

FOOD CHEMISTRY



FOOD CHEMISTRY IS THE STUDY OF CHEMICAL INTERACTIONS AND PROCESSES BETWEEN COMPONENTS OF FOOD. THE DISCIPLINE DATES BACK TO THE 18TH CENTURY, ROOTED IN THE INTEREST IN DEVELOPING ANALYTICAL METHODS FOR FOOD ANALYSIS FOR THE BENEFIT OF THE PUBLIC. IT COVERS A LARGE LIST OF ANALYTES SUCH AS PESTICIDES, COLORANTS, PHTHALATES, MINERALS, HEAVY METALS, ADULTERANTS, SUGARS AND FATS.



PESTICIDES

Pesticides are a substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest. The U.S. Environmental Protection Agency (EPA) reviews the scientific data on all pesticide products before they can be registered (or licensed) for use. If a product is intended for use on food crops, EPA also establishes a tolerance along with compliance and tolerances in water and soil. FDA, on the other hand, is responsible for enforcing regulations that set the limits of pesticides that are allowed in animal-derived products except meat and poultry, the latest regulated by USDA.



COLORANTS

Color additives are dyes, pigments or other substances that can impart color when added or applied to food, drugs, or cosmetics. Food colors are used in virtually every food product, be it dairy, confectionery, beverages, bakery or cereals. Although there is growing concern over the use of color additives in food, they are still commonly used to bring variation and maintain the natural appeal of the preserved food. The FDA regulates color additives used in the U.S. The Nutritional Labeling and Education Act of 1990 (NLEA) and its regulations require the declaration by name of all color additives subject to certification on food labels [21 CFR 101.22(k)(1)], whereas exempt color additives are required to appear in the ingredients declaration by name, as artificial color added, as color added, or by an equally informative term [21 CFR 101.22(k)(2)].



PHTHALATES

Phthalates are the softening agents in materials such as plastics and synthetic rubbers. Phthalates have been linked to deformities, diabetes, premature births and excess weight, due to the apparent interference with the body's hormones. Phthalates are present in conventional flooring, cables and packaging materials, as well as medical products and cosmetics. Due to phthalates being present almost everywhere, they can easily enter the food chain, and thus humans, via food and drink regardless of healthy eating habits.



VITAMINS

Vitamins are organic compounds that constitute essential nutrients contributing to a healthy life. The human body uses vitamins for a variety of biological processes, such as growth, digestion, and nerve function. Although most people get all the vitamins they need from the foods they eat, millions of people worldwide also take supplemental vitamins as part of their health regimen.

PRESERVATIVES

The term "chemical preservative" as defined by 21 CFR 101.22(a)(5), means any chemical that, when added to food tends to prevent or retard deterioration thereof. It does not include common salt, sugars, vinegars, spices or oils extracted from spices, substances added to food by direct exposure thereof to wood smoke, or chemicals applied for their insecticidal or herbicidal properties. Examples of preservatives include: benzoates, nitrites, sulfites, and sorbates.

MINERALS AND HEAVY METALS

Dietary minerals or mineral nutrients are chemical elements required by living organisms to support biochemical processes by serving structural and functional roles as well as electrolytes. Major minerals include calcium, phosphorus, selenium, magnesium, potassium, sodium, zinc and iodine. Heavy metals are elements that exhibit metallic properties. The most common heavy metals regulated in food due to their toxic effects are lead, arsenic, mercury and cadmium. Heavy metals are naturally found in nature and some can contaminate food products both naturally and due to manmade reasons.

SUGARS AND POLYSACCHARIDES

Sugar is the general name for a class of substances used to sweeten foods. They are carbohydrates, therefore composed of carbon, hydrogen and oxygen. There are various types of sugar. For example, simple sugars are called monosaccharides (such as glucose, fructose and galactose), whereas the table or granulated sugar is a disaccharide (sucrose).

FATS AND FATTY ACIDS

Fats consist of a wide group of compounds composed of triacylglycerides, triesters of glycerol and any of several fatty acids. Fatty acids are carboxylic acids with a long aliphatic chain that can be either saturated or unsaturated. Dietary fat is one of the three macronutrients, along with protein and carbohydrates, that provide energy to the body. The two main types of potentially harmful dietary fat are saturated and trans fat, whereas the two main types of potentially helpful dietary fat are monounsaturated and polyunsaturated fat.

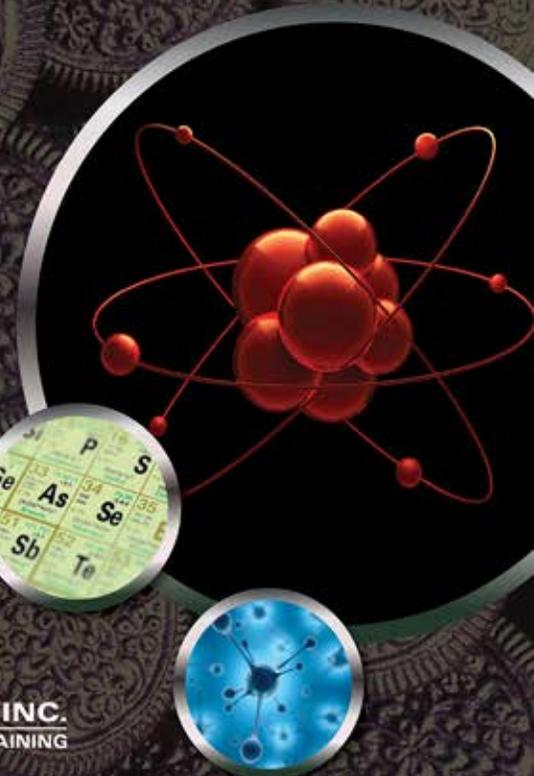


HORMONES

Since the 1950s, the Food and Drug Administration (FDA) has approved a number of steroid hormone drugs for use in beef cattle and sheep, including natural estrogen, progesterone, testosterone, and their synthetic versions. These drugs increase the animals' growth rate, the efficiency by which they convert the feed they eat into meat, and the leanness of their meat. While a variety of hormones are produced by our bodies and are essential for normal development of healthy tissues, synthetic steroid hormones have been found to affect cancer risks. Studies done so far do not provide evidence that hormone residues in meat or dairy products cause human health effects. Large-scale studies comparing the health of people who eat meat or dairy products from hormone-treated animals and people who eat a similar diet from untreated animals are not available.

FDA IMPORT DETENTION

The Food, Drug and Cosmetic Act (FDCA) and the FDA's import regulations allow the FDA to detain imported products when it appears to be in violation of established regulations. When this occurs, the FDA will issue a Notice of FDA Action. The FDA import detention notice specifies the nature of any violations and cites FDCA provisions.



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