

### A Brief Review of Probiotic Use.

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**Probiotic therapy refers to use of live microorganisms to treat human pathological disorders such as lactose intolerance and antibiotic induced superinfections. The critical point to be considered is whether such administered microorganisms can remain viable and multiply in the gastrointestinal tract given that their nutrient and environmental condition requirements are very exacting. In this brief review, the authors discuss the use of probiotics from a historical perspective and conclude that their use especially in form of traditional fermented food products can be justified the controversy notwithstanding.**

**Keywords:** Probiotic, *Lactobacillus*

#### Introduction

Probiotics are live microorganisms which when administered in adequate amounts confer health benefits to the host [1]. They may be used as dietary supplements and in alternative medicine. Until recently, probiotics have not been subjected to scrutiny to justify their safety and efficacy. This is now changing and many publications regarding their use in such conditions as lactose intolerance, colon cancer, hypertension, inflammation and antibiotic-induced superinfections are readily available.

Probiotic use is deeply rooted in cultural practices. The earliest documented reference to probiotics dates back to 1908 when the Russian Nobel Laureate Elie Metchnikoff attributed the good health and longevity of Bulgarian peasants to a lactobacillus in yoghurt which he named *Bacillus bulgaricus* [2]. In 1920, Rottenger demonstrated that *B. bulgaricus* could not survive in the human intestinal tract [3]. In 1930, Japanese scientist Minoru Shirota isolated *Lactobacillus casei* which was later used to make 'Yokult', the first probiotic drink, which is still in the market [4]. In the 1960s, the use of *Lactobacillus acidophilus* to ferment dairy products was popularised. In addition, other probiotic bacteria have been introduced. These

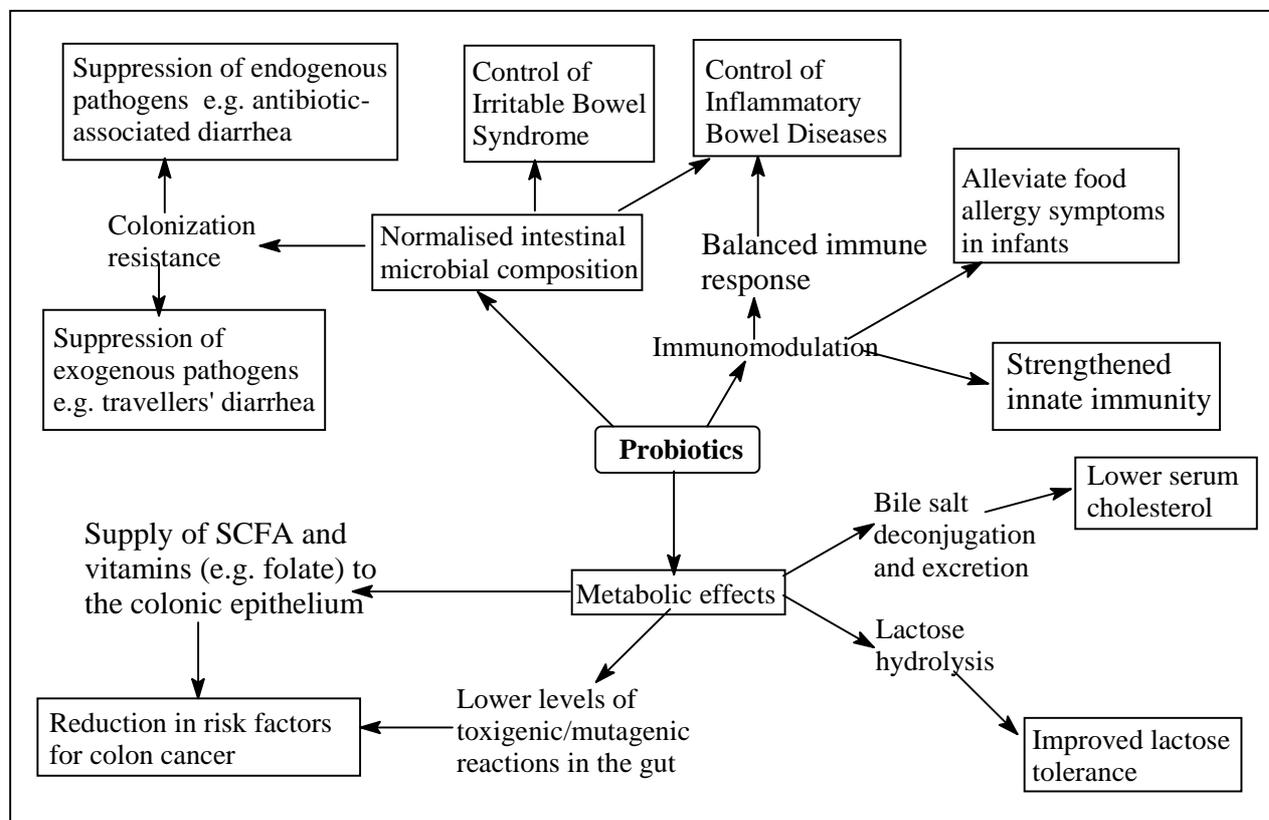
include *Bifidobacteria* spp, *Streptococcus thermophilus* and *Eubacteria* spp.

#### Mechanism of action of probiotics

Probiotics act principally in the gastrointestinal tract. The site and mechanism of action is summarised in Figure 1. Furthermore, it is known that some probiotics may be pathogenic, releasing noxious substances such as aminotoxins. In one clinical trial, a probiotic cocktail increased death rate of patients with pancreatitis [5].

For probiotics to be effective, they must remain viable in the gastrointestinal tract. Viability of bacteria may be improved by the medium. For example, when administered in form of yoghurt, bacteria are protected from effects of low pH and bile salts. Several studies show favourable outcome with respect to efficacy and safety following administration of *Lactobacillus acidophilus* [6-7]. Apart from bacteria, yeasts (*Saccharomyces* species) have been used as probiotics. However, when used to make traditional alcoholic brews by fermentation of carbohydrates, the process is self-limiting as the microorganisms are killed when alcohol concentration is about 6 %.

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**Figure 1: Possible mechanism of action for probiotics.**

### Traditional probiotic products

Table 1 shows some probiotics of dairy origin used in different parts of the world while Table 2 shows non-dairy traditional probiotic foods.

**Table 1. Dairy traditional probiotic foods**

Name	Type of food	Community
Qula	Cheese	Tibet
Saler	Cheese	France
Dahir	Fermented milk	Indonesia
Nono	Fermented milk	Nigeria
Kefir	White cheese	Morocco
Mursik	Fermented milk	Kenya
Maziwa lala	Fermented milk	East Africa

### Probiotic pharmaceutical products

Several probiotic pharmaceutical products are currently being marketed in different parts of the world. Examples of three products in the Kenyan Market are given below. These are used for gastrointestinal infections.

**Product 1:** Trilac capsules/granules:

*Streptococcus faecalis* (30 million cfu)  
*Clostridium butylicum* (2 million cfu)  
*Bacillus mesentericus* (1 million cfu)  
*Lactobacillus sporogenes* (50 million cfu)

**Product 2:** Enfor sachets

*Saccharomyces boulardii* (lyophilized)  
(hpl 250 mg)

**Product 3:** Kalsis capsules

Calcium gluconate (185 mg)  
 Magnesium gluconate (85 mg)  
 Vitamin E (3 mg)  
 Selenium rich yeast (16 mg)  
*Lactobacillus* (51 mg)

**Table 2. Non-dairy traditional probiotic foods**

Name	Type of food	Community
Sauerkraut	Fermented cabbage	Asia
Kimchi	Fermented cabbage	Korea
Ogi	Fermented maize	Nigeria
Fufu	Fermented sorghum	Nigeria
Tongwa	Fermented cassava	Tanzania
Kocha	Fermented maize	Ethiopia
Sour miffens	Fermented black tea	China
Abagi	Fermented millet/sorghum flour	Luo (Kenya)
Anjera	Fermented maize flour	Borana (Kenya/Ethiopia)
Tsimbare	Fermented millet/sorghum flour	Luhya (Kenya)

**Research on probiotics**

The number of publications on probiotics (in brackets) over the past has been increasing as follows: 1950-1970 (4); 1971-1990 (11); 1991-1995 (58); 1996-2000 (65); and 2001-2005 (2663). There are no suitable animal models that can be used to study the efficacy of probiotics. *In vitro* tests give limited information and the use of probiotics will continue to be based on

empirical evidence which in itself is not conclusive. The nutritional value of fermented products of dairy origin (Yoghurt, cheese, etc) justifies their use, the probiotic value notwithstanding.

**World market for probiotics**

The probiotic global market was estimated to be worth \$14.9 billion in 2007 and was expected to grow to \$15.9 billion in 2008. Most of the probiotics are marketed in form of food (e.g. yoghurt, fermented cheese) while a very small percentage is formulated as pharmaceutical preparations.

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