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Food Browning Control using Physical Methods

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Perspective

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ABOUT THE STUDY

Food gets dark as a result of internal chemical reactions known as browning. Browning is a fascinating research topic in the fields of health, nutrition, and food technology. It is one of the chemical processes that take place in food chemistry. Food changes chemically over time in a variety of ways, but browning in particular can be separated into two main categories: Enzymatic and Non-Enzymatic browning processes.

The instance of Browning has numerous significant ramifications for the food business in terms of nutrition, technology, and financial cost. The prevention of browning, its regulation, and the various strategies that may be used to maximise it and eventually extend food shelf life are of particular interest to researchers.

The management of enzymatic browning has always proven challenging for the food industry. There are numerous methods for preventing or slowing down the enzymatic browning of food, each of which focuses on a distinct stage of the chemical reaction. The various enzymatic browning control methods can be divided into two main categories: Physical and Chemical. Usually, several techniques are applied. Because of the potential risks associated with sulfites' activity and potent anti-browning properties, their use has been put on hold. Numerous studies have been done to determine the precise forms of regulatory mechanisms that occur when the enzymatic process is encountered. Controlling browning also entails taking steps to restore the colour of the food after it has browned.

Heat treatment

As food is heated, such when blanching or roasting, enzymes are denatured and the reactants that induce browning are eliminated. For instance, blanching is a method used in the production of wine, tea, the preservation of nuts and bacon, as well as the freezing of vegetables. Meat is frequently partially browned at high heat before being added to a larger recipe to be cooked at a lower temperature that results in less browning.

Cold treatment

The most popular methods for preserving food and preventing deterioration are freezing and refrigeration. In low temperatures, browning enzyme activity, or the pace of reaction, decreases. Thus, refrigeration aids in maintaining the fresh appearance, colour, and flavor of produce. Fruits and vegetables are distributed and sold in stores while being refrigerated.

Marine demersal

Demersal fish are those that inhabit or feed on the ocean floor. Some examples of seafood are stingrays, grouper, and flatfish. Compared to pelagic fish, demersal fish are more immobile and mostly eat crustaceans they find on the ocean floor. Demersal fish commonly have white meat, but pelagic fish typically have red flesh suggestive of the powerful swimming muscles they require.

Oxygen elimination

Eliminating oxygen from the surroundings helps to slow down the browning reaction because oxygen is required for enzymatic browning. When food is preserved, air is removed or replaced with other gases. Examples include vacuum packaging, modified environment packaging, wine or juice bottling, utilizing impermeable films or edible coatings, and dipping into salt or sugar solutions. Plastic or other impermeable films keep food from losing moisture and from being exposed to oxygen in the air. The development of packaging materials infused with anti-oxidants, anti-microbials, and anti-fungal agents such as butylated hydroxytoluene and butylated hydroxyanisole, tocopherols, hinokitiol, chitosan, and polylysine is becoming more and more popular. Polysaccharides, proteins, lipids, vegetable skins, plants, or polysaccharides can all be used as edible coatings.

Irradiation

Another technique for extending the shelf life of food is food irradiation utilizing UV-C, gamma and electron beams. Ionizing radiation slows down the maturity and sprouting of produce that will keep for a long time and kills the bacteria that cause food to spoil.