



Probiotics- Applications in Everyday Life

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Introduction

Probiotics are defined as live microorganisms which when administered in adequate amounts confer health benefits on the host. The human digestive tract has several kinds of bacteria, out of which probiotic bacteria maintains the natural balance of microorganisms by reducing the growth of harmful bacteria and promotes a healthy digestive system [1]. The microbes which are used as probiotics include bacterial species of genera *Lactobacillus*, *Bifidobacterium*, *Lactococcus*, *Escherichia* and yeast species of genus *Saccharomyces* [2].

Effects of probiotics on human health

Probiotics play a very important role in maintaining the health of an individual. Various effects of probiotics include:

- **Immune system:** Probiotics maintain optimal health and wellness of immune system; they provide a natural defense system for the body; prevent growth of harmful bacteria and strengthen the immune system towards allergies and help the body to produce vitamins [3].
- **Digestive system:** Probiotics support healthy digestion; reduces constipation; help control the illness- causing bacteria in the intestinal tract; improves lactose digestion (mainly for lactose-intolerant people); reduces blood-pressure and cholesterol level; improves body's absorption of minerals mainly, vitamins and decreases microbes causing dental cavities in the mouth [4].
- **Prevention of diseases:** Probiotics help in the cure of diseases like vaginal yeast infections, urinary tract infections, reduces the amount of cancer-causing substances within intestine, prevents or reduces colon cancer; reduces infections and inflammations and helps in fighting eczema [5].

Applications of probiotics

Probiotics are used in medical and food industry since they provide health benefits to humans and also improve texture and quality of various food products.

Examples of some probiotics with health benefits

Immune enhancement- *Lactobacillus reuteri* [6], Alteration of intestinal microbiota and prevention of harmful intestine microbe activities- *Brevibacterium breve*, *Bifidobacterium bifidum* and *Lactobacillus acidophilus* [7], Prevention of allergy development and symptoms- *Lactobacillus rhamnosus*, *Brevibacterium breve* and *Penicillium freudenreichii* [8]; Prevention of inflammatory bowel diseases- *Bifidobacterium animalis*, *Streptococcus thermophilus* and *Lactobacillus rhamnosus* [9].

These probiotics can be administered in the form of food products. Thus, these are also applicable in food industry.

Probiotics in food products

Srikhand- *Streptococcus thermophilus*; *Lactobacillus bulgaricus*; Cultured butter milk- *Lactobacillus lactis*, *Lactobacillus diacetilactis* and *Leuconostoc citrovorum*; Acidophilus milk- *Lactobacillus acidophilus*; Yoghurt- *Streptococcus thermophilus*, *Lactobacillus bulgaricus* and yeast; Kefir- *Lactococcus lactis*, *Leuconostoc* spp., *Torula* spp. and *Saccharomyces kefir*; Kumiss- *Lactobacillus bulgaricus*, *Lactobacillus acidophilus*, *Torula kumiss* and *Saccharomyces lactis*; Soft Italian, Cheddar, and some Swiss cheese varieties- *Streptococcus durans* and *Streptococcus faecalis* [10].

Recipes for preparation of probiotic products at home

Some of the above mentioned probiotic products can be prepared at home, the recipes are mentioned below

Yoghurt- Ingredients

a) Cream- Cream can be extracted from milk of cow, goat, sheep or can be bought in ready-made form from market; b) Milk- pasteurized double toned or milk of cow, goat and sheep can be used; c) Milk solids (optional)-non-fat dry milk powder (Nestle); d) Starter cultures- Cultures of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* can be purchased in dried form from various health foods or live cultures can also be purchased from local stores; e) Sweetners (optional)- sugar, honey, artificial sweetners and fruit flavorings for thickening can be added [11].

Recipe: Recipe for 1 kg Yoghurt is shown in table 1 [12].

S. No.	Yoghut recipe (1kg)	Yoghurt recipe, non-fat (1kg)
1.	1kg cream (whole or low-fat milk)	1 kg skim or double -toned milk
2.	¼ cup live starter culture or dry can be used as per directions on the packet	¼ cup live starter culture or dry can be used as per directions on the packet
3.	1/3 cup non-fat dry milk powder	2/3 cup non-fat dry milk powder
4.	2-4 tablespoons honey or sugar	2-4 tablespoons honey or sugar

Table 1

Recipe

Recipe for 1 kg kefir is shown in table 2 [21].

Procedure

- a) Heat cold, pasteurized milk in a saucepan and stir in non-fat dry milk powder for additional solids [13].
- b) Add sugar or honey (optional).
- c) Heating is done up to a temperature of 85-95°C (below boiling) over low flame with continuous stirring. To get, yogurt of thinner consistency, hold at 85-90°C for 10 minutes and for thicker consistency, hold at same temperature for 20 minutes [14].
- d) Cool this milk up to a temperature of 44-46°C and remove one cup of milk from it. Blend the removed milk with starter culture and add this mixture in rest of the milk. The temperature of whole content should now be in between 42-44°C [15].

- e) Pour this content immediately in a clean, warm container like thermos or insulated kettle, with lid closed and place it in incubator like oven or insulated cooler where the temperature of 43-45°C can be maintained. Let the container be kept for 4-7h in the insulator [16].
- f) Acidic flavor in the yoghurt shows the sign of its preparation. Refrigerate the prepared yoghurt for some time before tasting, which gives refreshing taste after cooling. Yoghurt can be stored for 10 to 21 days in refrigeration [17].
- g) Topping of fruits and nuts can be done after refrigerating it for few minutes to make yoghurt tastier [18].

Kefir- Ingredients

Milk- Cow milk [19]; b) Starter cultures- Lactococcus lactis and Saccharomyces kefir [20] can be purchased in dried form from various health foods; c) sugar

Recipe

Recipe for 1 kg kefir is shown in table 2 [21].

S. No.	Kefir (1l)
1.	1l milk (skim, by removing whole cream)
2.	2 table-spoons starter culture
3.	Sugar (add to taste)

Table 2

Procedure

- a) Boil the milk (skimmed) into a sauce pan, stirring every few minutes, to prevent its burning or sticking to pan [22].
- b) Cool the milk up to a temperature between 40-45°C [23].
- c) Mix and stir the kefir culture into the milk and immediately pour the content in large glass bowl [24].
- d) Cover and wrap the entire bowl with two large towels to keep the contents warm. Make sure, that one towel should be placed under the bowl, covering over the top and second towel should be placed at the top, covering the bowl from bottom [25].
- e) The time period is between 6-8h. The thickness in the consistency of milk, confirms the preparation of kefir. After cooling in refrigerator, delicious kefir can be served and tasted [26].

Conclusion

The above mentioned two probiotic products can be easily prepared at home in bulk for a regular drink. These products along with other probiotic products are also available in market. Therefore, to maintain a healthy, disease-free gut and for lactose-intolerants, consumption of probiotics is essential, safe and best.

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