THE SCIENCE WORLD
A Monthly e Magazine
ISSN:2583-2212
Popular Article
December, 2025 Vol.5(12), 11241-11243

Fiber As Functional Ingredient in Dairy Food

Patel Vinay M[1*]., Chaudhari Mahesh P[2]., Savaliya Ravi[3]., Rajani Bhargav[4]., Muniraju Aishwarya[5]

[1]Senior Research Assistant, Dairy Engineering Department, G N Patel College of Dairy Science, Kamdhenu University, Sardarkrushinagar, Gujarat, India
[2]Jr. Officer, Banas Dairy, Palanpur, Gujarat, India
[3]Jr. Officer, Banas Dairy, Palanpur, Gujarat, India
[4]Officer, Banas Dairy, Palanpur, Gujarat, India
[5]M. Tech Scholar, Dairy Microbiology Department, ICAR- National Dairy Research Institute, Karnal, India
*Corresponding Author email ID: patelvinay44490@gmail.com
DIO:10.5281/ScienceWorld.18034777

Introduction

Plants contain compounds including cellulose, hemicellulose, lignin and pectin collectively known as dietary fiber that the enzymes in our intestines cannot digest. Dietary fiber has long history, its term originating with Hipsley,(1953) who coined dietary fiber as a non-digestible constituent making up the plant cell wall. Botanists define fiber as a part of the plant organs, chemical analysts as a group of chemical compounds, consumer as a substance with beneficial effects on human health and for the dietetic and chemical industries dietary fiber is a subject of marketing. Later dietary fiber was defined as a ubiquitous component of plant foods and includes materials of diverse chemical and morphological structure, resistant to the action of human alimentary enzymes (Abou-zeid, 1982). Trowell *et al*. (1985) reported that "Dietary fiber consists of remnants of plant cells resistant to hydrolysis (digestion) by the alimentary enzymes of man", whose components are hemicellulose, cellulose, lignin, oligosaccharides, pectin's, gums and waxes.

Classification

Dietary fiber includes soluble dietary fiber (SDF) and insoluble dietary fiber (IDF). SDF refers to fibers that cannot be digested or absorbed by human bodies but are partly soluble in water. Examples of SDF are some gums, such as pectin, gum Arabic, guar gum, and beta-glucan, and also include some biological polysaccharides and synthetic polysaccharides. IDF

is a fiber that cannot be digested or absorbed by human bodies and is insoluble in water. IDF includes some components of the structure of cell walls, such as cellulose, hemicellulose, and lignin (Yang *et at.,* 2017).

Health benefits of fiber

Consumption of adequate amounts of DF reduces the risk of constipation, hiatus hernia, appendicitis, diabetes, obesity, coronary heart diseases, gallstones. Studies have shown that individuals with adequate intake (AI) of DF appear to be at lower risk for developing stroke, colorectal cancer, cardiovascular diseases and type-2 diabetes. Increased intake of DF is also associated with lower blood pressure and lower serum cholesterol levels. Adequate intake(AI) of fiber is suggested to aid in weight loss or prevent weight gain, mainly through satiety or fullness regulation. To improve immune function through gut health and fiber-microbiota interactions. In children, increased fiber intake has been found to be associated with lower risk of being overweight or obese (Li and Komarek, 2016).

Applications of soluble fibers in dairy industry

Inulin introduces numerous improvements into dairy products. Oat bran contains some insoluble fiber plus a larger amount of soluble fiber, both of which produce laxative effects. Polyfructan can be used in various bakery and dairy goods, in which it acts as a low-calorie bulking agent. Carrageenan is also used for thickening, suspending, and gelling food products. Alginates add a type of body and texture to ice cream that other gums don't easily duplicate. Carrageenan is used for thickening, suspending, and gelling food products. Gum acacia is a product derived from the exudates of acacia trees. It is a natural DF that is fermented in the large intestine. Xanthan gum is heat and pH resistant and also has a cleaner flavour when compared to other gums. Guar gum is well-established gum is widely used in a variety of products, but suffers from off-flavor defect. Pectin is used in diverse applications such as yogurt, confectionery and acid milk drinks. Lignin is abundantly present in “whole” preparations and also in fruits that contain edible seeds and mature vegetables such as carrots and other root vegetables (Ambuja and Rajakumar, 2018).

Fortified dairy products with dietary fibers

Milk, defined as the fluid secreted by the mammary glands of mammals, contain no fiber. Milk is rich source of nutrients; however, it is deficient in fiber. The inclusion of natural ingredients which are good source of dietary fibers can attract the attention of health-conscious consumers. Fortifying yogurt and other dairy products with fiber is of increasing interest to create functional foods with health benefits and improve their functionality. Fortifying yogurt with dietary fiber would complement its healthy properties. The maximum acceptable amount

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 18/12/2025

of date fiber in fortified yogurt with potential beneficial health effects is 3% (Hashim *et al*., 2009). Orange fiber was used as a novel fat replacer in light ice cream. The use of orange fiber is an effective alternative to fat in ice creams (Crizel *et al*., 2014). The acceptable quality fiber fortified misti dahi (FFMD) could be prepared using inulin and soy fiber at 1.5 % level of fortification (Raju and Pal, 2014). The incorporation of oligofructose in fermented probiotic lactic beverages modified some of their properties, such as rheological, but did not adversely alter their sensory acceptability (De Castro *et al.,* 2009). The influence of inulin, oligofructose and oligosaccharides from honey, combined in different proportions, on the consumers' sensory acceptance, probiotic viable count and fructan content of novel potentially synbiotic petit-suisse cheeses was investigated (Cardarelli *et al.,* 2008).

Conclusion

The soluble fiber enriched diets have a positive effect on human health. Human had to give more importance to their health and nutritional situation. So, recently it is watched that there has been increasing demand to dairy foods that has low calories, low fat and low cholesterol content and functional foods. The enrichment of dairy foods with dietary fibers is an effective way to enhance nutritional and physiological aspects and to promote functionality by influencing rheological and thermal properties of the final product. Nutritional benefits associated with dietary fiber fortification and fat reduction are appealing features for the development of novel products that can fill market niches.

Selected References

Abou-zeid, N. A. (2016). The nutraceutical effects of dairy products fortification with plant components: a review. *Int Adv Res Sci Eng Technol*, *3*, 1475-1482.

Ambuja, S. R., & Rajakumar, S. N. (2018). Review On "Dietary Fiber Incorporated Dairy Foods: A Healthy Trend". *International Journal of Engineering Research and Applications*, *8*(2), 34-40.

Cardarelli, H. R., Buriti, F. C., Castro, I. A., & Saad, S. M. (2008). Inulin and oligofructose improve sensory quality and increase the probiotic viable count in potentially synbiotic petit-suisse cheese. *LWT-Food Science and Technology*, *41*(6), 1037-1046.

Crizel, T. D. M., Araujo, R. R. D., Rios, A. D. O., Rech, R., & Flôres, S. H. (2014). Orange fiber as a novel fat replacer in lemon ice cream. *Food Science and Technology*, *34*(2), 332-340.

De Castro, F. P., Cunha, T. M., Barreto, P. L., AMBONI, R. D. D. M., & Prudencio, E. S. (2009). Effect of oligofructose incorporation on the properties of fermented probiotic lactic beverages. *International Journal of Dairy Technology*, *62*(1), 68-74.

Official Website
www.thescienceworld.net
thescienceworldmagazine@gmail.com
Published 18/12/2025

Hashim, I. B., Khalil, A. H., & Afifi, H. S. (2009). Quality characteristics and consumer acceptance of yogurt fortified with date fiber. *Journal of dairy science*, *92*(11), 5403-5407.

Hipsley, E. H. (1953). Dietary "fibre" and pregnancy toxaemia. *British medical journal*, *2*(4833), 420.

Li, Y. O., & Komarek, A. R. (2017). Dietary fibre basics: Health, nutrition, analysis, and applications. *Food quality and safety*, *1*(1), 47-59.

Raju, P. N., & Pal, D. (2014). Effect of dietary fibers on physico-chemical, sensory and textural properties of Misti Dahi. *Journal of food science and technology*, *51*(11), 3124-3133.

Trowell, H., Burkitt, D., & Heaton, K. (1985). Dietary fibre, fibre-depleted foods and disease.

Yang, Y. Y., Ma, S., Wang, X. X., & Zheng, X. L. (2017). Modification and application of dietary fiber in foods. *Journal of Chemistry*, *2017*.