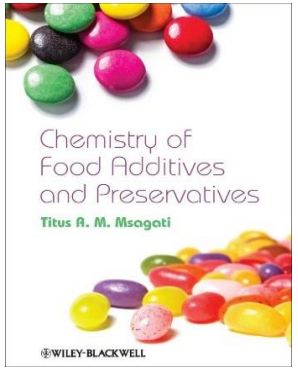
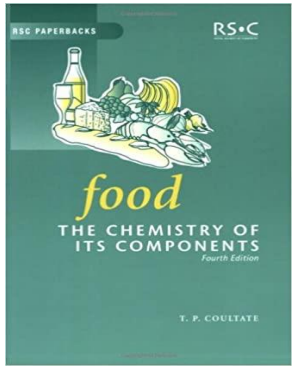
14.Week: FOOD ACIDS AND ACIDITY REGULATORS AND HUMECTANTS

1. 

2. 

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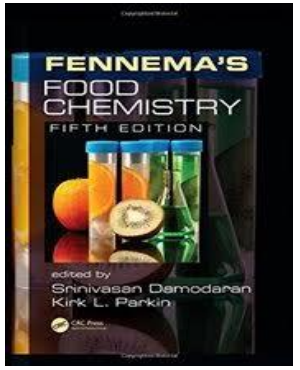
4. 

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FOOD ACIDS AND ACIDITY REGULATORS

Food acids and acid regulators perform dual functions in that they act as preservatives (antimicrobial) and antioxidants, and they also sharpen the taste or flavour of foodstuffs by imparting tartness.

Food acids used most frequently for these purposes include acetic acid (vinegar), citric acid, tartaric acid, malic acid, fumaric acid, and lactic acid. Other organic acids added to foods (tartaric acid, malic acid and lactic acid as well as some plant juices) are also used to give a sour taste to foods. Another food acid, fumaric acid (found naturally in some mushrooms), is mainly used in beverages and baking powders where it contributes to the sour taste of foods products.

Acidity regulators are substances such as organic or mineral acids, bases, neutralising agents, or buffering agents and are included in food products to modify and control the pH of foods (to regulate the acidity and alkalinity of foods).

Fruits and vegetables are among the food products where acids and acid regulators are massively used. The addition of food acids in foodstuffs is normally performed simultaneously with the adjustment of the total soluble solids for the purpose of matching the Brix/acid value with that of the food item being processed.

There are a number of other roles that food acids and regulators play apart from those mentioned above. These various **roles** include:

(**1**) Flavoring to provide a desired taste and serve to intensify, enhance, blend of modify the overall flavor of the product.

(**2**) Reduction of the pH to prevent or retard the growth of microorganisms and the germination of spores, and to increase the lethality of the process.

(**3**) Maintainer or establishment of pH by serving as buffering agents. Usually a combination of free acids and salts are used.

(**4**) Chelation of metal ions (Cu, Fe) to assist in minimizing lipid oxidation, reducing color changes and controlling texture in some fruits and vegetables.

(**5**) Alteration of the structure of foods including gels made from gums (pectin, carrageenan), and proteins.

(**6**) Interaction with proteins and emulsifiers to modify the structure of foods such as doughs, alter the heat stability of proteins, and to serve as an emulsifier in processed cheese.

(**7**) Modification of sugar crystallization in hard candy manufacturing.

To perform such a wide variety of functions, food acids contain a variety of functionalities and diversity in their chemistry.

Some are more suited for the role of flavour sharpeners and others as acidifiers, metal cheletors, antimicrobial agents and solubilisers.

The most commonly used food acids are acetic acid, citric acid, malic acid, phosphoric acid, fumaric acid and tartaric acid. All of these food acids are generally recognised as safe (GRAS), with the exception of fumaric acid.

HUMECTANTS

There is sometimes the requirement to keep products moist in the food industry, preventing any loss of quality. This is the case for food items such as cream in a cone, chocolate and cheese, in which additives preventing foodstuffs from drying (humectants) are incorporated. Humectants perform the function of moisturisers by attracting water molecules.

HUMECTANTS AND MOISTURE CONTROL

There are a number of food items which always need to be moist for the sake of safety, quality observance and to optimise shelf life for these particular food products. The controlled moisture content of these specified food products ensures quality and safety because they determine the microbial stability, physical properties, sensory properties and the rate of chemical changes that, if not controlled, are the cause of reduced shelf life. The types of food items being referred to here include dry cereal with semimoist raisins, ice cream in a cone, chocolate, hard candy with liquid centres and cheese, just to mention a few.

Among the strategies used to stabilise the moisture content of foodstuffs is the incorporation of food additives. These include non-ionic polyols such as sucrose, glycerin/glycerol and its triester (triacetin). These common humectant food additives are used for the purpose of controlling the viscosity and texture. They also add bulk, retain moisture, reduce water activity and perform the important function of improving food softness. One of the main advantages of these humectant food additives is that, since they are non-ionic, they are not expected to influence any variation of the pH of aqueous systems.

CLASSIFICATION OF HUMECTANTS