

## **Health Benefits of Yogurt Cultures**

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### **INTRODUCTION**

Fermentation has been used for thousands of years as a safe way to store perishable foods like milk. Fermented products are obtained from various sources such as grains, fruits, milk, meat, fish, and vegetables. In addition to changing the flavor and taste of the original food during fermentation, fermented foods have improved nutritional values and probiotic effects by viable microorganisms.

In the early 1900's, a hypothesis of Metchnikoff on the longevity in people who have consumed yogurt regularly triggered enormous researches on fermented milks. As scientific interest has been increased in the past two decades, researchers study the possible probiotic effects related to the consumption of fermented milks and the associated lactic acid bacteria. While rigorous research has not supported all of the various hypothesis on beneficial roles of fermented milks and lactic acid bacteria, some health benefits are now well documented, and others hold exciting possibilities for the future.

Difficulties in research are in part related to the fact that most health effects of lactic acid bacteria are strain-specific, and varying results may occur when using different strains of the same species or even different preparations of the same strain. There is also a large variability in the physiology of individuals tested, and large populations must be studied to provide valid results.

This articles reviews the current scientific knowledges on beneficial effects of fermented milks and lactic acid bacteria on human health.

#### **1. Properties of Probiotic Cultures**

Lactic acid bacteria used as probiotics are commonly defined as viable microorganisms that exhibit beneficial effects on the health of the host when digested. The theoretical basis for

selection of probiotic cultures includes safety, functional (survival, adherence, colonization, production of antimicrobial substances, immune stimulation, antigenotoxic activity and prevention of pathogens) and technical (growth in milk, sensory properties, stability, phage resistance, viability in processes) aspects.

## 2. Beneficial Roles of Lactic Acid Bacteria

### 1) Alleviation of Lactose Maldigestion

Lactase deficiency leads to lactose maldigestion which can cause a variety of gastrointestinal symptoms like cramps, pain, rectal gas, and osmotic diarrhea.

It is well accepted that ingestion of yogurt with live lactic acid bacteria is significantly improved in lactase-deficient individuals compared with milk or pasteurized yogurt. Mechanisms for these effects are not well known, but at least three factors - total lactase activity of cultures, slower oral-cecal transit time, and inhibition of lactose fermentation in large intestine - have been suggested.

### 2) Regulation of Intestinal Disturbance

Diarrhea is a significant world-wide problem and many intestinal disturbances are caused by food or water contaminated by bacteria or viruses, or by poor hygiene. Infants and young children are particularly susceptible to the ill-effects of diarrhea. Gastroenteritis can be caused by a variety of pathogens including rotavirus, *E. coli*, and *Campylobacter*. Several studies suggest that specific strains of lactic acid bacteria can prevent and decrease the duration of diarrhea because of their ability to alter the activity of the intestinal microflora and compete with potential pathogens. Furthermore, the World Health Organization (WHO, 1995) recommends that during treatment of diarrhea, yogurt should replace milk when available since it is better tolerated than milk and can help prevent malnutrition or reestablish nutritional adequacy.

### 3) Regulation of Gastrointestinal Flora (Integrity of Normal Gastrointestinal flora)

Ingestion of fermented milks with live lactic acid bacteria such as bifidobacteria or lactobacilli leads to an increase in fecal counts, both in infants and in adults. Elevated levels

of tested species return to normal after cessation of consumption, and the period of retention is strain-dependent.

Many data obtained in vitro experiments suggest that lactic acid bacteria may be able to contribute to the barrier effect of the intestinal microflora in several ways. The organic acid produced by lactic acid bacteria create an acidic environment that is unfriendly to some harmful bacteria. In addition, by-products of lactic acid bacterial metabolism, like bacteriocins, can manifest antimicrobial properties and inhibit the growth of some pathogens.

#### 4) Antimicrobial Activity

Some of lactic acid bacteria exhibit antagonistic activity against a variety of pathogens. For example, in vitro studies have demonstrated inhibition of various bacteria, such as *Helicobacter pylori*, *Yersinia pseudotuberculosis*, *Salmonella typhimurium*, and *Shigella sonnei* in the presence of *L. acidophilus*.

#### 5) Reduction of Cancer Risk

Research in the past decade has focused on the potential roles of lactic acid bacteria in the prevention of cancer, especially colon cancer. Several mechanisms have been proposed, including a direct suppression of carcinogens, the activation of the immune system, and an inhibition of harmful bacteria through modification of microflora. In human studies, ingestion of lactic acid bacteria reduce several fecal enzymes ( $\beta$ -glucuronidase, azoreductase, nitrate reductase, nitroreductase, and glycolic acid hydrolase) that are implicated in carcinogenesis, and thus reduce the risk of colon cancer. In addition fecal putrefactive metabolites such as *p*-cresol, indole, and ammonia were reduced when subjects consumed fermented milk. Most studies report a decrease in these enzymes during the study period when live lactic acid bacteria were consumed with a return to baseline levels during follow-up when no lactic acid bacteria were consumed. The mechanisms and long-term effects of these changes are not clear.

#### 6) Cholesterol Lowering Effect

Hypercholesterolemia is one of risk factors for cardiovascular disease, a major cause of

mortality in developed countries. Finding dietary means of lowering serum cholesterol levels can help reduce the risk of heart disease. Since Mann and Spoerry's observation on Maasai warriors in 1974, many studies have been conducted to find the possibility of a hypocholesterolemic effects of fermented milks. Lots of tests, including in vitro, in vivo, animals, and human trials, were performed but ,unfortunately, results have been inconsistent and the mechanism is unknown yet. What is clear is that regular consumption of yogurt does not increase plasma cholesterol concentration. Thus, yogurt can be part of the daily intake of individuals who are concerned about heart disease.

#### 7) Immunomodulation

The effect of fermented milks, including yogurt, on the modulation of immune system is the center of much ongoing research. Health benefits are associated with consumption of fermented milks : lactic acid bacteria and fermented milks have been found to modulate certain parameters of both the non-specific and specific immune responses.

It is speculated that lactic acid bacteria might exert positive effects on the human immune system at both the intestinal and the systemic levels. Yogurt has been shown to stimulate the production of gamma-interferon(gamma-IFN). Results are species- and strain-dependent.

### **CONCLUSION**

Today's consumers demand foods that not only taste good, but are also good for their health. Lactic acid bacteria in the form of fermented milks have been implicated in the maintenance of good health and in the prevention of many disorders. It is clear that some strains of lactic acid bacteria posses the ability to alter the activity of the intestinal microflora and thus to effect changes related to the gut. Fermented milks are better digested than milk in lactase-deficient people and in certain cases lactic acid bacteria are useful in the management of diarrhea. Also lactic acid bacteria can modulate the immune system and some cases they can reduce the risk of colon cancer.

As research continued, strain selection will become more significant, and the subsequent fermented milks will answer more and more of consumer's needs.