UNIT 17: FOOD ADDITIVES

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1.0 Introduction

In many catering preparations, additives are used for enrichment, as raising agents, as colouring agents, as flavouring agents, thickening and as stabilizing agents and in many forms.

In view of this, there is a need to study the requirements for these additives and the classes and uses of the additives in food.

This unit therefore, treats those compounds that are intentionally added to food to perform the functions listed below.

2.0 Objectives

At the end of this unit you should be able to

- Defi ne food additives
- Explain the need for additives
- Discuss food evaluation for the use of additives
- List characteristics of additives
- Discuss various classes of additives

Discuss uses of additives

3.0 Main Content

3.1 Definition and Basic Requirements of Additives

3.1.1 Definition

An additive is defined as a substance or mixed substances other than the basic food that are present in food during processing, packaging and storage.

They may be intentionally added to improve the keeping quality or at times they may occur accidentally. They may be inert or physiologically active to promote better nutritive value.

3.1.2 Factors Affecting Composition of Food

There is a need to discuss the composition of food to know the nutrients present in the food and to know the need for supplements of nutrients in the food.

Variability in the biological system of food affects the composition of the food. The level of soil fertility has effects on the composition of food. The intensity of light can also have effect on the nutritive value of the food.

Disease and insect infestations of food affect the chemical composition of the food as well as the flavour, colour and nutritional quality of the food.

Some of these actions cause loss or deficiency of some nutrients in the food and there may be the need for some food additives to correct these losses and deficiencies.

3.1.3 Needs for Additives

a. Baby foods are enriched by calcium due to rickets in children. To prevent anaemia, iron is added to flour, for fortification of garri protein from soy beans is added.
b. There must be food conveyor for the additives
e. The additives must be able to increase the keeping quality of the food and must increase the colour and flavour of the food.
d. The additives must be safe, must not interact with or antagonize the food to which it is added.

3.1.4 Food Evaluation of the Additives

When a new additive is to be used in food, you should do the following:

a. **Establish Standard of Identity**

We would know what minimum and maximum amounts of the additives that are required by the food, the people that will be affected by the use of the additives whether children, women, adult or priviledged people, the duration of the use and the frequency of the use.

b. Determine the property of the Additives

We should know the composition and the stability of the additive. We should also know how to remove any form of interaction between the food and the additive and how to study the cumulative effect on the consumption of the additive

c. Establish Safety Level

We should establish the minimum and maximum tolerance level of the additive.

3.1.5 Uses of Additives

Some additives are added to food to improve the colour and the flavour of the food. Some are added to prevent the growth of mould (anit-mycotic agent) and bacteria. Some are added as anti oxidants and emulsifiers.

Additives are generally added in small qualities to produce desired effects. You should note that every chemical additive added must be able to perform one or more of the following functions:

a. Increase the nutrition values of the food.
b. Enhance the consumer acceptability of the food
c. Improve the keeping quality of the food
d. Facilitate the preparation of the food.

Students' Assessment Exercise 17.1

Discuss the uses of Additives

Classification of Food Additives

3.2.1 Acids, Alkalis, Buffers and Neutralizing Agents

The degree of acidity and alkalinity is of importance to many foods

The tartness (caustic taste) of a number of soft drink other than cocoacola is impacted by the addition of organic acids such as citric acid from citrus, marlic acid from apple and tartaric acid from grapes.

In confectionary products, acids are also used as flavouring agent and in chocolate, we use alkaline as flavouring agents.

In baking industry, raising agents are used to produce carbondioxide which makes the batter light and porous thereby providing a finished product of good volume, crumb, texture and palatability. This has been properly discussed under raising agents in Unit 10.

Emulsification and the desired tartness in processing cheese and cheese spread are obtained by addition of acids such as citric, lactic, marlic and phosphoric acid.

Buffering agents such as sodium salts of citric, marlic and tartaric acids are used to control the degree of acidity of soft drinks,

PH adjustment is necessary in diary as excessive acidity in cream must be neutralized for satisfactory churning and to produce butter of acceptable flavour and keeping quality.

3.2.2 Emulsifying, Stabilizing and Thickening Agents

Emulsifying agents are used in baked goods, cake mixes, ice cream, confectionary goods, frozen preserve and mayonnaises. Some of these emulsifying agents are lecithin, mono and diglycerides, polyoxyyethelenc

fatty esters. In bakery the emulsifying agents increase the volume, uniformity and finess of the bread.

The texture of the ice cream and other frozen preserve is dependent in part on the size of the ice crystals which is controlled by small amount of stabilizing agents such as agar, gelatine cellulose gum and some edible vegetable gums.

Gelatin. peptin and starch are used in confectionary products to give its specific texture. The lbaming property of brewed beer can be improved by the addition of certain stabilizing, agents such as gum sodium alginate, cellulose ;:tim and sorbitol.

3.2.3 Bleaching Agents, Maturing Agent and Bread Improvers

You learned in unit nine that wheat flour is bleached when it is exposed and stored. the colour changes from pale yellow tint to white. These colour changes can be sped up by the addition of some oxidizing agent such as benzoid peroxide. oxide of nitrogen nitroxyl chloride and chlorine. These oxidizing agents improve the baking quality, decreases storage cost and hazards of spoilage and insects and rodents infestation. Potassium iodides, potassium bromate and calcium peroxide are used as bread improvers. Those inorganic salts used as yeast food and dough conditioners are ammonium chloride, ammonium phosphate, calcium phosphate and ammonium sulphate and calcium sulphate.

3.2.4 Flavouring Agents

Some spices and some essential oils are used as flavouring agents in some processed food. Some synthetic types of these additives are also used now in soft drinks, baked goods. ice cream and confectionary. They are used in small amount in the food. Their concentration is low because some of them are cancinogenic. Examples of synthetic flavouring agents are benzaldehyde, carvone, enthylacetate and methsalicynate.

3.2.5 Colouring Agents

They are used extensively in confectionary, baked goods, soft drinks and dairy products, some of the colouring agents from plant sources are annatto alanat, carotene, cochineal, chlorophyll, and turmeric.

3.2.6 Nutritional Supplements

Wheat flour is supplemented with vitamins and minerals. You learned before that we supplement rice with thiamine.

In margarine, we add vitamin A and D. In evaporated milk vitamin D is added.

You have learned in this unit that garri is supplemented with protein from soy beans.

3.2.7 Preservatives and Antioxidants

Sodium diacetate is added to flour to prevent ropiness in bread. Some other products that can be used to prevent ropiness are proportionate of sodium and lactic acid as well as monocalcium phosphate.

Sorbic acid is used as anti-mycotic agents (Prevention of mould growth) in cheese.

Benzoic acid and sodium benzoate are used in oleo-margarine, fruit juices and confectionary to inhibit bacteria and mould growth.

Salt 2nd vinegar are used as preventing agents against microbial activities in rocess of meant and meat products.

Students' Assessment Exercise 17.2

List some examples of colouring and flavouring agents and the food in which they are used.

4.0 Conclusion

In this unit, additives are defined: the needs for additives, the food evaluation for the use of additives and the uses of additives are discussed. Also discussed are the classes of intentional food additives and the foods in which they are used.

5.0 Summary

An additive is defined as a substance or mixed substances other then the basic food which are present in the food during processing, packaging and storage. Some of the additives may be intentionally added to the food to enhance the quality of the food, to promote better nutritional status, to enhance the consumer acceptability of the food and to promote better nutritional status of the food.

The food additive must be added in small amount to the food and they must not interact with or antagonize the foods that convey them.

The minimum and the maximum tolerance levels of the additives must be ascertained before they are used.

The food additives may be used as colouring agents, flavouring agentd, preservatives, food supplements, thickeners in soup, emulsifying agents, raising agents buffers, acids and alkalis (used to regulate the PH of some mixture of food).

6.0 Tutor Marked Assignment

Discuss the use of acids, alkalis, buffers and neutralizing agents as additives in food.

Answers to Students' Assessment Exercise

17.1 See answers in Section 3.1.5

17.2 See answers in Sections 3.2.4 and 3.2.5

7.0 References and Other Sources

Davidson S. et al (1975) Human Nutrition and Dietetics. Sixth edition Longman Group Ltd.