EMGEN Newsletter

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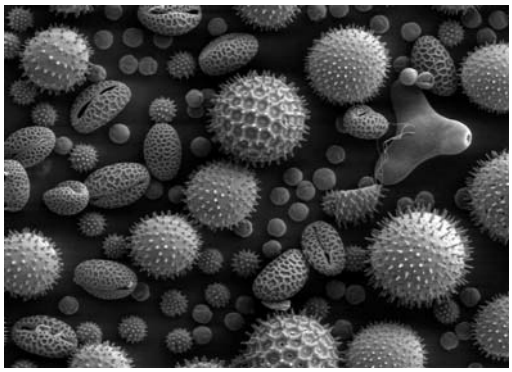
PROBIOTICS

A probiotic is described as a possible microbial food complement that benefits the host through its effects in the human health when consumed. These days the term probiotic is used to name consumed microorganisms involved with benefits for humans and animals. A major development of the potential market for probiotics has directed to higher requests for scientific demonstration of assumed benefits refers to the microorganisms. Researchers show that probiotics can be used as therapeutic material for the treatment of different disorders for example gastrointestinal infections, allergy, inflammatory bowel syndrome, diarrhea, colon cancer, etc. Probiotic is also used for animal health and well being. Some effects of probiotics on human health improvement are listed below:

Allergies



Probiotics decrease the range of inflammatory cytokines and intestinal permeability in vitro; therefore this would be useful in allergy symptoms. Several studies demonstrate the efficiency of probiotics in allergic conditions, for example eczema, allergic rhinitis and food allergies. The results of these studies are promising, but further studies necessary to define probiotics particular role.

Figure 1. Allergens: plants pollen

Antibiotic-associated diarrhea

Probiotics could decrease the intestinal effects and Antibiotic-associated diarrhea. In an experiment 119 children who received antibiotics for their disease was treated by probiotics, after 2 weeks, the diarrheal symptoms of the group receiving Lactobacillus GG reduced to 70% in compared with the group receiving placebo. Some studies show other bacterial probiotics was not as successful as *Lactobacillus* GG.

Immune function and infections

Competitive inhibition of some strains of lactic could involve in decreasing pathogens and some research shows that they may have an effect on immune function by changing the rate of IgA-producing , phagocytosis function, total amount of T lymphocytes and natural killer cells. Clinical experiments have confirmed that probiotics may reduce the occurrence of respiratory-tract infections in children. Even though, LAB products research shows the capacity in the treatment of acute diarrhea, and effects on rotavirus infections in children and travelers' diarrhea in adults, there is no accepted evidence for such suggestions.

Helicobacter pylori

Adults Helicobacter pylori infections might be influenced by Some strains of lactic acid bacteria in assistant the standard medical treatments, but there is no accepted evidence for such treatment.

Inflammation

According to an examination about the regulation of cytokine function, some of LAB strains may affect modulation of inflammatory and hypersensitivity responses.

Necrotizing enterocolitis

Several clinical studies demonstrate the potential of probiotics to decrease the risk of necrotizing enterocolitis in premature infants.

Vitamin production

Since vitamin K, folic acid, and vitamin B12 deficiencies cause different disorders, nowadays there are some studies about healthcare and probiotics are refer to production or interaction of Probiotic with vitamins.

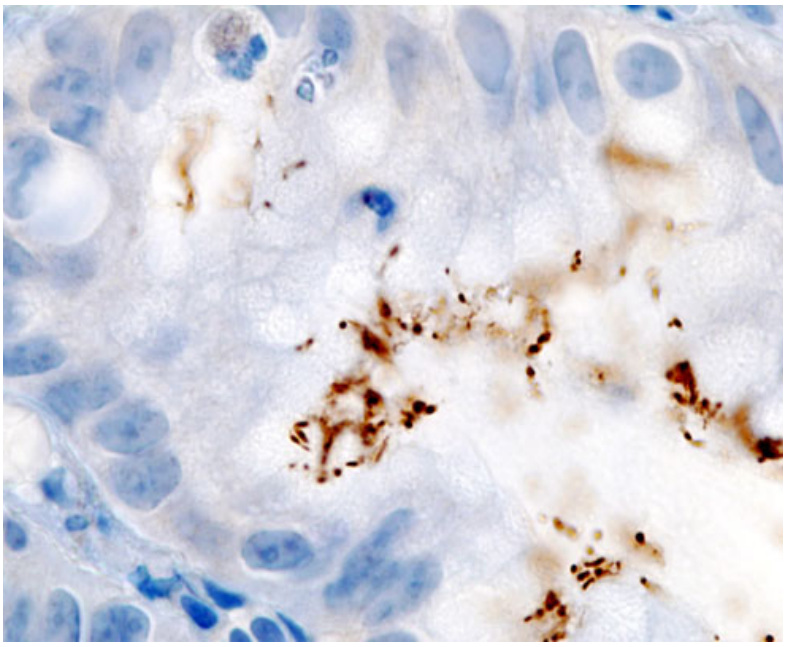


Figure 2. Immunohistochemical detection of Helicobacter

Side effects

In spite of the advantages of Probiotics and the

consideration of being safe, they possibly will cause bacteria- unwanted side effects in certain cases.

There are some people at higher risk of probiotic consumption, people with certain illnesses such as immune compromise, short bowel syndrome, cardiac valve disease and premature infants. In inflammatory bowel disease people, the passages of viable bacteria from the gastrointestinal tract to the internal organs reduce the condition of healthiness. Using probiotics may cause fatal infectious disease for example bacteremia, fungemia. A clinical study was expressed to estimate the efficiency of probiotics in decreasing childhood allergies. Those received the probiotic shows higher possibility of developing sensitivity to allergens than who gets the placebos. Also it has been proposed that probiotics cause obesity in humans but there is no confirmation has been reported.

Conclusion

The existing applications of probiotics include treating a wide range of human illnesses. Some probiotics benefits the treatment of acute and antibiotic-associated diarrhea; prevention of atopic eczema, the prevention of respiratory infections in children, prevention of dental caries, elimination of nasal pathogen transfer and treatment of inflammatory bowel disease. The consumption of probiotics in medical experiments is increased fast. Reporting negative findings are as important as positive one, since they show the way of more studies to discover more use of probiotics. Certainly, in cooperation with food industry and medical, a remarkable growth of probiotics application can be observed in food and medicine over the next decade.

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5. https://en.wikipedia.org/wiki/File:Misc_pollen.jpg
6. https://en.wikipedia.org/wiki/File:Immunohistochemical_detection_of_Helicobacter_(1)_histopatholgy.jpg

KEFIR

"Kefir" is referred to the Turkish word key if, which means "feeling good". The kefir beverage is initiated from the Caucasus Mountains, a traditional product highly demanded in Eastern Europe, Russia and South-west Asia. Presently, kefir consumption increase in countries, due to its unique sensory properties and long history related to useful effects on human health.

Kefir is known by its different flavor, typical of yeast, and sparkling sensation in the mouth. Kefir fermentation products include lactic acid and CO_2, which causes viscosity, and acidity. Other components are diacetyl, acetaldehyde, ethyl and amino acids give the flavor to beverage.

Kefir is not the product of the metabolic activity of a single or a few microbial species; therefore it is different from fermented dairies.

A water-soluble polysaccharide in Kefir grains is named as kefiran. The usual color of healthy grains is white.

Nutritional composition

Researches shows kefir contents different range of nutrients such as dietary minerals, vitamins, essential amino acids, and conjugated linoleic acid. Main composition of Kefir is water and by-products of the fermentation process, which is carbon dioxide and ethanol.

Several dietary minerals are found in kefir, such as calcium, iron, phosphorus, magnesium, potassium, sodium, copper, molybdenum, manganese, and zinc. Moreover kefir is composed of vitamins in variable amounts, including vitamin A, vitamin B1 (thiamine), vitamin B2 (riboflavin), vitamin B3 (niacin), vitamin B6

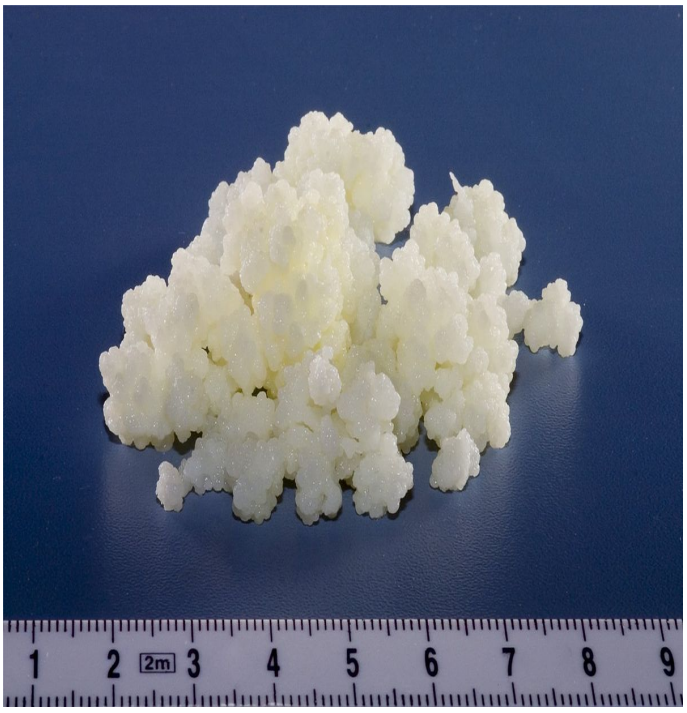

Figure 1. Kefir grains

(pyridoxine), vitamin B9 (folic acid), vitamin B12 (cyanocobalamin), vitamin C, vitamin D, and vitamin E. methionine, cysteine, tryptophan, phenylalanine, tyrosine, leucine, isoleucine, threonine, lysine, and valine are the Essential amino acids that are found in kefir.

Probiotics

Different microorganisms are studied inside kefir grains, the results shows numerous varieties of probiotic bacteria are in kefir products for example *Lactobacillus acidophilus, Bifidobacterium bifidum, Streptococcus thermophilus*, Lactobacillus delbrueckii subsp. bulgaricus, *Lactobacillus helveticus, Lactobacillus kefiranofaciens*, *Lactococcus lactis*, and *Leuconostoc* species. Kefirans are the product of Lactobacilli.

Also, kefir contains lactose metabolizer yeast strains, like *Kluyveromyces marxianus* and *Kluyveromyces lactis*, and yeast strains that do not metabolize lactose, such as *Saccharomyces cerevisiae* and *Kazachstania unispora.*

Therapeutic Aspects

In the past Kefir was an option for the treatment of some clinical illnesses such as gastrointestinal problems, hypertension, allergies, and ischemic heart disease. Nowadays scientists noticed that the different ways to produce kefir is a significant problem to compare reported scientific kefir therapeutic consequences.

Different Kefir grain is fermented and bioactive compounds have been evaluated, such as organic acids, carbon dioxdie, oxygen peroxide, ethanol, and bacteriocins. These compounds possibly participate in producing substrates which are provided some health benefits individually or together.

Antimicrobial Activity

In some literatures is reprted that all milk fermented with kefir grains and kefir grains isolated component affect as the inhibitory factor against *E. coli, L. monocytogenes, Salmonella typhimurium,* S. Enteritidis, *Shigella flexneri* and *Y. enterocolitica, Candida albicans, Shigella sonnei, Staphylococcus aureus, Bacillus subtilis, E. faecalis* and *S. Enteritidis,* but did not inhibit *P. aeruginosa*. All these studies shows that kefir antimicrobial activity depends on the organic acids, peptides (bacteriocins), carbon dioxide, hydrogen peroxide,

ethanol and diacetyl compounds which may have beneficial properties in food borne pathogens reduction moreover it is contributed in the treatment and prevention of gastroenteritis and vaginal infections.

Anti-inflammatory and Healing Activity

The Therapeutic and anti-inflammatory activities caused by kefir consumption in the intestinal microbe composition may be due to a mixture of elements, for example acids and bacteriocin which is produced by kefir grains, has been inhibited pathogens directly. Using kefir caused LAB amounts growth in the intestinal mucosa and Enterobacteria reduction. In Russia, kefir consumption is known as the treatment of peptic ulcers in the stomach and duodenum of human patients.

Anticarcinogenic Effects

Cancer prevention and the suppression of early-stage tumors is the anti-carcinogenic role of kefir products. In fact they affect activities of enzymes that caused carcinogens or involve in immune system. Some evidence shows that mice treated with kefir had a higher effect of protection against damage produced by carbon tetrachloride, indicating that kefir can also act as an antioxidant.

Stimulation of the Immune System

Physiological activities such as stimulation of the immune system are caused by the materialization of bioactive peptides during fermentation or digestion processes. Furthermore the immune system probably is stimulated by the effects of kefir grains exopolysaccharides. Some activities of kefiran show the capability of modifying the immune cells balance in the intestinal mucosa. Kefir also could induce a response in the intestinal mucosa and innate immune system.

Hypocholesterolemic Effect

Possibly the inhibition of the exogenous cholesterol absorption in the small intestine is related to the hypocholesterolemic activity in LAB which is caused by incorporation of cholesterol to bacteria. Even though studies were observed a reduction of serum triglyceride and cholesterol levels, particularly the non-HDL-C fraction, another result was reported kefir did not decrease total cholesterol, LDL-C, HDL-C and triglycerides levels,

but increased the concentrations of isobutiric, propionic and isovaleric acids, in addition to the total volume of short chained fatty acids in feces.

Kefir and Lactose Intolerance

The existence of galactosidase in fermented kefir products could be suitable for lactose intolerants. It has been confirmed that some kefir grains display galactosidase enzymatic activity; therefore that kefir contains fewer lactose than milk.

Conclusion

Kefir is a traditional model of the symbiotic relationship of bacteria and yeasts. Current scientific studies confirm the health benefits of kefir consumption.

At this time, the application of probiotics in the food industry is developed. The interaction between different microorganisms in foods could guide to the advanced technological processes.

The kefir grains microorganisms and kefir processing circumstances is caused different types of kefir products. Scientists use different cultures and mesophilic and thermophilic LAB to generate new types of kefir. But their success in comparison with traditional kefir is partial which means the microbial diversity in kefir grains is concluded the probiotic and beneficial properties of final product.

Figure 2. Milk kefir

Numerous benefits of kefir are unique; consequently it is suggested to consume for premature infants, young children, pregnant and nursing women, patient, old people and lactase intolerant individuals. Many researchers studied many properties of kefir but generally not well defined. Future discoveries will show more explanation about kefir and its benefits.

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6. https://en.wikipedia.org/wiki/File:Kefir_in_a_glass.JPG

CONSUMING PROBIOTICS PROMOTES WEIGHT LOSS, REDUCES BMI

The digestive health advantages of probiotics have been discussed. Some facts about probiotics role in human health still have not been discovered.

The *International Journal of Food Sciences and Nutrition* have been published an article which is confirmed that body weight and body mass index (BMI) can be reduced by probiotics consumption.

Even though the total weight loss in this study was nominal, it could show a great way to achieve better life-style. And it helps to keep weight-related diseases such as Type 2 diabetes and high blood pressure under control.

Reference: https://www.sciencedaily.com/releases/2016/07/160711092643.htm

NEW PROBIOTIC RECOGNIZED IN FERMENTED JAPANESE VEGETABLE

Raw or cooked “burdock root” or “gobo” shows a negligible positive effect on colon health. Because an acceptable amounts gobo must be used to change the bacterial composition of the colon.

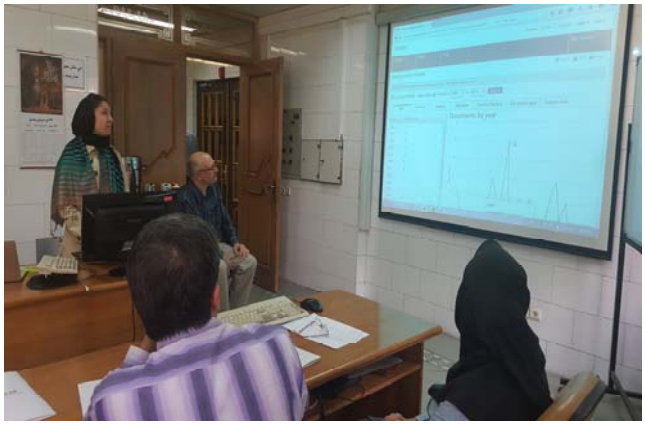
Japanese research group has investigated the gobo’s benefits. And they revealed that the fermentation process results a liquid full of different enzymes. These enzymes are possibly responsible for the colon health improvement.

Researchers are going to study more about long-term effects of enzyme on the colon and the composition of bacteria in the intestine.

Reference: https://www.sciencedaily.com/releases/2016/07/160704082849.htm

DR. FLORIAN MADERSPACHER, SENIOR EDITOR AT CURRENT BIOLOGY CELL PRESS/ELSEVIER VISITED EMGEN

Dr. Florian Maderspacher, Senior Editor at Current Biology Cell Press/Elsevier and Ms. Gamze Keskin Customer Development Manager of Elsevier visited EMGEN on May 15 2016. Dr. Soroush Sardari, Director of EMGEN, hosted their visit. Dr. Maderspacher made a presentation on “how to get a paper published”. He also had a private meeting with Director of EMGEN and Dr. Khalaj to present solutions of publishing problems. All parties discussed various topics on academic research and publication both in and outside of Iran. Dr. Maderspacher’s visit will encourage submissions of papers to Current Biology from the faculties in our network.



JOURNAL OF FUNCTIONAL FOODS

ISSN: 1756-4646

The *Journal of Functional Foods* helps to collect the results of fundamental and practical research about functional foods (such as probiotics) and how are they developed and commercialized.

Impact Factor: 3.973

INTERNATIONAL DAIRY JOURNAL

ISSN: 0958-6946

The *International Dairy Journal's* issues are refer to research and critical reviews that improve dairy science and technology, and nutritive and wellbeing aspects of dairy foods.

Impact Factor: 1.938

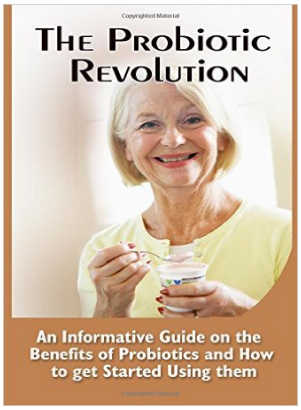
TRENDS IN FOOD SCIENCE & TECHNOLOGY

ISSN: 0924-2244

Trends in Food Science & Technology is one of the leading international refereeing journals that publish critical reviews and commentaries of recent technology, food science and human nutrition.

Impact Factor: 5.150

THE PROBIOTIC REVOLUTION: AN INFORMATIVE GUIDE ON THE BENEFITS OF PROBIOTICS AND HOW TO GET STARTED USING THEM

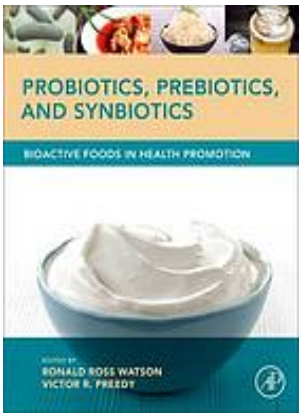


Author: Leonardo Ward

Publisher: CreateSpace Independent Publishing Platform, 2016

ISBN: 1530010233, 9781530010233

PROBIOTICS, PREBIOTICS, AND SYNBIOTICS: BIOACTIVE FOODS IN HEALTH PROMOTION

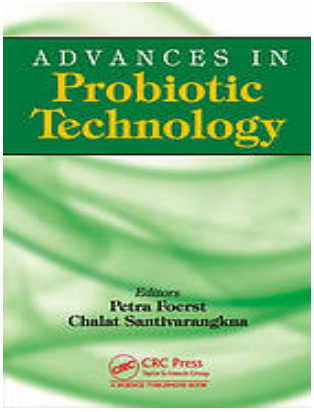


Editors: Ronald Ross Watson, Victor R. Preedy

Publisher: Elsevier Science, 2015

ISBN: 0128023716, 9780128023716

ADVANCES IN PROBIOTIC TECHNOLOGY



Editors: Petra ger, Chalat Santivarangkna

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ISBN: 1498734588, 9781498734585

Announcements

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on Molecular and Cellular Biology
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Gastrointestinal Control of Metabolism (Z6)

May 9—13, 2017
Tivoli Hotel and Congress Center, Copenhagen, Denmark

DEADLINES:
Scholarship Deadline: Jan 12, 2017
Discounted Abstract Deadline: Jan 12, 2017
Abstract Deadline: Feb 9, 2017
Discounted Registration Deadline: Mar 9, 2017

http://www.keystonesymposia.org/index.cfm?e=web.Meeting.Program&meetingid=1459

conferenceseries.com

10th International Congress on
Clinical Virology
December 4-6, 2017 Dubai, UAE

http://clinicalvirology.conferenceseries.com/

1st International Conference on Food Bioactives & Health
13-15 September 2016
Norwich, United Kingdom

FOOD BIOACTIVES & HEALTH

http://www.globaleventslist.elsevier.com/events/2016/09/the-1st-international-conference-on-food-bioactives-health/

GENETICALLY MODIFIED FOODS

Genetically modified foods, GM foods or Transgenic foods are referred to foods which derived from plants or animals with recombinant gene. In fact, Genetic engineering methods introduce new techniques such as selective breeding and mutation breeding to achieve better crops and products. Since 1994, genetically modified foods have been commercially available. Because of high demand for some crops such as soybean, corn, canola, and cotton seed oil, high percentage of GMO food outcomes have focused on cash crops which have been modified for pathogens resistance and better nutrient source. In this picture you see transgenic plums called C5 which have a pox virus resistance gene.

Reference: https://en.wikipedia.org/wiki/Genetically_modified_food

FOOD SCIENCE

Food science is the useful science dedicated to the study of food. The describes food science as the lessons which combine the engineering, biological, and physical sciences together to help understanding the nature of foods, the causes of food denaturation, the main process of food procedure, and the foods development that consumes in public. The textbook *Food Science* explains food science more simple as "the request of basic sciences and engineering to understand the physical, chemical, and biochemical characteristics of foods and the principles of food processing". This picture shows one of food science laboratories in Australia.

Reference: https://en.wikipedia.org/wiki/Food_science

FOOD PHYSICAL CHEMISTRY

Food physical chemistry is a branch of Food chemistry focused on studying physical and chemical interactions in foods concerning physical and chemical aspects that is useful for foods and food systems. Researchers mostly drive the food physical chemistry concepts from rheology, theories of transport phenomena, physical and chemical thermodynamics, chemical bonds and interaction forces, quantum mechanics and reaction kinetics, biopolymer science, colloidal interactions, nucleation, glass transitions and freezing, disordered/ noncrystalline solids. The picture is Cornstarch at 800x with polarizer filter. Excerpt size: 200µm x 150µm.

Reference: https://en.wikipedia.org/wiki/Food_physical_chemistry