

Nutrition Congress 2015: Chemicals structure, properties, regulations and applications of non-nutritive high intensity sweeteners- Osama O Ibrahim - Bio Innovation LLC

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Abstract

High Intense Sweeteners (HIS) are commonly used in food products, beverages and some oral pharmaceuticals as a sugar substitutes or sugar alternatives and provide sweet without calories. HIS are in high demands due to its multiple advantages including assisting people in losing weight or avoiding obesity and assisting diabetics to control their blood sugar level. The first known intense-sweetener is Saccharine that was discovered in the year 1878. Since then scientists exposed several other rigorous sweeteners that are sweeter than sucrose with zero calorie. Some of the accepted sweeteners are the plant documents (Steviol glycosides and Mogrosides), semi-synthetic peptides (Aspartame and Neotame) and non-natural chemicals (Saccharine, Acesulfame-K, Sucralose, and Cyclamate).

High intensive sweeteners (HIS) from natural sources are refer to natural sweeteners and considered to be safe with GRAS status. The two natural sweeteners Rebaudioside-A extracted from Stevia leaves and Mogrosides extracted from Luo Han Guo (Monck fruit) were considered to be safe with GRAS status in the year 2008 and 2010 respectively. Semi-synthetic peptides such as Aspartame and Neotame and synthetic chemicals such as Saccharine Sucralose, Acesulfame potassium, and Cyclamate, are not natural and refer to artificial sweeteners. These artificial sweeteners before being approved must undergo extensive safety evaluation in tests with humans and animals and must meet the same standard of safety for consumption by consumers including pregnant women and children. In United States, these artificial sweeteners were approved by FDA as safe for applications as food additive sweeteners in foods, beverages and pharmaceuticals. As the high-intensity sweeteners are much sweeter than table sugar (sucrose), smaller amounts of high-intensity sweeteners are needed to achieve the same level of sweetness as sugar in foods.

Plus the availability of a variety of low-calorie sweeteners for use in foods expands the capability to develop reduced-calorie products that better meet consumer needs and desires. In addition, blending some low-calorie sweeteners in foods and beverages may also act synergistically to produce the desired level of sweetness with smaller amounts of each

sweetener and resulting taste frequently meets consumer expectations of a sweetness outline close to that of sugar. People may choose to use high-intensity sweeteners (HIS) in place to sugars for a number of reasons, including to these HIS do not contribute calories or only contribute a few calories to the diet. High Intensive sweeteners ,assist people in losing weight, avoiding obesity diseases and other health associated with high caloric intake by replacing common sugars such as sucrose, dextrose, high fructose corn syrup and corn syrup in foods and beverages with these non-nutritive, zero calorie high intensive sweeteners without changing people's diet habits and taste. Assist diabetics to control their blood sugar levels without scarifying their regular diets and taste. Also, Patients with reactive hypoglycaemia producing excess insulin after the break down of complex carbohydrates or sucrose in their diets into glucose that is released into the blood stream and quickly metabolized causing blood glucose levels to fall below the proper level for the body and brain function. As a result, these patients like diabetes, must avoid consuming foods containing high-glycaemic index ingredients such as complex carbohydrates or sucrose and must choose foods containing sugars substitutes such as the high intensive sweeteners as alternative. There are other several advantages for the application of high intensive sweetener in foods, beverages, candies, chewing gums and other products. For example, these High intensive sweeteners are non-fermentable by oral micro flora. This non fermentable property helps consumers to prevent dental plaque and decay.

Other examples that benefits both consumer and manufacturers are the wide range stability of pH and temperature for these high intensive sweeteners that allows its applications in products required long shelf life at room temperature. Consumers' concern for weight management is the major market demand for these zero calorie high intensity sweeteners as a replacement for sugars in their diets and the worldwide consumption of these low calorie high-intensity sweeteners is largely dependent on the production of diet carbonated soft drinks and low-calorie foods. Beverages market are the largest end-use for these high-intensity sweeteners, followed by foods, table top sweeteners, personal care products

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(such as toothpaste), and pharmaceuticals. The World Health Organization estimates that there are over a billion people globally who are overweight and over 400 million of which are obese. Unfortunately, these numbers are expected to continue increasing and the market demand for these zero calorie, non-nutritive High intensive sweeteners (HIS) will increase. It is estimated that the global market of high intensive sweeteners for the year 2014 was 9.4 billion and it is expected to reach 9.9 billion by the year 2016. The old discovery Saccharine is the only high intensive sweeteners that is facing tough competition from the newly discovered competitors and its market demand continue declining. Despite these zero calorie high intensity sweeteners are approved by FDA in United States and by similar organization in other countries and are recommended by physician or registered dietician for a large segments of the population for several health reasons, some people continue to question the safety of these low calorie high intensity sweeteners in their diets. In United States, FDA continues to maintain and review scientific literatures on the safety of these approved high intensive sweeteners in foods, beverages and other products. In the case of new evidence suggested that a product containing the approved low calorie high intensity sweetener is unsafe, FDA is responsible to review such suggestion and take the proper action. Even, these extensive safety evaluations by FDA and by other similar organizations worldwide it did not change the safety concern of some people worldwide.

These high intensive sweeteners are approved as safe for applications in foods, beverages, dietary supplements and pharmaceuticals products by Food and Drug Administration (FDA) in us and by other similar agencies in other countries. The levels of those non-nutritive high intensive sweeteners utilized in foods, beverages, dietary supplements and pharmaceutical products are supported the approved daily intake (ADI) by FDA and by other safety authorities worldwide. This ADI level is 100 fold less than the safe dose demonstrated in laboratory studies. It is estimated that the global demand of HIS is exceeding 9.0 billion dollars and growing. The only HIS that is declining in global market is the old discovered sweetener Saccharine.

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