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# Food Products with High Satiety Properties Based on Gum

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*Abstract* – **Nowadays, the opportunities to consume energy-dense, unhealthy snacks are encouraged by the obesogenic environment that has developed in the western world, especially among adolescents. If satiating products were readily available, this would allow better control of eating behavior and encourage responsible consumption. Consequently, the ability to manufacture products with high satiating capacity is a matter of interest to the food industry nowadays. Alongside proteins, polysaccharide gums are the most promising ingredients and the ones that can play the most important role when designing foods with high satiating capacity. The effect of the food matrix and the rheology and composition of each gum on the physiological effect is complex and requires an interdisciplinary approach. An increasing number of studies is showing the positive effects of gums on satiety and suggesting useful synergies between gums that have different effects.**

*Keywords* – **Gum, Nutritional, Physiological, Satiety.**

## I. Introduction

Gums are water-absorbing hydrocolloids which increase the viscosity and stability of food systems and have wide applications in many food products. In certain cases, using gums makes it possible to change to a large extent the formulation or constituents/ingredients of a specific food product. Today, consumption of unhealthy snacks with high fat content is widely advertised in the Western world, particularly among adolescents [2]. Obesity which is growing at an alarming rate throughout the world is gradually turning into a major public health concern with unknown socioeconomic costs [9]. Filling foods, if available in sufficient amounts, can provide better control on eating habits and encourage correct food consumption. As a result, in today's food industry is interested in producing food stuff with high filling capacity. As well known nutrients with the highest potential for being used in filling foods, proteins and fibers are widely used for this purpose [1].

## II. Filling Properties of Gums

Numerous studies have evaluated the filling capacity of a long list of soluble gums in viscous solutions. The effect that most viscous solution fibers have on the sense of satisfaction is caused by a reduction in enzyme efficiency, stomach cavity bloating (due to absorbing liquids by fibers), or delayed bowel movement which can in turn delay the satisfaction signals sent from the stomach. Moreover, an absorption delay in the small intestine and longer transit time in the same can increase the time required for contact between nutrients and the epithelium of the small intestine [4,5].

## III. Various Kinds of Gum

### *A. Gum Arabic*

Taken from the Senegalia Senegal tree, gum Arabic is white in color, soluble in water, comprising six hydrocarbons. Gum Arabic or acacia gum is a natural gum extracted from two species of acacia, namely, Acacia Senegal and Acacia Seyal. Gum Arabic is used in the food industry as a stabilizer and in printing industry as a lubricant in specific types of printing ink. In the past, this gum was used to change the viscosity of writing ink. Gum Arabic is a complex compound of saccharides and glycoproteins. Most properties of the gum are derived from these compounds. Gum Arabic is edible [6].

### *B. Gum Asafoetida*

Asafoetida is extracted by cutting the sap root of the tree Ferula or cutting the stalks of Asafoetida producing plants in the summer. This gum is presented to the market in two forms. The first is called Asafoetida tear, a very clean, dust free, smooth, high quality, and clear liquid with a reddish or brownish yellow color. It is about the size of a hazel nut or sometimes a pea. Its cross section is white in color, but upon exposure to air, its color quickly darkens due to oxidization. The other gum is called "bulk gum". This low quality gum is gathered carelessly off the ground and is mixed with dirt, dust, dried leaves, etc. It usually has a bittersweet and sometimes bitter taste, and a sharp acrid smell like that of garlic [3].

### *C. Gum Whelan*

Microbial exopolysaccharides have a high molecular weight and contain valuable biopolymers. They are used in various applications including food and pharmaceutical industries, cement systems, and cosmetics industries. Whelan is a microbial product with a prominent position among polysaccharides due to its microbial properties. Whelan biopolymer gum is mainly synthesized through fermentation with Alcaligenes sp. and consists of main column tetrasaccharide chain polymers including L. mnosus, L. rhamnosus, D-glucose and D-Gluchronic acid. This gum is used as a thickener, suspension agent, coupler, emulsifier, stabilizer and elastomer. It also has various applications in cement systems [7].

### *D. Locust Bean Gum*

This gum is extracted from the seed endosperms of the carob tree. It is a hydrocolloid substance with a unique performance which has turned it into a new stable thickening agent. Once added to food materials, this gum

increases their cohesion and ultimately improves their texture and other applied characteristics through aqueous phase control. Locust bean gum is used in food industry as a thickener and stabilizer for ice creams, sauces, breads, and processed meat industries. Daily consumption of Locust Bean Gum can reduce the risk of heart disease, diabetes, and gastric irregularities. Due to its effect on the structure and stickiness of food, this gum can change the rate of carbohydrates breakdown. This characteristic would likely affect the regulation of blood sugar and insulin which are the key factors in preventing obesity and diabetes [8].

## IV. Conclusion

Due to the filling effects of gums (which induce a sense of satisfaction), they can be made easily available as ingredients of food products. Thus, public health can be greatly improved since in this way, consumption of snacks with high fat content would gradually decrease. Moreover, there are many varieties of gums with different nutritional and functional properties in nature which can be used in the preparation of food stuffs.

## References

[1] Halford, J. C. G., & Harrold, J. A. (2012). Satiety-enhancing products for appetite control: science and regulation of functional foods for weight management. Proceedings of The Nutrition Society, 71, 350e362.
[2] Hardy, L. L., Grunseit, A., Khambalia, A., Bell, C., Wolfenden, L., & Milat, A. J. (2012). Co-occurrence of obesogenic risk factors among adolescents. The Journal of Adolescent Health, 51, 265e271.
[3] Seidemann J. World spice plants: Economic usage, botany, taxonomy. Springer Berlin Heidelberg. Germany. 2005, pp: 156 - 157.
[4] Slavin, J. (2010). Whole grains and digestive health. Cereal Chemistry, 87, 292e296.
[5] Slavin, J. L., & Green, H. (2007). Dietary fibre and satiety. Nutrition Bulletin, 32(Suppl.1), 32e42.
[6] Smolinske, Susan C. (1992). Handbook of Food, Drug, and Cosmetic Excipients. p. 7. ISBN 0-8493-3585-X.
[7] Nakhaei Moghaddam, T.& Nakhaei Moghaddam, F. Production and functional properties of gum Whelan. 1 St National Conference on novel food Sciences, july 1, 2014.
[8] Nakhaei Moghaddam,T.& Mobaraki, A. Locust Bean Gum, a Gum with High Nutritional and Functional Properties. 1 St National Conference on novel food Sciences, july 1, 2014.
[9] Nakhaei Moghaddam, T. Anti-obesity effects of vegetables contain phytochemicals_. 1 St National Conference on novel food Sciences, july 1, 2014.

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