

NUTRITIVE SWEETNERS AND NON NUTRITIVE SWEETNERS IN FOOD: AN OVERVIEW

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Abstract - This study is designed to overview the use of nutritive and non nutritive sweeteners in to our diet. Foods that containing various non nutritive sweeteners has a great impact on consumer life. Nutritive sweeteners are used to provide more caloric values in foods. Non-nutritive sweetening substitute recommend no energy in terms of calories and can be supplementary added to a few food and beverage increase with little quantity. Non-nutritive sweeteners provide sweeteners ranges from 200 to 8000 times as sweet as sugar and they are often referred as high intensity sweeteners (HIS). The addition of non-nutritive sweetening substance in a range of category products give the impression more like sugar, maltodextrin, a carbohydrate extract from cornstarch. A choice of foods, typically sweet desserts, baked desert, confectionaries and beverages have been introduced. Non-nutritive sweeteners are artificially derived compound have been developed that provide few or no calories nutrients in the diet and are term like non-nutritive sweeteners. Now days, peoples are more quality and health conscious. There request for sugar free food without compromise on calories is growing day by day. The interest of polyols, Sorbitol and mannitol in out cadaver is enormously slow and is shortened. The unsatisfactory metabolism and due to fermentative frightful conditions, the foodstuffs are made up of short chain fatty acids , so the energy engrossed is a smaller amount as compared to energy absorbed in entire metabolism of polyols. These in addition do not cause quick boost in blood glucose level. Therefore, the present study is considered to overview the effect of nutritive and non-nutritive sweeteners in various foods.

Keywords - Nutritive and non nutritive sweeteners, Food, Calories, Health.

I. INTRODUCTION

Sweetening agent is generally classified (Claudia et al, 2012) as nutritive sweeteners. Nonnutritive sweeteners are several hundred to several thousand times sweeter than sucrose. Nonnutritive sweetener for community among diabetes is diminution in calories and carbohydrates for power executive and glycemic control (Claudia et al, 2012). Various foods , characteristically sweet, scorched desert are sweetened with non-nutritive sweeteners are synthetic compounds have been developed that provide few or no calories are nutrients in the diet and are termed as non-nutritive sweeteners, cakes (Warshaw and Power, 1999). people, now a days are more quality and health conscious. There demand for sugar gratis products exclusive of compromise on calories is increasing day by day (Diffy and Anderson, 1998). The absorption of polyols (Sorbitol and Mannitol) in out body is very slow and is incomplete. There is incomplete metabolism and due to fermentive degradation, the products are short chain fatty acids and gases, so the energy absorbed is less as compared to energy absorbed in complete metabolism of polyols. These also do not cause rapid increase in blood glucose level. This is the reason; polyols are used in diabetic and dietetic cakes (Warshaw and Power, 1999).In various types of commodities sweeteners offer sweetness, consistency, flavor and also enhance shelf life (Salminen and Halikainen, 1990). Sweetener gives the fermentable substrate for years-leavened products. Sweeteners also lessen or slow down starch gelatinization and gluten progress in some kind of baked produce. Fructose and sugar

alcohols such as sorbitol and mannitol are used in special nutritional foods as a bulking agent and as humectants with sweet taste (Francis. 2000). Non-nutritive sugar substitute present no energy (calories) and sweeten with little quantity. Non-nutritive sugar substitute are 200 to 8000 time as sweet as sugar that referred as high intensity sweeteners (HIS). Carbohydrate derived from cornstarch, is used to bulk up the substance so it can be measured like sugar. Use of nonnutritive sweeteners considers little- and continuing toxicity, carcinogenicity, and reproductive toxicity, and allergies (Claudia et al, 2012). The objective of this review is to see the use of nutritive sweeteners and non nutritive sweeteners in foods eaten by us in our sail life.

II. NUTRITIVE SWEETENERS

2.1. SUGAR C₁₂H₂₂O₁₁(TABLE SUGAR): Sugar cane and sugar beets are the major raw material for the production of simple sugar that is known as nutritive sweeteners in food items. Sugar s the nutritive sweeteners that is used overall the world and enjoyed by all ages people. The use of sucrose, fructose, and glucose (Fig:1) are supposed to be containing more caloric value.

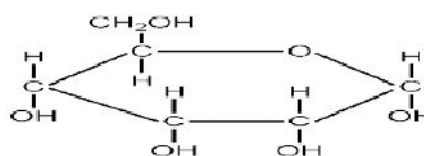


Fig: Chemical structure of simple sugar (Sucrose).

If one consume more it may harm to their health due to their high caloric content results some carcinogenic effects on health. Natural nutritive sweeteners are available in too many forms, when sucrose is added in to any food products it metabolize and breakdown into many simple sugar (Fig:1). Honey is also a kind of natural sugar in which fructose founds naturally which is also a caloric sugar.

III. NON NUTRITIVE SWEETENERS

3.1. ASPARTAME (C₁₄H₁₈N₂O₅): Non nutritive sweetener aspartame (L-aspartyl-L-phenylalanyl-methyl ester), is artificially incorporated into beverages, so many industrial food are available in market that have been sweetened with artificial sweeteners aspartame, but it has been observed from many reports consuming foods sweetened with artificial sweeteners (Fig.2) have some physiological and carcinogenic effect on human health (Maher, T. J and R. J. Wurtman, 1987).

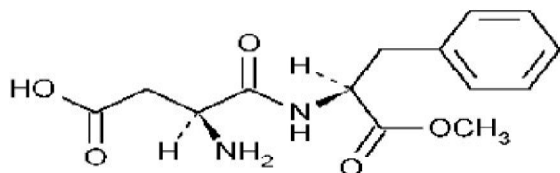


Fig.2. Chemical structure of Aspartame

Enormous industry has working to increase the industrial value that focus on diet containing low calorie, and light foods drinks for the general public, and a number of new, aspartame artificial sweeteners have been introduced with rising use in a extensive variety of food products (Tordoff, M.G. and A. M., Alleva, 1990). Various food additives were mixed with aspartame and sodium nitrite was analyzed in foods, which have revealed negative effects on many living organisms (Morando, S.M. D. and Michela, P.2014). Sodium nitrite is generally used in meat as a food coloring agent to produce the red color that the consumer (Isabella R. Gomez, 2013). Chloroaspartame, L-aspartyl-L-4-chlorophenylalanine methyl ester, was synthesizing from chlorophenylalanine methyl ester and the thioanhydride of aspartic acid. (Marcus et al, 2015).

3.2. ACESULFAME-K (C₄H₄KNO₄S):

Non nutritive sweeteners Acesulfame-k is also a well known artificial sweetener used in various food items. It is evaluated from previous studies it is 200 times more sweet from table sugar (Liang Y, G., and M. V, Pfeiffer, 1987). A study on blood insulin was checked by conducting experiment by injecting acesulfame k (Fig:3) which results no significant difference in blood glucose level. Mixture of Acesulfame K (20 mg/kg body weight/min) similar time blood glucose was gradually reduced from 103.0 +/- 7.3 to 72.0 +/- 7.2 mg/dl (Liang Y, G., and M. V, Pfeiffer, 1987).

Acesulfame-K is a non-absorbable, high power low caloric sweetener (Almeida et al,2012).

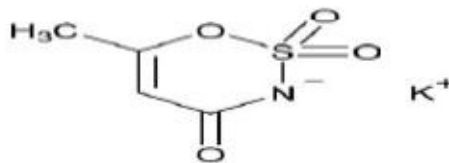


Fig. 3. Chemical structure of Acesulfame-K.

Addition of acesulfame k as a sweetener into the baked products and brownies were evaluated. Significance of acesulfame-K on nutritional and sensory characteristics of various foods with speckled quantity of fat were evaluated. Acesulfame k, a commercially accessible sugar substitute (186kcal/100g) was used as a source of ace-K it also restrain polydextrose, maltitol and tactitol as bulking agents (Almeida et al, 2012).

3.3. NEOTAME (C₂₀H₃₀N₂O₅):

Neotame having chemical formula (C₂₀H₃₀N₂O₅) has been widely used as a non nutritive sweeteners in most of the industrial food products similar to aspartame as a high intensity sweeteners. Neotame is 30-60 times more sweet than the aspartame, and 7000-13000 more sweet from sucrose. Food Drug Administration of US proved neotame a food additive. According to research evaluated that neotame is not carcinogenic, cheap, more sweet, and widely used in various industrial food products (Kirtida, 2011).

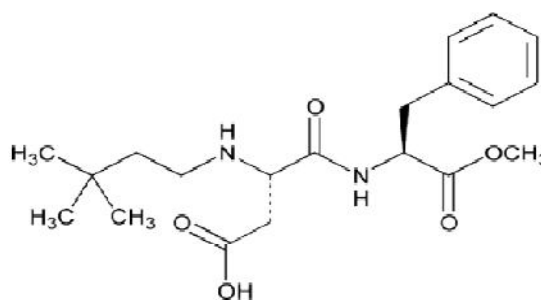


Fig. 3. Chemical structure of Neotame (N-(N-(3,3-Dimethylbutyl)-L-α-aspartyl)-L-phenylalanine 1-methyl ester).

CONCLUSION

It has been concluded from the various studies the use of nutritive and non nutritive sweeteners is of great importance from health prospective and demand of low caloric food for new growing lifestyle of peoples demanding more safe and low caloric foods that has been commercially available in world market. There are some controversial study on health some time they also cause food allergies in human health which

results some health diseases. All kind of non nutritive sweeteners have their own importance in foods and diet.

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