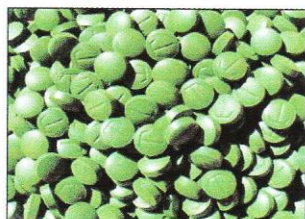


# The Pharmaceutical Micro-Biology

## Micro-Algae: Small but Mighty!

By **Nikhil Koria**

### What are micro-algae?



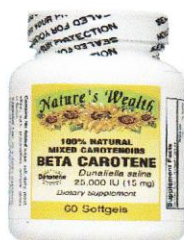
Chlorella tablets



Spirulina tablets



Kelp tablets



Dunaliella salina tablets

Micro-algae, also known as microphytes, are single celled organisms that practice the process of photosynthesis.

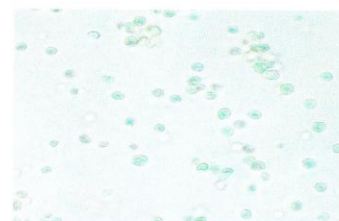
The microscopic algae are often found growing in groups of hair like strands (depending on the species) performing their everyday job of photosynthesis.

They are found in fresh and marine waters, and are large producers of oxygen. There are around 30,000 species which have been classified and they can be used in medicines or dietary tablets such as Spirulina and chlorella (see below).

Micro-algae could potentially save you money if you eat omega 3 tablets.

By eating micro-algae instead of omega 3 extracted from fish you could save a lot of money, as fish is becoming expensive nowadays, so the price of omega 3 tablets go up. So instead of buying omega 3 tablets buy micro-algae tablets, which are cheaper because they are the original source of omega 3 and fish eat them to get their omega 3, they don't naturally have it!

So micro-algae are more concentrated in omega 3, making them cheaper, better for you and it kills less fish in the process!



Micro-algae or microphytes

The only downside to all of this is that over exploiting the micro-algae for uses such as bio-diesel, could result in a shortage of micro-algae for fish to eat in the mid-term, meaning they will no longer contain omega 3, and less tablets will be produced in the mid-term as there are less micro-algae to produce them from!

### How can micro-algae improve your health?

Micro-algae is found to improve your immune and digestive system therefore you will be less likely to get things like coughs, colds, infections, diseases and constipation.

Micro-algae can be taken as tablets such as Chlorella, Spirulina, Dunaliella salina and Kelp which are found to contain high quantities of vitamins and minerals. They are perfect for growing children, sports players and even Olympic athletes to keep the body in great shape and as they are all natural there are no side effects! All of these tablets can be found in most Herbal shops such as Holland and Barrett.

Chlorella	Spirulina	Kelp	Dunaliella salina
Chlorella helps to strengthen your digestive and immune system, and support energy levels, it also helps to detoxify your body (clean the blood and fat deposits) so as a result of this you will lose weight. It has also been shown to slow down cancer and help people to defeat diabetes and obesity!	With over a hundred nutrients Spirulina is a multi-nutritious tablet used by sports personal, and athletes mainly because the body absorbs it quickly so it has a quick impact. For more information please visit: <a href="http://www.australianspirulina.com.au/spirulina/spirulina.html">http://www.australianspirulina.com.au/spirulina/spirulina.html</a>	Kelp is needed for those who have a lack of iodine in their body. It is also a good source of vitamins and minerals and is used to help digestion, constipation, obesity and cancer. For more information please visit: <a href="http://www.livestrong.com/article/233540-what-are-kelp-tablets-used-for/">http://www.livestrong.com/article/233540-what-are-kelp-tablets-used-for/</a>	This drug provides a lot of vitamin A in the form of beta-carotene (found in vegetables such as carrot). You take this drug if you seek better vision, a stop to un-explained hair loss, skin rash or constant infections, which are all the side-effects of a lack of vitamin A!

For more information on the article please visit:

- <http://en.wikipedia.org/wiki/Microalgae>
- <http://rhotini.hubpages.com/hub/Microphytes-omega3>

# food fad or food fact?

**Do probiotic drinks and yoghurts really improve our health? This article looks into whether the claims are actually true.**



Nearly 60% of UK households regularly buy probiotic drinks, and over £200 million of them are sold in Britain every year. With this in mind, we have reviewed some of the extensive scientific research which has been undertaken as to whether probiotic supplements aid our health or not.

In our intestines, there are normal, healthy organisms called microflora, which work together with our immune system to keep it working correctly. Antibiotics and dietary changes are suspected of upsetting the natural balance of the gut's microflora. At any time in your life an imbalance of these microbes could cause a disruption to your immune system.

Probiotics are usually a dairy food or a dietary supplement containing live bacteria that replace or add to the beneficial microflora present in the intestines.

Clinical trials have shown that eating these live bacteria can help sufferers of certain illnesses, such as antibiotic-associated diarrhoea, and there is evidence they can help

women who have recently given birth to lose weight. However, Michael Wilson, Professor of Microbiology at University College London said: "For people with compromised immune systems, increasing the bacterial load could lead to health problems." He went on to say, "No bacterium is totally innocuous (harmless). If you are healthy there is probably no harm in taking probiotics, but there is also no benefit. But to increase the bacterial burden if you are immunocompromised (where your body's ability to fight infectious disease is highly reduced) is asking for trouble."

A spokesman for Yakult, one of the leading probiotic brands, disputed Professor Wilson's warning.

"We have 75 years of studies, carried out by independent scientific research bodies in the UK, Europe and Japan, including human trials, which have all demonstrated the health benefits of supporting the gut flora with Yakult."

Yakult, in one of its television advertisements states: "Yakult's billions of friendly bacteria help keep your gut healthy and a healthy gut helps make for better digestion and stronger natural defences."

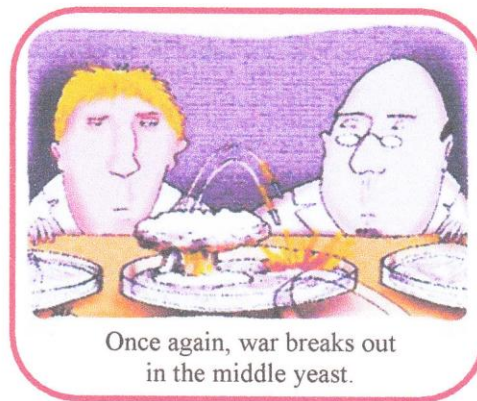
They also claim Yakult to be the only probiotic product in the world that contains *Lactobacillus casei* Shirota strain. This is known to destroy the harmful bacteria living in the intestines, and therefore improving and maintaining the health of human beings.

The European Food Safety Authority (EFSA) examined more than 500



health claims from food companies (not just Probiotic Supplement Makers) about the nutritional value or healthiness of products, and only one third were approved. The claims related to more than 200 foods and food components such as vitamins and minerals, fibre, fats, carbohydrates and probiotic, or therapeutic, bacteria to determine their nutritional value.

So, the jury is still out. Probiotic foods may or may not be fantastic for giving you better digestion or making your natural defences stronger. One thing that was clear in the marketing research, however, people said they would continue to buy their favourite probiotic drinks and yoghurts because of the great taste!



Once again, war breaks out in the middle yeast.

**For more information visit:**

<http://www.medicinenet.com/probiotics/article.htm>

# Health Today

## The Bugs in Your Gut

There are 100 trillion bacteria that live in or on your body and most of these live in your gut. In fact there are about 1000 different species of gut bacteria and there are 10 times as many bacteria in your gut than there are cells in your whole body. 3kg of your body weight is just the millions of bacteria that live in your intestines?

Some of these bacteria are 'good', health promoting bacteria that your body needs for various beneficial jobs, and some of these bacteria are 'bad' and these are associated with a whole range of health problems and illnesses.

The 'good' bacteria are needed for your digestive system to work properly. They break down hard to digest foods, help to neutralize toxins, keep 'bad' bacteria and yeasts in control and even make the Vitamins B and K. They line the walls of the stomach and protect our stomach lining.

The by-products the bacteria produce help to regulate the growth of the guts cells and keep them healthy. They help our gut fight infection by regulating our immune system. The two main 'good' bacteria are called Lactobacillus and Bifidobacterium

The gut is also filled with 'bad' bacteria that are known to release toxins, cause inflammation to the gut wall and are increasingly thought to be associated with a wide range of health problems. There are many species of 'bad' bacteria which live in the gut but the main ones are called Salmonella, Campylobacter and Clostridium *difficile*

The balance of 'good' and 'bad' gut bacteria is very important to our health, but there are many things that can change this delicate balance;

- **Antibiotics** which are used in the fight against infection are very good at wiping out the unhealthy gut bacteria, but also destroy 'good' bacteria. The 'bad' bacteria then very quickly grow and can take-over the 'good' bacteria.

- **Medications** like ant-acids reduce stomach acid and make the gut pH better for 'bad' gut bacteria to grow.

- **A high fat and high sugar diet** can provide the perfect environment for 'bad' bacteria to thrive, especially as 'bad' gut bacteria love sugar!

- **Low fibre** in the diet encourages the growth of 'bad' gut bacteria and lots of fibre encourages the growth of 'good' gut bacteria

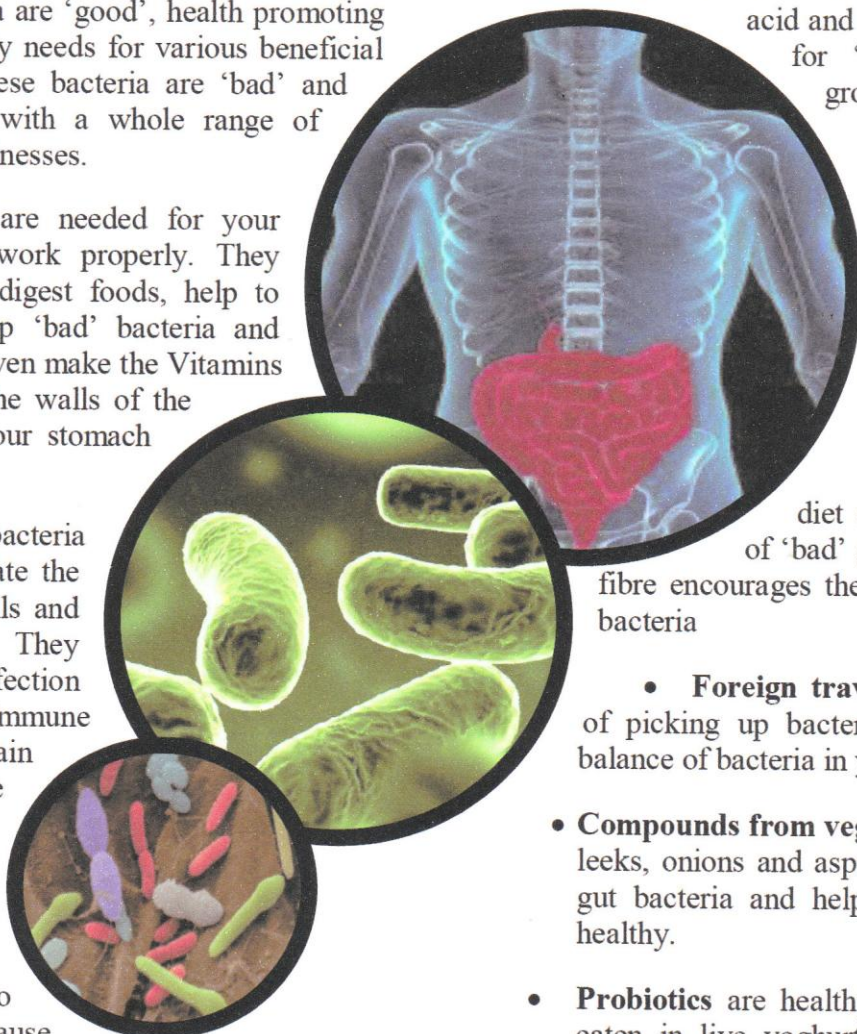
- **Foreign travel** increases your risk of picking up bacteria that can upset the balance of bacteria in your gut

- **Compounds from vegetables** like artichoke, leeks, onions and asparagus feed the 'good' gut bacteria and help to keep the balance healthy.

- **Probiotics** are healthy bacteria that can be eaten in live yoghurt and other fermented foods or taken as a food supplement which help repopulate the 'good' bacteria in the gut.

For further information;  
<http://www.typesofbacteria.co.uk/>

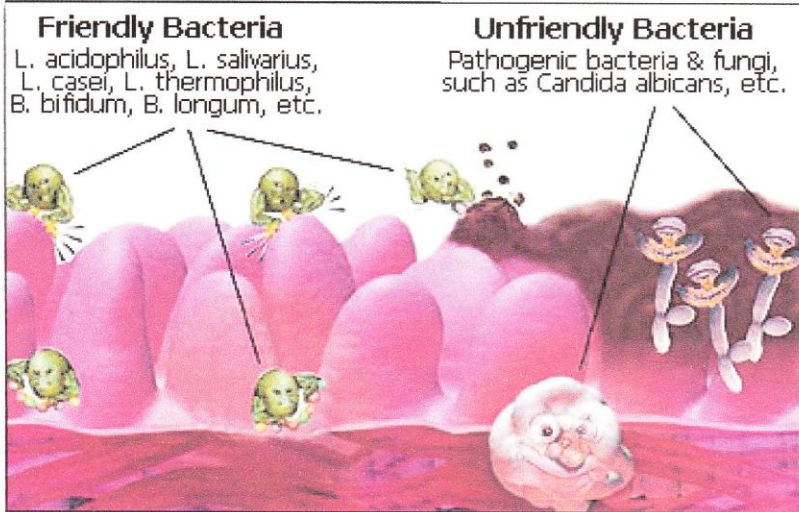
By Scarlet Mayes





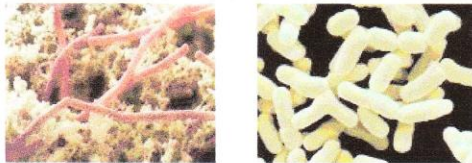
# HAVE THE GUTS TO WIN

## PROBIOTICS AND PREBIOTICS



This diagram shows microbes referred to as “friendly” and “unfriendly” bacteria. Friendly bacteria alter the flora balance inside the intestines and promote good digestion, boost immune function, reduce the growth of harmful bacteria and increase the resistance for infection. Unfriendly bacteria produce toxic by-products and contribute to long term illnesses and chronic deterioration of the body.

Probiotics are live microbes that are beneficial to the digestive system. Lactic acid bacteria (LAB) and bifidobacteria are the most common types of microbes used in probiotics but certain yeasts and bacilli (a class of bacteria) may also be used. The original observation of the role played by the certain bacteria was introduced by Russian scientist, and Noble laureate, Élie Metchnikoff in the beginning of the 20<sup>th</sup> century. But, the term “probiotics” was first introduced by Werner Kollath in 1953.



Lactobacillus and bifidobacterium

### HOW PROBIOTICS WORK

Consumption of probiotics increases the levels of useful bacteria in the gut and can support the immune function. Researchers, actively pursuing studies, have shown that the use of probiotics as part of a healthy lifestyle and diet can lead to the prevention of a number of intestinal disorders such as

- Antibiotic-induced diarrhoea
- Travellers’ diarrhoea
- Gastroenteritis (diarrhoea and vomiting)
- Irritable bowel syndrome.

By Mya Gahle

Prebiotics are non-digestible food ingredients that stimulate the growth and activity in the digestive system. These are also claimed to be beneficial to health. It is assumed that prebiotics increase the growth of bifidobacteria and lactic acid bacteria. Prebiotics were first identified and named by Marcel Roberfroid in 1995. Traditional dietary sources of prebiotics include soybeans, raw oats, unrefined (natural) wheat, unrefined barley and yacon (a plant).

### HOW PREBIOTICS WORK

Prebiotics in foods or supplements are eaten

The prebiotics are not digested in the stomach or small intestine

Prebiotics remain intact until they pass into the large intestine

The prebiotics are used as food for good bacteria in the large bowel

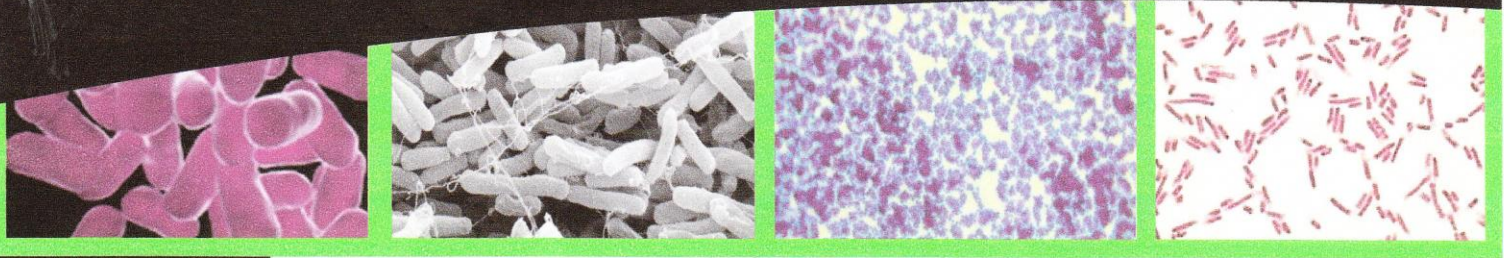
Increased good bacteria in the large intestine leads to a variety of health effects.

As a result, prebiotics are intact as they pass into the large intestine. Here, they are available as a food source for friendly bacteria. This results in the levels of friendly bacteria increasing which then forms an environment that is unfavourable to the growth of some pathogenic (disease-causing) bacteria. When the gut becomes abundant in friendly bacteria from the consumption of prebiotics it results in a number of positive effects in the digestive and immune systems.



- <http://www.sportscoachingbrain.com>
- <http://abbottnutrition.com>
- <http://www.atihealthnet.com>
- <http://www.wikipedia.org/>

# THE HEALTH DIGEST



From left to right – Lactobacillus, Escherichia coli, Enterococcus faecalis, Proteus mirabilis bacterium

## Microflora – A Gut Reaction

*Most people are aware of the connection between intestinal diseases and harmful bacteria, but what is less well known is the positive role of bacteria in our body and the effects it has on our health and well-being.*

Some people find it strange to think of all these little organisms living in your body, but in truth you could not live without them.

The microflora of the gut plays a bigger part in your health than most people realise. The gut flora is the collection of microscopic organisms that live within our intestinal systems, and is made up of a variety of different organisms, the most important one being bacteria. A person's gut flora is estimated to be made up of between 300-1000 different types of bacteria. Some of the types found in the large intestine are shown in **Table 1**. Fungi and protozoa also make up part of the gut flora, but little is known about what they do. Some forms of the known fungi are in **Table 2**.

**Table 1.**

Bacterium
Bacteroides oralis
Enterococcus faecalis
Escherichia coli
Klebsiella sp.
Bifidobacterium bifidum
Lactobacillus
Proteus mirabilis
Clostridium septicum
Pseudomonas aeruginosa
Salmonella enteritidis

**Table 2.**

Fungi
Candida
Saccharomyces
Aspergillus
Penicillium

Microflora are more important than most people think. Microflora in the gut can help –

- \*to prevent the growth of harmful micro-organisms that cause disease
- \*with the production of natural antibodies and vitamins
- \*with the normal function and development of the digestive system
- \*maintain the immune system
- \*the gut develop and function properly
- \*to destroy ingested toxins (poisons) that can be harmful to the human body

It is very easy to disturb your gut flora. If you do disturb it, it can lead to all sorts of health problems. The most common way to disturb your gut flora is the use of antibiotics. Sometimes, it is unavoidable to not use antibiotics, but never use them when you don't need them and always finish the course of treatment (this will prevent resistant strains from developing). Ingesting too much sugar, processed foods, alcohol and drugs can damage your gut flora. Your gut flora is so susceptible to damage that even stress can harm it.

To make sure that the microflora in your gut remains healthy you can –

- \*drink more water
- \*manage your stress levels
- \*eat a healthy, balanced diet

Managing your lifestyle can lead to dramatic improvements in your health which will then impact the overall quality of your life.

For further information go to:

[http://www.purenouyou.com/shop/index.php?main\\_page=index&cPath=162](http://www.purenouyou.com/shop/index.php?main_page=index&cPath=162)



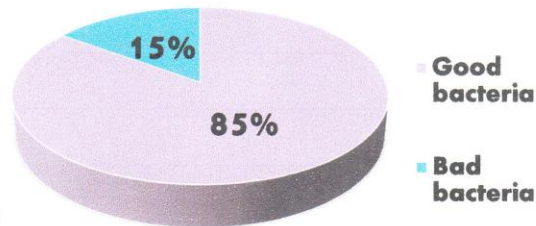
# The Gut Flora Games

With the Olympics arriving in the summer, everyone is inspired to stay healthy and maintain a balanced diet. We know about keeping active by exercising regularly, and we understand that it is good to eat fruit and vegetables. But, how much do we know about probiotics and prebiotics.

## The heroes and villains of the gut

The good bacteria live in the gut. They help to:

- Digest food
- Boost the immune system
- Produce vitamin K
- Rebuild the lining of the intestines and stomach



For example, *Lactobacillus* is a type of bacteria found in the gut. It helps digestion by breaking down lactose and other sugars. It also helps to create an acidic environment in the gut, that helps to stop the growth of harmful bacteria.

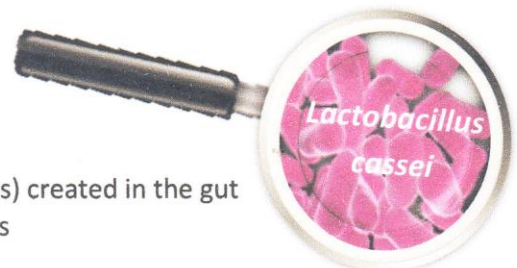
The bad bacteria have learnt to invade cells and a lot of them secrete a toxin. They can do serious harm to the body and are sometimes deadly. For example, *Salmonella* destroys the cells of the intestine to feed on the cell content inside. The result is fever, nausea and a nasty case of diarrhoea. A healthy gut flora contains at least 85% good bacteria.

## The probiotics

Probiotics are beneficial live bacteria that you can ingest. They commonly contain lactic acid bacteria (*Lactobacillus casei*) which are found naturally in your digestive system. The bacteria pass through the stomach and into the intestines where they perform a number of important functions.

Probiotics help:

- The digestive processes
- Absorption of nutrients
- Neutralise many of the toxic by-products caused by digestion
- Reduce levels of toxins and carcinogens (cancer causing substances) created in the gut
- Produce key vitamins such as Vitamin K and some B group vitamins



These can be taken in the form of a tablet or added to a health drink or food product, but are also naturally occurring in most dairy products. These sources simply add to the number of good bacteria currently in your gut.

## The prebiotics

Prebiotics are non-living substances, usually carbohydrates like fructo- and oligo-saccharides, that are fermented by the microflora in the gastrointestinal tract (the stomach and intestines). They encourage the growth and activity of good bacteria within the intestines, thus enhancing the effects of probiotics. Prebiotics can be found naturally in grains, fruits and legumes, or taken as a supplement. Prebiotics contain dietary fibre which improves bowel function. They also strengthen the bowel wall and reduce the risk of intestinal infection. They are often recommended for weight management as they increase the number of hormones that reduce the sensation of hunger.



## Working together

To obtain the benefits from both probiotics and prebiotics, they can be taken together as synbiotics.

### Sources of Probiotics:

- Yakult
- Activia yoghurt
- Sauerkraut
- Pickles
- Miso (a soy product from Japan)



### Sources of Prebiotics:

- Banana
- Garlic
- Onions
- Honey
- Oats



Further information: "[www.yakult.co.uk](http://www.yakult.co.uk)" & "*Gut flora, nutrition, immunity and health*" by R. Fuller