate an immune response in allergic individuals. It is known that peanuts are the leading cause of severe allergic reactions, followed by shellfish, fish, tree nuts, and eggs. Peanuts, tree nuts including almonds, Brazil nuts, cashews, hazelnuts (filberts), macadamia nuts, pecans, pine nuts (pangolins), pistachio nuts, walnuts, sesame seeds, milk, eggs, fish including shellfish and crustaceans, soy, gluten, fava beans, garlic and onion, mustard are some of the most known allergic foods. HHP processing improved the reducing of allergenic structure and allergen city of some foods. Recently, limited studies have been performed on HHP effects on the structure of known allergens and the elimination of allergen compounds in foods. Further studies are needed for some allergenic proteins in various food matrices. The characterization and stability evaluation of food and food

constituents (chemical active ingredient/microorganism) for which nutrition or health claims want to be requested are essential for the success of an application to EFSA. This work reviews the requirements that must be fulfilled for a full characterization of the active substance, comprising origin, elaboration, or extraction method, and chemical/microbiological composition, using validated analytical methods. The review focuses not only on establishing the specifications of the final active ingredient or food but also on ensuring homogeneity between batches. In addition, the article discusses the methodologies and conditions of the stability studies that need to be performed on food and food constituents to verify that the relevant compounds--chemical and microbiological active ingredients--will get to the consumer in the intended state and concentration to accomplish the claimed health effect over shelf life. The growing presence of products on the market with added value in terms of health makes essential their regulation and harmonization in critical aspects such as safety. The toxicology applied to the bioactive compounds should demonstrate the absence of toxic effects at doses advised for consumption, as well as evaluate the potential toxic effects in the assumption that the products are used in quantities superior to those recommended. The specific strategy should be defined case by case; therefore, prior to any toxicological development, it is essential to study all the information regarding the bioactive compounds (BACs) characterization, nutriedynamics and nutrikinetics, that is available. In this guideline, a general strategy to be applied in the development of BACs is proposed. It includes a first in vitro phase to discard genotoxicity and endocrine effects and a second in vivo phase with different possibilities regarding the duration and the extension of the studies. It is known that manufacturers quite often put into foodstuff marking or advertisement the information about its beneficial action into the consumers health, i.e. about its functional qualities. However in Russian Federation the rules are regulated using of term "functional foods" doesn't established. In the review of legislation acts which are regulated of using claims in the foodstuff marking or advertisement in the different countries have been shown that claims concerning of energy and nutritional values of foods (beneficial nutrition claims) should be used in compliance with established rules without additional investigations. Food health claims referring to the reduction of disease risk and (or) functional foods claims for children must maintain in compliance with established procedure. Only claims that have scientific evidence about its beneficial for health could be recommended for approval. Thereupon insistent necessity in development, discussion and approval regulation in the field of using Claims concerning the functional qualities of foods (described rules of using beneficial nutrition claims and claims referring to the reduction of disease risk and to children's development and growth) in Russian Federation and United Customs Union are obvious.

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