



A REVIEW ON PROBIOTICS AND THEIR BENEFICIAL & SIDE EFFECTS

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ARTICLE INFO

Short Review Article History

Received: 14 August, 2015

Accepted: 11 October, 2015

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ABSTRACT

The World Health Organization's 2001 definition of probiotics is live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host. The FAO/WHO consultation was also a first effort towards the assessment of probiotics efficacy and resulted in May 2002 in a document named as Guidelines for the Evaluation of Probiotics in Food. The term probiotic is currently used to name ingested microorganisms associated with beneficial effects to humans and other animals. Probiotics exert their beneficial effects through various mechanisms, including lowering intestinal pH, decreasing colonization and invasion by pathogenic organisms, and modifying the host immune response. Probiotic benefits associated with one species or strain do not necessarily hold true for others. The strongest evidence for the clinical effectiveness of probiotics has been in the treatment of acute diarrhea. Probiotics are now widely used in many countries by consumers and in clinical practice. The modern-day garden *pea* is thought to have originated from the field *pea* that was native to central Asia and the Middle East. Because its cultivation dates back thousands and thousands of years, the *green pea* is widely recognized as one of the first food crops to be cultivated by humans. *Green peas* are one of the newer probiotic discoveries to come to light. Some of the health benefits of *green peas* are well known, but recent research shows they are also a source of probiotics. In this article we review the safety of probiotics and discuss *Green Peas* used as Probiotics.

Keywords: Probiotics, microorganisms, Types, Green Peas

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INTRODUCTION

Probiotics are microorganisms that are believed to provide health benefits when consumed. The term probiotic is currently used to name ingested microorganisms associated with beneficial effects to humans and other animals. Introduction of the concept is generally attributed to Nobel Prize recipient Élie Metchnikoff, who in 1907 suggested that "the dependence of the intestinal microbes on the food makes it possible to adopt measures to modify the flora in our bodies and to replace the harmful microbes by useful microbes". A significant expansion of the potential market for probiotics has led to higher requirements for scientific substantiation of putative beneficial effects conferred by the microorganisms. Studies on the medical benefits of probiotics have yet to reveal a cause-effect relationship, and their medical effectiveness has yet to be conclusively proven for most of the studies conducted thus far [1].

Commonly claimed benefits of probiotics include the decrease of potentially pathogenic gastro-intestinal microorganisms; the reduction of gastro-intestinal discomfort; the strengthening of the immune system; the

improvement of the skin's function; the improvement of bowel regularity; the strengthening of the resistance to cedar pollen allergens; the decrease in body pathogens; the reduction of flatulence and bloating; the protection of DNA; the protection of proteins and lipids from oxidative damage; and the maintaining of individual intestinal micro- biota in subjects receiving antibiotic treatment. The World Health Organization's 2001 definition of probiotics is "live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host". Following this definition, a working group convened by the FAO/WHO in May 2002 issued the "Guidelines for the Evaluation of Probiotics in Food". This first global effort was further developed in 2010, two expert groups of academic scientists and industry representatives made recommendations for the evaluation and validation of probiotic health claim. The same principles emerged from those groups as the ones expressed in the Guidelines of FAO/WHO in 2002. This definition, although widely adopted, is not acceptable to the European Food Safety Authority because it embeds a health claim which is not measurable [1-3].

A consensus definition of the term “probiotics”, based on the available information and scientific evidence, was adopted after a joint Food and Agricultural Organization of the United Nations and World Health Organization expert consultation. In October 2001, this expert consultation defined probiotics as: “live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host”. The FAO/WHO consultation was also a first effort towards the assessment of probiotics efficacy and resulted in May 2002 in a document named “Guidelines for

the Evaluation of Probiotics in Food”. This effort is accompanied by local governmental and supra-governmental regulatory bodies requirements to better characterize health claims substantiations [4].

A group of scientific experts assembled in London, UK, on October 23, 2013, to discuss the scope and appropriate use of the term ‘probiotic.’ The meeting was motivated by developments in the field since 2001. The panel’s conclusions were published in June, 2014 [2-3].



Figure 1: Different types of probiotics

Probiotics have to be alive when administered. One of the concerns throughout the scientific literature resides in the viability and reproducibility on a large scale of the observed results, as well as the viability and stability during use and storage and finally the ability to survive in the intestinal ecosystem. Probiotics must have undergone controlled evaluation to document health benefits in the target host. Only products containing live organisms shown in reproducible human studies to confer a health

benefit can actually claim to be a probiotic. The correct definition of health benefit, backed with solid scientific evidence, is a strong element for the proper identification and assessment of the effect of a probiotic. This aspect represents a major challenge for scientific and industrial investigations because several difficulties arise, such as variability in the site for probiotic use (oral, vaginal, intestinal) and mode of application [3-5].



Figure 2: A Strain of Probiotics

TYPES OF PROBIOTICS

There are several different kinds of probiotics:

1. ***Lactobacillus***: This may be the most common probiotic. It's the one we'll find in yogurt and other fermented foods. Different strains can help with diarrhea and may help with people who can't digest lactose, the sugar in milk.
2. ***Bifidobacteria***: We can also find it in some dairy products. It may help ease the symptoms of irritable bowel syndrome (IBS).
3. ***Saccharomyces boulardii***: This is also known as *S. boulardii* and is the only yeast probiotic.
4. ***Streptococcus thermophilus***: This produces large quantities of the enzyme lactase, making it effective, according to some reports, in the prevention of lactose intolerance.
5. ***Enterococcus faecium***: This is normally found in the intestinal tract of humans and animals.
6. ***Leuconostoc***: This has been used extensively in food processing throughout human history, and ingestion of foods containing live bacteria, dead bacteria, and metabolites of these microorganisms has taken place for a long time [6-9].

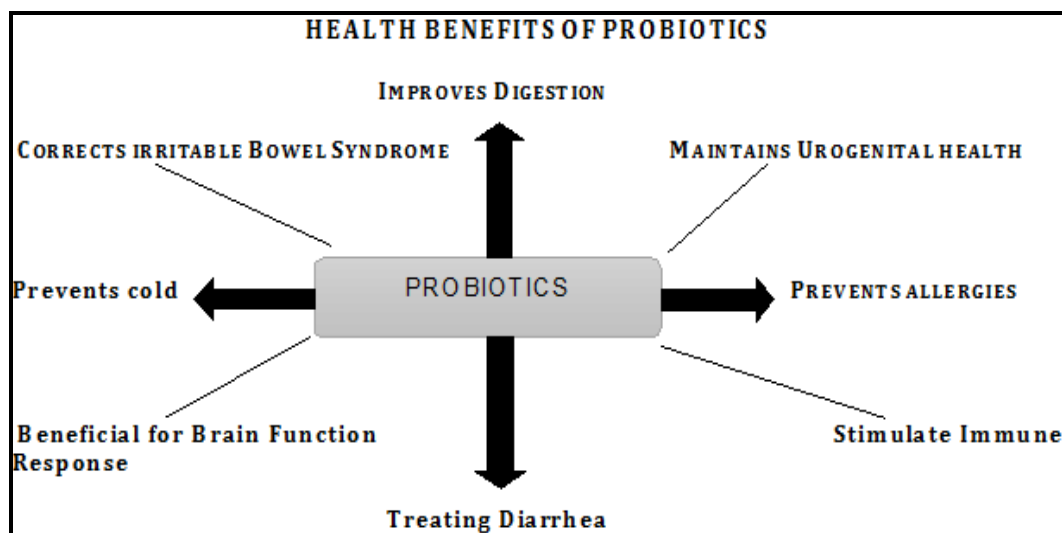


Figure 3: Diagram showing Health Benefits of Probiotics

SOME EXAMPLES OF PROBIOTICS



HISTORY OF GREEN PEAS

The modern-day garden *pea* is thought to have originated from the field *pea* that was native to central Asia and the Middle East. Because its cultivation dates back thousands and thousands of years, the *green pea* is widely recognized as one of the first food crops to be cultivated by humans. *Peas* were apparently consumed in dry form throughout

much of their early history, and did not become widely popular as a fresh food until changes in cultivation techniques that took place in Europe in the 16th century. *Peas* are now grown throughout the world in nearly every climatic zone, and are widely consumed in both fresh and dried form [8-10].



Figure 4: Green Peas

While growing approximately 3 million tons of peas per year, Canada is currently the largest world producer and exporter of peas. France, China, Russia, and India are also large-scale producers of this legume. Despite being a large-scale producer of *peas*, India is also the world's largest importer of this food due to its great popularity in that country. *Peas* are one of the few members of the legume family that are commonly sold and cooked as fresh vegetables. There are generally three types of *peas* that are commonly eaten: *garden or green peas (Pisum sativum)*, *snow peas (Pisum sativum var. macrocarpon)* and *snap peas (Pisum sativum var. macrocarpon ser. CV.)* *Garden peas* have rounded pods that are usually slightly curved in shape with a smooth texture and vibrant green color. Inside of them are green rounded pea seeds that are sweet and starchy in taste. *Snow peas* are flatter than *garden peas*, and since they are not fully opaque, you can usually see the shadows of the flat *pea* seeds within. *Snap peas*, a cross between the *garden* and *snow pea*, have plump pods with a crisp, snappy texture [7-10].

GREEN PEAS AS PROBIOTICS

Green peas are one of the newer probiotic discoveries to come to light. Some of the health benefits of *green peas* are well known, but recent research shows they are also a source of probiotics. In December 2013, Japanese researchers published a preliminary study in the *Journal of Applied Microbiology* revealing that *green peas* contain *Leuconostoc mesenteroides*, a strain of probiotic bacteria with high IgA-inducing ability in animals. This means that green peas help to build your immune system and may be able to help your body fight off infections and colds [7-10]. These kinds of antibodies are usually found in the lining of the human airway and digestive tracts and could help promote mucosal barrier function. Because heat can damage probiotics make sure to eat some raw *peas* and don't overcook them. Use them raw in a salad or eat as a snack [2, 8]

ACTIVITIES OF GREEN PEAS

Green Peas, cooked

1.00 cup

137.75 grams

Calories: 116

GI: low

1. Weight management: Peas are low-fat but high-everything-else. A cup of peas has less than 100 calories but lots of protein, fiber and micronutrients [10-12].
2. Stomach cancer prevention: Peas contain high amounts of a health-protective polyphenol called coumestrol [12].
3. Anti-aging, Strong immune System, and high energy: It includes flavonoids: catechin and epicatechin, carotenoid: alpha-carotene and beta-carotene.
4. Prevention of Wrinkles, Alzheimer's, Arthritis, Bronchitis, Osteoporosis, and Candida: Pisumsaponins I and II and pisomosides A and B are anti-inflammatory phytonutrients found almost exclusively in peas.
5. Blood sugar regulation: High fiber slows and protein slows down how fast sugars are digested [12].
6. Heart Disease prevention: The generous amounts of vitamin B1 and folate, B2, B3, and B6 reduce homocysteine levels which are risk factor for heart disease.
7. Prevents Constipation: The high fiber content in peas improves bowel health and peristalsis [10].
8. Healthy bones: Vitamin K and B help to prevent osteoporosis [9].
9. Reduces bad Cholesterol: The niacin in peas helps reduce, the production of triglycerides and VLDL (very low-density lipoprotein) [9].

NUTRIENT PROFILE [7-9]

Table 1: Nutrient Profile of Green Peas

Nutrient	Amount	DRI/DV (%)	Nutrient Density	World's Healthiest Foods Rating
Vitamin K	35.68 mcg	40	6.2	very good
Manganese	0.72 mg	36	5.6	very good
Fiber	7.58 g	30	4.7	very good
Vitamin B ₁	0.36 mg	30	4.7	very good
Copper	0.24 mg	27	4.1	very good
Vitamin C	19.56 mg	26	4.1	very good
Phosphorus	161.17 mg	23	3.6	very good
Folate	86.78 mcg	22	3.4	very good
Vitamin B ₆	0.30 mg	18	2.7	Good
Vitamin B ₃	2.78 mg	17	2.7	Good
Vitamin B ₂	0.21 mg	16	2.5	Good
Molybdenum	6.89 mcg	15	2.4	Good
Zinc	1.64 mg	15	2.3	Good
Protein	7.38 g	15	2.3	Good
Magnesium	53.72 mg	13	2.1	Good
Iron	2.12 mg	12	1.8	Good
Potassium	373.30 mg	11	1.7	Good
Choline	40.91 mg	10	1.5	Good

Probiotics are under considerable research, as the concept holds promise for human health and well-being, and corresponding commercial opportunities. Protection of consumers requires health claims to be confirmed with sufficient scientific evidence. Overall scientific demonstration of probiotic effects requires defining a healthy microbiota and interactions between microbiota and host, and the difficulty to characterize probiotic effectiveness in health and disease. Recent developments of high-throughput sequencing technology and the consequent progresses of metagenomics represent a new approach for the future of probiotics research [9-13].

Research into the potential health effects of supplemental probiotics has included the molecular biology and genomics of *Lactobacillus* in immune function, cancer, and antibiotic-associated diarrhea, traveller's diarrhea, pediatric diarrhea, inflammatory bowel disease and irritable bowel syndrome. Testing of a probiotic applies to a specific strain under study. The scientific community

cautions against extrapolating an effect from a tested strain to an untested strain [1].

Although research does suggest that the relationship between gut flora and humans is a mutualistic relationship, there is very little evidence to support claims that probiotic dietary supplements have any health benefits. Improved health through gut flora modulation appears to be directly related to long term dietary changes [11-14].

In a 2009 blog post, one expert reasoned that preliminary clinical results exist for some applications, such as treating diarrhea, but wider health benefits claimed by probiotic proponents lack plausibility since the body's "ecosystem" is sufficiently complex that adding a few bacteria is unlikely to have the claimed effect. Since then, there has been an increase in the body of scientific evidence supporting the use of specific probiotics to improve health. Although the body's complex microbial community is incompletely understood at present, there is strong

scientific consensus on the benefits of using of probiotics

SIDE EFFECTS

In some situations, such as where the person consuming probiotics is critically ill, probiotics could be harmful. In a therapeutic clinical trial conducted by the Dutch Pancreatitis Study Group, the consumption of a mixture of six probiotic bacteria increased the death rate of patients with predicted severe acute pancreatitis [11].

In a clinical trial conducted at the University of Western Australia, aimed at showing the effectiveness of probiotics in reducing childhood allergies, researchers gave 178 children either a probiotic or a placebo for the first six months of their life. Those given the probiotic were more likely to develop sensitivity to allergens [12].

Some hospitals have reported treating lactobacillus septicemia, which is a potentially fatal disease caused by the consumption of probiotics by people with lowered immune systems or who are already very ill. Probiotics taken orally can be destroyed by the acidic conditions of the stomach. A number of micro-encapsulation techniques are being developed to address this problem [13].

One 2009 paper cited a 2007 study in chickens as a support for causally linked probiotic products such as yogurts with obesity trends. However, this is contested as the link to obesity, and other health related issues with yogurt may link to its dairy and calorie attributes [14].

Some experts are skeptical on the efficacy of many strains and believe not all subjects will benefit from the use of probiotics [11-14].

CONCLUSION

A healthy diet is key to a healthy life, but there is a major nutritional gap between what people eat (even with a good diet) and what they need to be healthy. Probiotics are great step towards eliminating the Nutritional Gap in many people's gut health. Probiotics are not just for people with GI Tract or Stomach problems. Probiotics are being heralded by the medical community as the "future of preventative medicine". Probiotics, or at the very least products that might have probiotic properties, have been with us for decades, if not centuries, but it has only been in recent years that they have been subjected to serious scientific study. This surge in interest in probiotics has coincided with the era of the microbiome; as more and more is understood about the gut microbiota in health and disease, the therapeutic option of modulating the microbiota through the administration of probiotics has gained a more secure foundation. Regrettably, while a vast literature attests to the beneficial impact of probiotics in a variety of animal models and the mechanisms underlying such positive effects have been dissected in great detail, the data base on probiotics in man remains pretty slender to make progress, a number of basic issues need to be addressed: strain characterization and other aspects of quality control need to be rigorously applied.

Besides finding probiotics in food, you can also find probiotic supplements in capsule, tablet, powder, and liquid form. While they do not provide the additional nutritional value that food can offer, they can be useful if you do not consume many of the probiotic containing

to address certain medical states or conditions [10].

foods. Although probiotic products are marketed for many different uses, scientific evidence supporting specific uses is still limited, and the FDA has not approved any health claims for probiotics. Before using probiotics, learn as much as you can by talking to your health care provider and researching reliable sources of information.

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