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History, Processing, Types and Health Benefits of Indian Yogurt

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Abstract

Yogurt is a food which is nutrient rich and it is produced after the milk bacterial fermentation. Yogurt should have 3.25% milk fat and 8.25% milk solids non fat and the titrable acidity of at least 0.9%, which is expressed as lactic acid. Before adding bulky flavoring additives, the USDA yogurt criteria specify that the yogurt must satisfy the composition requirements of milk fat and MSNF. The data used in this research work has been taken from various secondary sources like journals, review articles and websites etc. which helps to understand the history, manufacturing, types and health aspects of the yogurt. The standard procedure for making yogurt consists of changing the milk's original composition, pasteurizing the yogurt mixture, fermenting it at temperature between 40 and 45°C , cooling it down and then adding flavors and fruit. Different types of yogurts are found in the market like fruit yogurt, French style, non-diary, drinkable, organic and probiotic yogurt which have many health benefits. Probiotics found in yogurt have an antitumor property, that is why it prevents the growth and development of tumors. Yogurt also improves insulin resistance and reduces the risk of Type-2 diabetes. Lactobacillus gasseri found in yogurt has positive health effects on peripheral blood flow, autonomic nerve activity, and skin condition. The study highlights yogurt's nutritional profile, production process, and health benefits. Emphasizing the importance of meeting USDA criteria, it explores yogurt's diverse types and therapeutic properties, including its role in cancer prevention, diabetes management, and cardiovascular health. Lactobacillus gasseri's impact on various bodily functions is also discussed.

Keywords: Yogurt, pasteurization, stabilizers, flavors, bacterial-culture

INTRODUCTION

Yogurt, also known as "yoghurt" or "yoghourt", is referred to by the United States Food and Drug Administration's (FDA) Code of Federal Regulations as a food product made by culturing one or more optional dairy ingredients, such as cream, milk, partially skimmed milk, and skim milk. This can be done alone or in conjunction with a specific bacterial culture that contains the lactic acid-producing bacteria *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. A minimum of 3.25% milk fat and 8.25% milk solids non-fat (MSNF) should be included in yogurt, along with at least 0.9% of titratable acidity, expressed as lactic acid, in it [1]. Before adding bulky flavoring additives, the USDA yogurt criteria stipulate that the yogurt must satisfy the composition requirements for milk fat and MSNF [2].

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METHODOLOGY

The data used in the present study was gathered from a variety of secondary sources, including

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websites, book chapters, review articles, and research papers published in reputable journals. The primary objective of this study was to gain knowledge as much as possible about yogurt's types, processing history, and health benefits in an Indian context.

RESULTS AND DISCUSSION

History of Yogurt

About 6000 BC, Indian Ayurvedic scripts mention the health advantages of eating fermented milk product. In Indian cuisine nowadays, there are over 700 different types of yoghurts and cheese. Other than drying it, the only safe way to preserve milk is to make yoghurt, for millennia. Greek and Roman empires were well-known for their usage of yoghurt, and the Greek was the first to documented it in written around 100 BC, mentioning that it was used by barbarous nations. In the Book of Job (the Bible), Abraham's owed his long life and good health to eating yoghurt, and there is mention of a "Land of Milk and Honey", which is considered as a reference to yoghurt.

It is thought that the Turkish term "yogurmak", which meaning to thicken, coagulate, or curdle, is where the name "yoghurt" originates. The 11th-century books named Kutadgu Bilig by K. H. Yusuf and Diwan Lughat al-Turk by Mahmud Kashgari both detail the usage of yoghurt by mediaeval Turks. The texts include word "yoghurt" and discuss how nomadic Turks use it. The Turkish people were also the first to assess the potential medical benefits of yoghurt for treating a wide range of illnesses and symptoms, including cramps and diarrhea, as well as for relieving sunburned skin pain.

The Mongol Empire's founder, Genghis Khan, is said to have fed yoghurt, a staple of the Mongolian diet, to his army because he thought it gave bravery to his army. Following an offer from France's Turkish allies to treat severe diarrhea, King Francoise I of France brought this dairy product to Western Europe in 1542. Later, it was combined with other items, including fruits, honey, cinnamon, and sweets, and served as a dessert.

It was not until the 20th century that scientists provided a justification for yoghurt consumption's health advantages. The lactic acid bacteria *Bacillus bulgaricus*, commonly known as *L. bulgaricus*, was initially identified in 1905 by Stamen Grigorov, a medical student from Bulgaria. As a yoghurt cultures, it is continued to use now. Based on Grigorov's research, Russian Nobel winner Yllia Metchnikoff of the Pasteur Institute in Paris proposed in 1909 that lactobacilli in yoghurt were linked to longer life spans among Bulgarian peasants' population. Yoghurt gained popularity as a health food at the start of the 20th century and was offered as medication in pharmacies. When manufacturer Isaac Carasso from Barcelona, started blending yoghurt with jams, the product became commercially successful. Daniel Carasso, the son of Isaac Carasso, founded Dannon (Danone in France) after escaping the Nazi occupation. The first yoghurt factory and laboratory opened its doors in France in 1932, while the first one in the US opened its doors in 1941 [3].

PROCESSING OF YOGURT

The knowledge of the processing or manufacturing of yogurt has transferred from many generations. It is a traditional technique. However, in past years, it has become more analytical due to the advancement of various areas like food engineering, microbiology, and biochemistry.

Components Required for Yogurt Manufacturing

The leading ingredient in yogurt manufacturing is milk and also requires collection of ingredients like stabilizers, flavors, sweeteners, fruits, and bacterial cultures [4].

PROCESS OF MANUFACTURING

The different manufacturing processes for set and stirred yogurt are depicted in Figure 1 in a flow chart.

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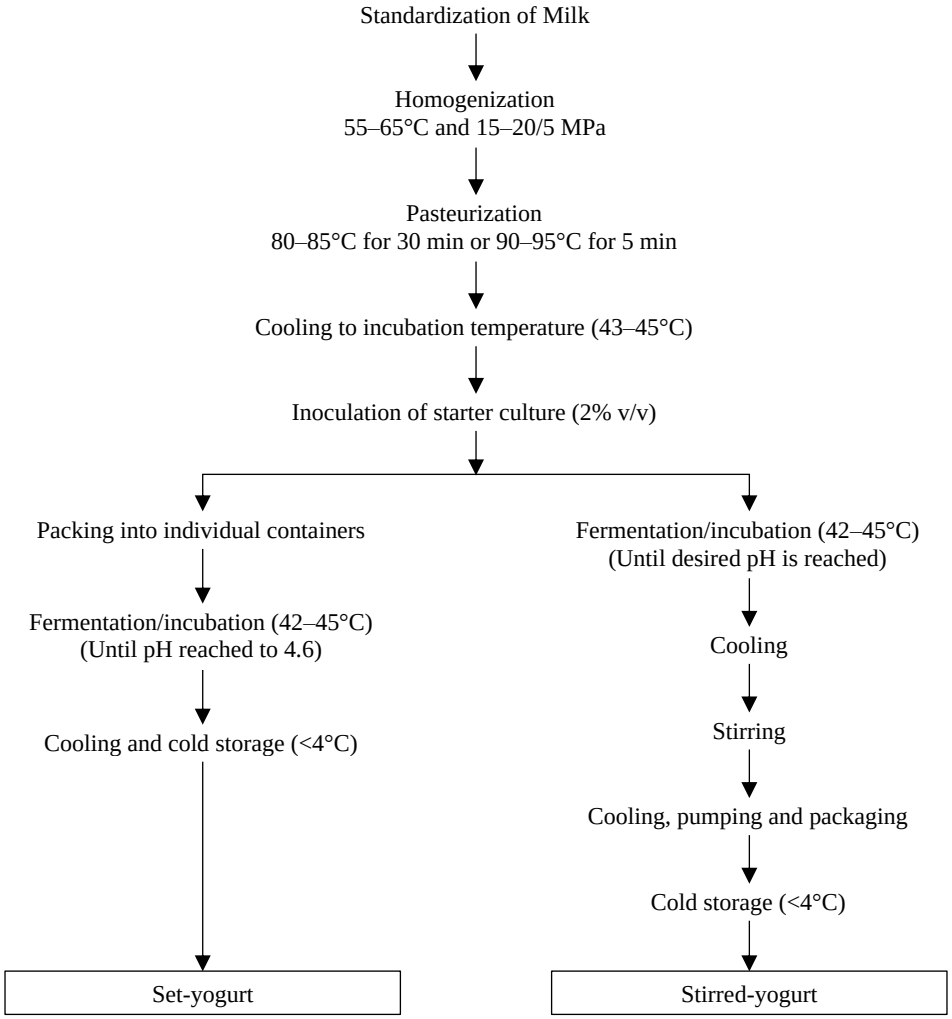

Figure 1. Manufacturing process of set and stirred yogurt (Adapted from Lee and Lucey) [5].

Standardization of Milk

The standardization of milk is accomplished at 550°C, and then excess fat is extracted with a centrifugal method. 0.01% fat content is present in non-fat yogurt, 1–2% fat content is present in light fat yogurt and >3.2% fat content is present in whole fat yogurt. The protein content of the mixture could vary from 3–5 to 15% in order to decrease syneresis and enhance the texture of the yogurt. The simplest and most conventional way is to add milk powder. It is a simpler process. Whey powder or caseinates are two prevalent applications for milk proteins [6]. Pectin and Gelatin are stabilizers that are added to yogurt mixtures to achieve the distinct qualities of yogurt, such as feel, texture, physical appearance, and thickness, as well as to prevent whey separation [4].

Homogenization

The size of the fat globules is decreased in the homogenization process. Creaming, (the separation of an aqueous phase from a layer filled with fat) is prevented via homogenization. Cavitation and turbulence work together to reduce the size of the globules. The instrument which is used for decreasing particle size by this method is referred to as a homogenizer [7]. Generally, the first and second sessions of homogenization of milk are carried out for more than 10–17 min at pressures of 10–20 and 5 MPa, respectively. In comparison to the traditional homogenization process, the more recent introduction of ultra-high pressure homogenization to the industrial yogurt manufacturing process has increased the yogurt's hardness and water-holding ability [4].

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Heat Treatment

Almost all individuals consider that one of the most crucial processes in the production of yogurt involves heating the milk, which has a significant impact on the microstructure and physical characteristics of the finished product [4]. Heat treatment makes it possible to get rid of inactive lactoperoxidases and spoilage microorganisms from milk. By allowing whey protein denaturation and interaction with casein, heat treatment improves the texture of yogurt by decreasing gel syneresis and raising gel hardness. In commercial yogurt manufacturing, the mixture is typically heated to 90–95°C for 3–7 min before cooling to fermentation temperature [6].

Inoculation and Fermentation

The yogurt mixture temperature is lowered to 43–46°C after the heat treatment and afterward, yogurt starter culture bacteria is added at a concentration of roughly 2%(v/v). For the thermophilic microorganisms employed in the yogurt starter culture, this temperature range is ideal [4]. In order to make yogurt on a big scale, concentrated starting cultures of the two yoghurt bacteria, *Lactobacillus bulgaricus* and *S. thermophilus*, are added to a mixture [6]. Starting cultures are commonly inoculated into a sterile, sealed stainless steel vessel. However, in the production of set-and-stirred yogurt, the location of fermentation varies. In set yogurt manufacturing processes, it typically takes place in individual containers, and stirred yogurt, takes place in big, sanitary stainless steel vats. The fermentation process is terminated by quickly cooling achieving the appropriate incubation temperature after it has been held and monitored at an ideal level for a few hours (2.5–3 h) or till the pH and acidity have reached the appropriate levels. Lactose is converted to lactic acid during the fermentation process by the lactic acid bacteria's metabolic activity, which coagulates milk proteins and produces some volatile compounds that give it its distinct flavor.

Cooling

Yogurt is frequently blast chilled to cold temperatures (<10°C once it reaches the ideal pH range of 4.5–4.6. Thus terminates the fermentation process and prevents further acid formation. To produce set yogurt, yogurt is either blast chilled in cooling tunnels or immediately moved to a cold store. Conversely, while making stirred yogurt, the coagulum in the jacketed fermentation vat is first agitated to create a smoothed product, which is then cooled before being filled into containers. The USDA Specifications state that yogurt should be refrigerated and kept at temperatures below 7.2ºC following the last steps of manufacture and/or packing [4].

TYPES OF YOGURTS

Fruit Yogurt

Fruit yogurts come in two varieties: sundae-style yogurt, which has the fruit arranged at the bottom of the container, and Swiss-style yogurt, which has the fruit evenly spread throughout the yogurt. At the preparation stage, fruit pieces or pulp are added to increase consumer attractiveness and sweetness while producing a range of Flavors.

French Style Yogurt

This type of yogurt is sometimes referred to as custard-style yogurt as it is prepared in a pot using a direct culture method that is influenced by French culture and has a pudding-like texture. Fruit pieces, usually blueberries and strawberries or a combination of the two, are occasionally added to French-style yogurts to flavor them [4].

Non Dairy Yogurts

For people with milk allergies and those who have gastrointestinal issues after eating dairy-based yogurt products, non-dairy yogurts offer a special alternative. They are also a great choice for those who avoid dairy products due to personal or religious convictions. For fermentation, some producers of non-dairy yogurts use live and active cultures, while others do not.

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Organic Yogurt

Organic milk is used for organic yogurt. Although organic products are typically more expensive, some consumers are becoming more interested in them because they are better for their health.

Drinkable Yogurt

The nutrients in drinkable yogurts are the same as those in natural yogurts, although they could include more calories and sugar. They are created by flavoring regular yogurt with extra flavors and water. It is a fantastic choice for anyone who is often on the move or who does not like the hard yogurt texture.

Probiotic Yogurt

While living and active cultures are present in certain yogurts, other yogurts also include cultures that have been shown to have health advantages beyond nutrition. Live bacteria, or probiotics, are recognized to provide health advantages. Some producers supplement their yogurts with probiotics. The majority of probiotic yogurts are regarded as immune system boosters or digestion aides [8].

HEALTH BENEFITS

Yogurt and other milk products are excellent sources of bioavailable calcium. A serving of 50 g of yogurt is said to offer 41% of a 5-year-old's recommended daily calcium intake [9]. Yogurt and other fermented dairy products appear to have been known for generations due to their positive health effects being referenced in both the Bible and early Hindu texts [9, 10]. Yogurt is said to offer numerous health advantages in addition to its rich nutritional profile. The primary carbohydrate present in milk is lactose, a disaccharide made up of a single glucose and galactose molecule. Inside the intestines, the enzyme lactase breaks down lactose into its simpler sugar forms. Insufficient secretion or disruptions to the lactase digestion process can lead to the passage of undigested lactose into the large intestine. This, in turn, can be fermented by the colonic microbiota, causing gastrointestinal symptoms such diarrhea, flatulence, and abdominal pain. Lactose intolerance is the term used to describe this problem. It has been noted that poor calcium intake and low bone mineral density are linked to lactose intolerance, perhaps due to the unnecessary elimination of milk and dairy products from the diet [9, 11]. Thus, it can be said that yogurt helps those who are lactose intolerant get all the benefits of milk products without to deal with the discomfort related with hypolactasia or lactose malabsorption. It is widely acknowledged that optimal gut microbiota balance is linked to both healthy nutrition and overall health. Furthermore, it is recognized that the main microbial strains connected to this equilibrium are Lactobacilli and Bifidobacteria [9, 11, 12]. There are several therapeutic benefits associated with regularly consuming bio-yogurt and maintaining a good microbial profile [9]. Probiotics that are found in yogurt are thought to have antitumor properties through inhibiting carcinogens and procarcinogens, inhibiting bacteria that transform procarcinogens into carcinogens, stimulating the immune system of the host, and lowering intestinal pH to lower microbial activity. Consuming yogurt that has probiotic bacteria in it can prevent the growth and development of tumors. Consuming yogurt can improve insulin resistance, decrease blood glucose and lipid levels, and reduce the risk of Type-2 diabetes. Regular yogurt consumption was found to be associated with a 28% lower incidence of Type-2 diabetes, according to an analysis of the longitudinal EPIC survey. Some research suggests that probiotic bacteria and a unique type of vitamin K linked to fermentation may be the means by which yoghurt's health advantages are mediated. Yogurt that contains *Lactobacillus gasseri*, which has positive health effects on peripheral blood flow, autonomic nerve activity, and skin condition (moisturization and pigmentation). *Lactobacillus gasserii* containing yogurt is effective against *Helicobacter pylori* (*H. pylori*), improves the pepsinogen I/II ratio in *H. pylori*, creates positive results in healthy volunteers and *H. pylori*-infected patients, and prevents the development of HCl-induced acute gastric lesions by producing prostaglandin E2 and healing chronic gastric ulcers caused by acetic acid. Eating yoghurt reduces cholesterol synthesis. It lowers cholesterol, thus reducing the risk of heart attack. *Lactobacillus acidophilus* and some bifidobacteria can lower cholesterol in the intestine [13].

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CONCLUSION

Yogurt is a probiotics food which improves our intestinal health. It offers calcium in a form that is bioavailable. The milk protein found in yogurt has all essential amino acids required to keep our bodies functioning at their best. It strengthens the body's capacity to absorb lactose, boosts immunity, and guards against a number of gastrointestinal illnesses. These days, the market offers a wide variety of yogurts to satisfy everyone's specific needs and requirements.

REFERENCES

1. FDA. Yogurt. 21 CFR 131.200, Code of Federal Regulations. Washington, DC: US Dept. of Health and Human Services; 2013a.
2. USDA. USDA Specifications for Yogurt, Nonfat Yogurt and Low fat Yogurt. Dairy Programs. Agricultural Marketing Services. Washington, DC: United States Department of Agriculture; 2001.
3. Fisberg M, Machado R. History of Yogurt and current patterns of consumption. Nutr Rev. 2015; 73(1): 4–7. DOI: https://doi.org/10.1093/nutrit/nuv020
4. Weerathilake W, Rasika D, Ruwanmali J, Munasinghe M. The evolution, processing, varieties and health benefits of yogurt. Int J Sci Res Publ. 2014 Apr; 4(4): 1–10. Retrieved from https://www.researchgate.net/publication/264004596
5. Lee WJ, Lucey JA. Formation and physical properties of yogurt. Asian-Australas J Anim Sci. 2010; 23(9): 1127–1136.
6. Singh R, Nikitha M, Mangalleima N. The product and the manufacturing of yoghurt. Int J Mod Trends Sci Technol. 2021; 7(10): 48–51. doi:10.46501/IJMTST0710007
7. Britannica TE. (1998 Jul 20). Homogenization: Definition & Examples. [Online]. Retrieved from Encyclopedia Britannica: https://www.britannica.com/science/homogenization
8. Banerjee U, Malida R, Panda R, Halder T, Roymahapatra G. Variety of yogurt and its health aspects- a brief review. Int J Innov Pract Appl Res. 2017 Dec 1; 7(7): 56–66. Retrieved from https://www.researchgate.net/publication/321028178
9. Mckinley MC. The nutrition and health benefits of yoghurt. Int J Dairy Technol. 2005; 58(1): 1–12.
10. Lourens-Hattingh A, Viljoen BC. Yogurt as probiotic carrier food. Int Dairy J. 2001; 11(1): 1–17.
11. Buchowski MS, Semenya J, Johnson AO. Dietary calcium intake in lactose maldigesting intolerant and tolerant African-American women. J Am Coll Nutr. 2002; 21(1): 47–54.
12. Rybka S, Kailasapathy K. The survival of culture bacteria in fresh and freeze-dried AB yoghurts. Aust J Dairy Technol. 1995; 50(2): 51–57.
13. Halder T, Roymahapatra G, Malida R. Variety of yogurt and its health aspects- A brief review. Int J Innov Pract Appl Res. 2017; 7(7): 56–66.

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