

Nutritive Value and Health Benefit of Fermented Milks

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Abstract

Fermented milk plays a very vital role in human civilization from ancient time. Fermented milk product is not only nutritionally superior but it has plenty of health benefits, though all the health benefit mechanisms of fermented milk is not known but in future fermented milk would be one of the substitute of medicine.

Keywords: Lactic acid, β -galactosidase, biological value, anticholesterolemic

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INTRODUCTION

The presence of millions of microorganisms in every milliliter of milk has a powerful and lasting effect, as they change milk into fermented dairy products. During fermentation the concentration of some of components of various categories of nutrients acting as substrate to various microbial enzyme decrease while other composites, which were almost nonexistent before, appear [1].

Fermented products are more digestible since they are based on the supposed predigestion of fat, lactose and protein by the bacterial cultures [2]. Some early observations on the nutritive value of dahi are recorded on the vitamin C level [3], vitamin B complex [4], growth promoting value [5] and calcium retention [6].

The dosage of 100 g of probiotic yoghurt containing 10^8 cells/g of *Lactobacillus* and *Bifidobacteria* along with *freudenreichii subsp shermanii*, once in a day after meal for a period of seven days can be used to discourage the growth of harmful microorganisms in addition to providing improved nutrition in infants [7].

Nutritive Value of Fermented Milks

Lactose Catabolism

Lactose is the most important sugar present in milk. This disaccharide containing glucose and galactose (β -1-4 linkage) is used by the two specific yoghurt species as the main source of carbon and energy [8]. Subjects intolerant to

lactose absorb the lactose in yoghurt better than that in milk due to availability of the of microbiological β -galactosidase origin [9].

Lactic Acid

Production of lactic acid is the most important biochemical process occurring during fermentation of milk. The lactic acid helps to destabilize casein micelles and lead to the formation of three dimensional network of protein, encompassing other ingredients thus resulting into 'soft' curd, which is better digested within the stomach as compared to normal milk [10]. The oral transit time is twice as long with yoghurt relative to milk, which enhances the nutrient absorption. Lactic acid, being an essential energy source for the heart and other fundamental organs, has been considered to play significant role in human metabolism [11].

Protein Quality and Digestibility

Protein quality of fermented milk is derived from milk, microbial cell protein built up as a result of growth of starter bacteria and free amino acids and peptides released due to proteolytic activity of the organisms. The native milk proteins are converted into a soft curd containing finely dispersed casein particles due to bacterial action in the fermented milk product [12] rendering it easily digestible and assimilated. The major amino acids in yoghurt are proline and glycine [13]. The free essential amino acids content increases by 3.8 to 3.9 fold. This leads to

better digestibility and nutritive value of fermented products [6].

Biological Value

The cumulative effect of the available essential amino acid content of milk proteins and microbial cell proteins is reflected in the biological value of the total proteins isolated from fermented milks prepared with different cultures. The protein quality (biological value) of dahi samples was found to be higher (by 3 to 30 %) than that of milk used for preparing dahi [14].

THERAPEUTIC ASPECTS

From The time immemorial, human beings know the therapeutic aspects of fermented milks. Various relevant aspects covered in literature are delineated here under.

Anticholesterolemic Effect

When a group of Masui (an African ethnic group) ingested fermented milk in place of their daily consumption of 4 to 5 liter of milk, Mann and Spoerry [15] noted a reduction in their blood cholesterol level. Mann [16] reported that anticholesterolemic effect is due to the formation of hydroxy methyl glutaric acid and/or orotic acid, which presumably inhibit a rate limiting enzyme, involved in cholesterol biosynthesis. Chawla and Kansal [17] indicated probable reason for decrease in cholesterol biosynthesis to be inhibition of glucose-6-phosphate dehydrogenase and 6-phosphogluconate dehydrogenase in rates after consumption of cow milk Dahi.

Feeding of fermented milk containing very large number of probiotic bacteria (approx. 10^9 /g) to hypocholesterolaemic patients was found to lower cholesterol level from 3 to 1.5 g/liter [9]. This lactic micro flora reduces the risks of heart disease by lowering blood cholesterol levels, increasing resistance to low density lipoprotein cholesterol oxidation and by reducing blood pressure.

Some researchers [18] reported that heat treated yoghurt and live yoghurt were found to exert similar hypocholesterolaemic effect. The anticholesterolemic effect of fermented milks has been reported by many workers [19].

Regular consumption of milk culture with *Lb. acidophilus* as single or mixed cultures has been known to reduce serum cholesterol level in rats [20]. Agerback [21] reported the reduction of serum cholesterol levels by regular consumption of fermented milk by human volunteers.

Anticarcinogenic Effect

Consumption of milk fermented with yoghurt starter bacteria inhibits the growth of certain types of tumors, such as Ehrlich Ascites, in both mice and rats [13]. Feeding of the fermented milk resulted in reduced proliferation of Ehrlich Ascites tumor cells in mice [22] and also Sarcoma and Leukemia [2]. Pasteurization of yoghurt did not appreciably diminish the antitumor activity because the antitumor action was associated with the cell wall of the starter microorganisms.

Immunity

Immunity is one of the most important systems to protect our body against foreign invaders. Conge [23] compared the effect of live yoghurt and heated yoghurt on the immune systems and growth response in rats. The weight gain was not significantly affected in rats fed with both yoghurts. De Simon [11] suggested that yoghurt might stimulate interferon production. Recent work on gamma interferon and lymphocytes showed that ingestion of yoghurt and *Lactobacilli* stimulated parts of the immune system in mice [24].

Gastro Intestinal Therapy

It was recently observed that *Campylobacter jejuni*, one of the recent emerging pathogen, was unable to survive more than 25 min when ingested in yoghurt [5]. Thus even under poor hygienic conditions, yoghurt is safer than raw milk [25]. Yoghurt has been found to restore normal intestinal flora disturbed by antibiotic therapy [3]. Few antibiotics are available in the market containing certain *lactobacilli* and certain proportions of *Lactobacillus acidophilus* are also prescribed by doctors to prevent the ill effects of antibiotics and to maintain the desired gut flora. Antibacterial effect of yoghurt on pathogens resistant to standard antibiotics has also been noted [26]. Yoghurt has also been found to cure gastro-intestinal disorders such as diarrhea

particularly infantile diarrhea, gastro enteritis [27], constipation [28], reduce serum cholesterol levels and aid in the treatment of peptic ulcer [3].

Supplementation of infant formula with *Bifidobacterium lactis* and *Streptococcus thermophilus* has been reported to provide protection against nosocomial diarrhea in infants [7]. The therapeutic value of fermented milk has been clearly established by the researchers. Buttermilk as made using lactic starters, will also possess some of these valuable properties. However, systematic studies on making buttermilk; a marketable product is highly required [29-34].

CONCLUSION

Health promoting mechanism of fermented milk on various diseases is still not clear for scientist but continuous researches are going on in all over the world. In near future main deadly diseases like cancer might be defeated by the potential effect of fermented drink.

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