WHY DRINK BUTTERMILK?

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ABSTRACT

Although it is a by-product whose composition largely depends on the production technology, buttermilk is a nutritionally valuable food because it is a good source of minerals, vitamins and proteins and has a similar content to skimmed milk. Buttermilk is a functional food as it contains phospholipids and milk fat globule membranes, making it a good medium for the production of functional beverages with added functional ingredients such as fibre, prebiotics, probiotics, bioactive peptides and others. Nevertheless, buttermilk is not recognised by consumers as a valuable food, which is why its consumption is still insufficiently represented in the daily diet.

Keywords: buttermilk, by-product, functional food

INTRODUCTION

Buttermilk is the liquid that remains during the churning of fermented or unfermented cream and milk in the production of butter. It can also be produced by spontaneous fermentation of liquid skim milk or by inoculation of non-fermented buttermilk and milk with mesophilic lactic acid bacteria strains such as *Lactococcus lactis* subsp. *lactis*, *Lc*. *lactis* subsp. *cremoris* and *Leuconostoc mesenteroides* subsp. *cremoris*. Today, buttermilk is widely used in the food industry in liquid or powder form as an emulsifier and flavour enhancer in the production of various foods such as bread, cakes, cookies, ice cream and chocolate. Although it is a by-product whose composition largely depends on the production technology, buttermilk is a nutritionally valuable food as it is a good source of minerals, vitamins and proteins with a content similar to that of skim milk (Banerjee and Qamar, 2022). Buttermilk is also considered a functional food as it contains phospholipids and milk fat globule membranes (Ali, 2018). In this sense, buttermilk can be a good medium for the production of functional beverages with added functional ingredients such as fibre, prebiotics, probiotics, bioactive peptides and others. Nevertheless, buttermilk is not recognised as a valuable food by consumers, which is why its consumption is still insufficiently represented in the daily diet.

NUTRITIONAL VALUE OF BUTTERMILK

The properties of liquid buttermilk depend not only on the type of milk and the season, but also on the butter production technology. In general, there are two types of buttermilk: unfermented (sweet) and fermented (addition of lactic acid bacteria before/after churning). Regardless, the physicochemical composition of buttermilk is similar to that of skim milk, with the exception of the phospholipid content, which is significantly higher in buttermilk (Table 1) (Mudgil and Barak, 2016). Buttermilk is a rich source of calcium, phosphorus,

potassium, vitamin B12, B2, caseins, whey proteins and enzymes (Conway et al., 2014). Libudzisz and Stepaniak (2003) state that buttermilk contains 117 mg/100 g calcium, 150 mg/100 g phosphorus and 0.03 mg/100 g potassium. Despite its high nutrient content, cultured buttermilk is naturally deficient in vitamin C, iron and fibre (Naidu et al., 2003).

Table 1: Physical and chemical composition of non-fermented buttermilk and skimmed milk

Parameter	Non-fermented buttermilk	Skim milk
Milk fat (%)	0.60	0.09
Protein (%)	3.70	4.30
Lactose	4.84	5.25
Total solids (%)	9.75	10.80
Phospholipids (mg)	78.60	8.50
pH value	6.85	6.70

Source: Kumar et. al. (2015)

FUNCTIONAL BEVERAGES BASED ON BUTTERMILK

Kilic (2022) defines functional foods as natural foods that contain bioactive compounds that have a medicinal effect on the immune system and health. This refers primarily to the milk fat globule membrane (MFGM) contained in buttermilk, the liquid that remains after the churning process in butter production. This is because buttermilk has a high content of the original polar milk lipids (1.2–2.1%) (Ali, 2019) and can contain up to seven times more phospholipids (glycerophospholipids, sphingolipids) than whole milk (Zanabria and Corredig, 2011). Milk phospholipids (phosphatidylethanolamine, phosphatidylinositol, phosphatidylcholine, phosphatidylserine, sphingomyelin) are the major structural components of many biological membranes, including the fat globule membrane of milk, and are considered functional components in foods. Mudgil et al. (2016) found that phospholipids in buttermilk are considered important because of their positive influence on lowering cholesterol levels and blood pressure, as well as their anti-inflammatory and anti-cancer effects.

Due to its emulsifying properties, buttermilk as a food ingredient can improve its properties (Kifah et al., 2014), which is why it is widely used by the food industry. In terms of nutritional value, buttermilk as a functional food has great potential for human nutrition, especially for children and the elderly who have difficulty chewing. One of the possible solutions is to increase its consumption of buttermilk by enriching it with various ingredients such as fruit juices, pulp or additives that have a similar protein content to milk (Shree et al. 2017). Mudgil and Barak (2019) found that cultured buttermilk can be a good base for ingredients such as fibre, prebiotics, probiotics, fruit-based functional ingredients, bioactive peptides, etc. In addition to the probiotics and prebiotics commonly used in the manufacture of dairy products, some recent research shows the successful incorporation of supplements such as algae and Aloe vera. The addition of supplements such as Spirulina platensis in powder form to buttermilk can improve the nutritional and physicochemical properties without significantly altering sensory acceptability (Rose et al., 2023). An improvement in the nutritional value of buttermilk can be achieved by adding Aloe vera juice, which is a good source of vitamin C, iron and fibre (Mudgil et al. 2016).

CONCLUSION

Although buttermilk is a by-product, it is a functional food that is very valuable for human nutrition, which is why it is important to increase its consumption. One of the possible solutions is to enrich buttermilk with various additives that simultaneously increase its nutritional value and sensory properties.

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