



PREBIOTICS & PROBIOTICS

Submitted By

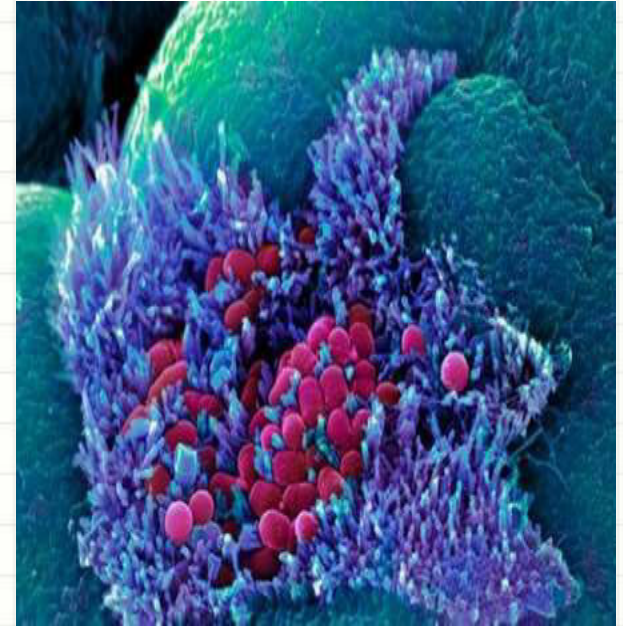
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PROBIOTICS VS PREBIOTICS

| SIDE BY SIDE COMPARISON | |
|--|--|
| PROBIOTIC | PREBIOTIC |
| A live organism | Food for the live organism |
| Die due to temperature, acidity, time | Not affected by temperature, acidity, time |
| “Used up” in the stomach and small intestine | Reaches the hind gut |

INTRODUCTION

- ❖ “Micro flora of the large intestine complete digestion through fermentation, protect against pathogenic bacteria and stimulate the immune system.
- ❖ Probiotics and prebiotics in the diet can modify the composition and some metabolic activities of the micro flora.
- ❖ Probiotics appear effective in treatment of childhood diarrhea, post-antibiotic diarrhea, and pouchitis.
- ❖ They affect immune modulation and there are varied but encouraging results in vaginosis, IBS (Irritable Bowel Syndrome) and IBD (Inflammatory Bowel Diseases)”.



HISTORY

- The concept of probiotics was first introduced in the 20th century by Noble prize winner, Elie Metchnikoff(1845-1916).
- He suggested that long and healthy life of Bulgarian peasants resulted from their consumption of fermented milk products.
- He himself introduced in his diet sour milk fermented with bacteria he called “*Bulgarian Bacillus*, later called as *Lactobacillus delbrueckii* subsp.” and found his health benefited.
- He proposed that consumption of fermenting food products positively influenced the micro flora of the colon, decreasing toxic microbial activity, decrease intestinal pH, suppress the growth of proteolytic bacteria, etc.

“PROBIOTICS”

- ❖ The root of the word ‘probiotic’ comes from the Greek word *pro*, meaning “*promoting*” and *biotic*, meaning “*life*”.
- ❖ The Food and Agriculture Organization of the United Nation (FAO) defines probiotics as “live micro-organisms, which, when administered in adequate amount produce beneficial effect to the host when taken orally”.

LIST OF PROBIOTIC CANDIDATE:-

| Microorganisms | Genus | Species |
|----------------|------------------------|---|
| Bacteria | <i>Lactobacillus</i> | <i>L.acidophilus, L.brevis, L.reuteri, L.casei, L.rhamnosum, L.bulgaricus, L.cellobiosus, L.delbrueckii, L.fermentum.</i> |
| | <i>Bifidobacterium</i> | <i>B.thermophilus, B.infantis, B.longum, B.bifidum, B.animalis.</i> |
| | <i>Streptococcus</i> | <i>S.lactis, S.thermophilus, S.cremonis, S.alivarius.</i> |
| | <i>Bacillus</i> | <i>B.Coagulans</i> |
| | <i>Pediococcus</i> | <i>P.acidilactici</i> |
| | <i>Leuconostoc</i> | <i>L.mesenteroides</i> |
| | <i>Enterobacter</i> | <i>E.faecium, E.faecalis.</i> |
| Fungi | <i>Aspergillus</i> | <i>A.niger, A.oryzae.</i> |
| Yeast | <i>Saccharomyces</i> | <i>S.boulardii, S.cerevisiae, S.carlsbergensis.</i> |

Properties of probiotics

- ❑ It should be safe to the host.
- ❑ It should not produce any pathogenic or toxic effect.
- ❑ It must be resistance to hydrochloric acid, bile and pancreatic juice.
- ❑ It should have anti-carcinogenic activity.
- ❑ It should produce lactic acid.
- ❑ It should retain viability during storage and use.
- ❑ It should stimulate the immune system of the body.
- ❑ It should have the ability to colonize the gastrointestinal tract.

:-Beneficial effects of probiotics in human

- ✧ Diarrhoea:-** Probiotic have preventive and curative effects on diarrhoea.
- ✧ Irritable Bowel Syndrome(IBS):-** It can be prevented by the *Lactobacillus plantarum 299V*.
- ✧ Heicobacteriosis:-**Probiotic had an in vitro inhibitory effect reduce gastric inflammation.
- ✧ Necrotising Enterocolitis:-** Treating with *B.infantis* and *L.acidophilus* to new born result in reduction of NEC.
- ✧ Urogenital infection:-**It can be prevented by taking *L.fermentum* and *L.rhamnosus*.
- ✧ Colon cancer:-**Lactic bacteria may act against colon cancer.
- ✧ Blood pressure:-**Milk fermented by lactic acid bacteria may result in the reduction of this sickness.

Sources of probiotics:-

- ☂ Yogurt that contains live bacteria culture.
- ☂ Cheese that is NOT baked.
- ☂ Fermented milk.
- ☂ Kefir.
- ☂ Miso.
- ☂ Tempeh.
- ☂ Sauerkraut.
- ☂ Kim chi.
- ☂ Soy beverages and unfermented milk.
- ☂ Pickle

Sources of probiotics:-



Kefir



Tempeh

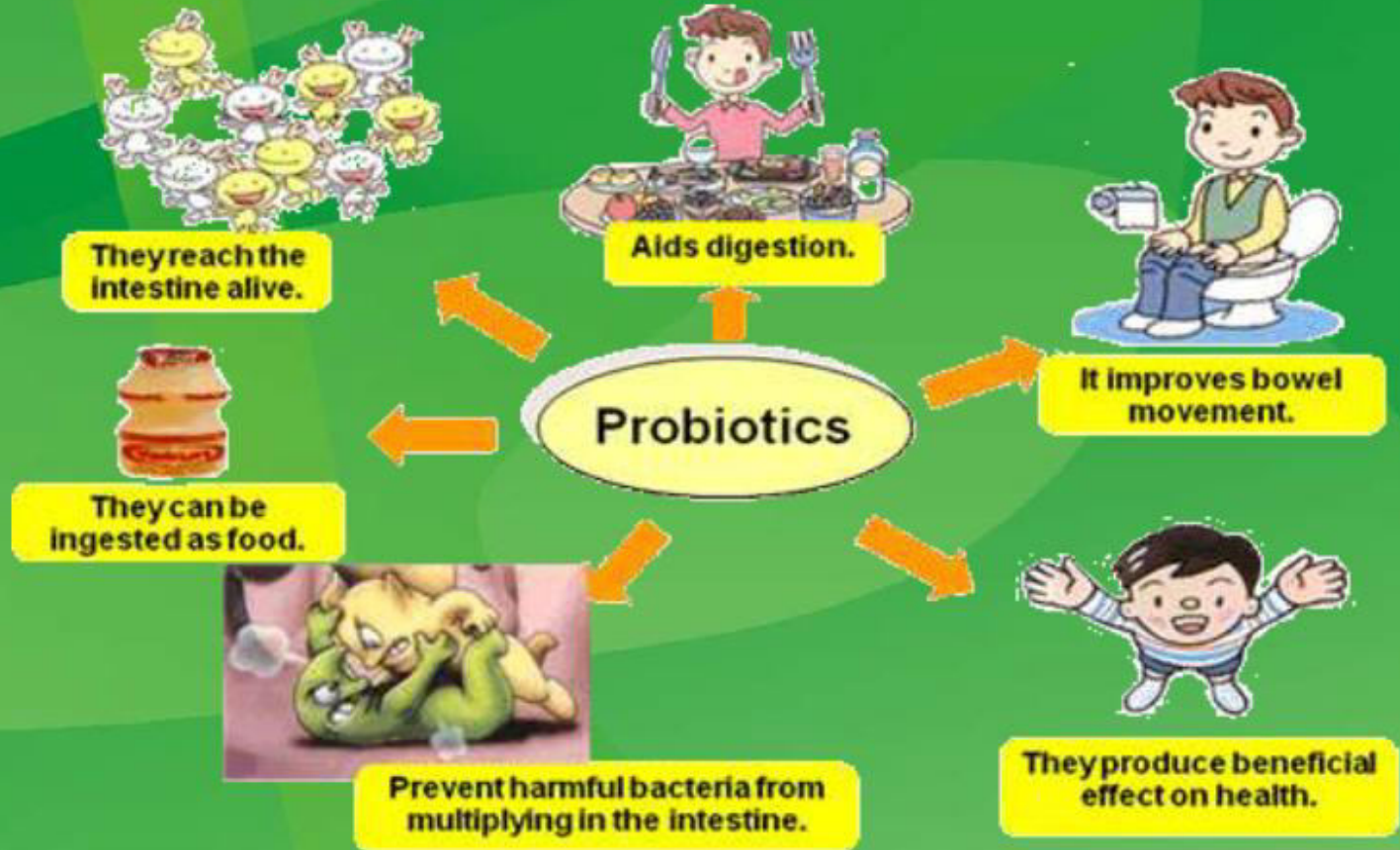


Yogurt




Miso

Effects :-





Mechanisms of probiotic activity

- **Competition for adhesion receptors or sites:** The presence of some bacteria in the intestinal tract is dependent on their ability to adhere to the gut epithelium, such that they become immobilised on the gut wall and resist being flushed out by peristalsis, as well as occupying a niche at the expense of potentially- harmful organisms.
 - **Stimulation of immunity:** The underlying mechanisms of immune stimulation specifically cell-wall components or cell layers may act as an adjuvant and increase humoral immune response.
 - Degradation of toxin receptors.
- 

Probiotic supplement:-



Side effects of probiotics:-

- ✿ It has been mentioned that use of probiotics in critically ill person may be harmful.*
- ✿ Consumption of a mixture of six probiotic bacteria increased the death rate of patients with predicted severe acute pancreatitis.*

Since probiotic are viable organisms, it is very likely that they may induce infection in the hosts.

Four yellow pencils are arranged to form a square frame on a green background. The pencils are positioned at the top, bottom, left, and right sides of the frame. The word "PREBIOTICS" is written in a bold, black, serif font inside a white rectangular box centered within the frame.

“PREBIOTICS”



Prebiotic



- ✧ The concept of prebiotic was introduced by Gibson & Roberfroid, in 1995
- ✧ Prebiotics are an alternative for probiotics or their cofactors
- ✧ "Non-digestible food ingredients that beneficially affect the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon that can improve host health."

Role of prebiotic

| Prebiotic factor | Origin | Microbes stimulated | Effects |
|---|--|--|---|
| Oligosaccharides | Onion, garlic, chicory root, burdock, asparagus, Jerusalem artichoke, soybean, wheat bran. | <i>Bifidobacterium</i> species | Increase in bifidobacterium, suppression of putrefactive bacteria, prevention of constipation and diarrhea. |
| Fructooligosaccharides (inulin, oligofructo) | Same as for oligosaccharides | <i>Bifidobacterium</i> species <i>Lactobacillus acidophilus</i> , <i>Lactobacillus casei</i> , <i>Lactobacillus plantarum</i> | Growth of bifidobacteria and acid promotion. |
| Fructan | Ash-free white powder from tubers of Jerusalem artichoke. | <i>Bifidobacterium</i> species | Growth of bifidobacteria |
| Human kappa casein and derived glycolmacropeptide | Human milk: chymotrypsin and pepsin hydrolysate. | <i>Bifidobacterium bifidum</i> | Growth promotion. |
| Stachyose and raffinose | Soybean extract | <i>Bifidobacterium</i> species | Growth factor. |
| Casein macropeptide | Bovine milk | <i>Bifidobacterium</i> species | Growth promotion. |
| Lactitol(4-O-β-D-galactopyranosyl)D-glucitol | Synthetic sugar alcohol of lactose | <i>Bifidobacterium</i> species | Growth promotion. |
| Lactutose(4-O-β-D-galactopyranosyl)D-fructose | Synthetic derivative of lactose | <i>Bifidobacterium</i> species | Growth promotion. |



Properties:-

- Limited hydrolysis and absorption in the upper GIT (gastro-intestinal tract).
- Selective growth stimulation of beneficial bacteria in the colon.
- Immuno stimulation.
- Stimulation of beneficial flora that promotes colonization resistance.



Jerusalem artichoke



Asparagus



Chicory



Jicama




Leek



Yacon



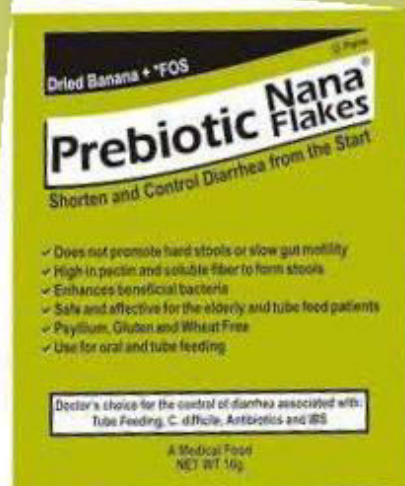
USES OF PREBIOTIC

- ⚽ Enhance bone density and increase Calcium absorption.
 - ⚽ Improve immune function in both the gut and body.
 - ⚽ Establish a healthier balance of bacteria in the gut.
 - ⚽ Promote regular bowel movements.
 - ⚽ Suppress appetite.
 - ⚽ Reduces the risk of an intestinal infection.
 - ⚽ Increase in mineral absorption and improvement of bone health.
 - ⚽ Modulation of gastro-intestinal peptides production, energy metabolism and satiety.
 - ⚽ Initiation (after birth) and regulation/modulation of immune functions.
- 

Prebiotic supplement



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Dried Banana + FOS

Prebiotic Nana Flakes

Shorten and Control Diarrhea from the Start.

- ✓ Does not promote hard stools or slow gut motility
- ✓ High in pectin and soluble fiber to form stools
- ✓ Enhances beneficial bacteria
- ✓ Safe and effective for the elderly and tube feed patients
- ✓ Psyllium, Gluten and Wheat Free
- ✓ Use for oral and tube feeding

Doctor's choice for the control of diarrhea associated with:
Tube Feeding, C. difficile, Antibiotics and IBS

A Medical Food
NET WT 10g





Health Benefits Prebiotic




- ❁ **Immune System Strength:** Prebiotic fiber promotes the growth and colonization of beneficial bacteria in the gut. These bacteria aid the immune system in fighting illness-causing bacteria and viruses.
- ❁ **Normal Bowel Function:** Irritable bowel syndrome, which is characterized by bloating, gas, stomach pain, cramping, bouts of constipation and diarrhea, is caused by food being digested improperly. , prebiotic fiber causes foods to be digested normally, over a normal period of time, not too quickly or too slowly.
- ❁ **Cancer Prevention:** Bifidobacteria digests inulin in the gut flora and produces short chain fatty-acids: acetic acid, propionic acid, and butyric acid. Within the intestine, it is believed that these acids can help prevent certain forms of cancer.
- ❁ **Colon cancer:** The insoluble fiber from prebiotics, some experts believe, are actually doing a part in preventing colon cancer by sweeping up carcinogens and other dangerous toxins before they can be absorbed into the bloodstream where they can do damage.



Side effect

Excessive consumption of prebiotics particularly those in the oligosaccharides category may cause abdominal discomfort and distension, as well as significant levels of flatulence. The Nutrition Information Centre of South Africa's University of Stellenbosch, recommends that daily consumption of prebiotics be held below 20 grams.





THANK YOU