

L. Salivarius

Introduction: *Lactobacillus salivarius* (*L. salivarius*) is a gram-positive, non-spore forming bacillus bacteria. It is a homofermentative organism (only produces one byproduct of metabolism - lactic acid) that is found occurring naturally in the human oral cavities, intestines, and vagina. It is considered to be non-pathogenic and is sometimes used to produce lactic acid in fermented foods; and is used as a probiotic to help prevent infections by other microorganisms. *L. salivarius* also produces lactase enzyme as well as bacteriocins, proteins or peptides that are toxic to some other types of bacteria. While *L. salivarius* has been challenging to grow in culture for production purposes, it is quite prolific in the gut, and is therefore able to soon out compete many other bacteria, including many pathogens. *L. salivarius* is a facultative anaerobe, meaning that it can grow in the presence or absence of oxygen; it grows best in the small intestine, but the live bacteria can be found in feces as well. *L. salivarius* is somewhat unique among probiotics in that it is capable of growth in less than ideal conditions. It is one of only a few that can grow in high salt conditions. This makes *L. salivarius* an ideal probiotic for reducing the amounts of undesirable or pathogenic gut bacteria.



Lactobacilli

Dosage: When **Daily *L. Salivarius*** is used as a routine preventive supplement, 1 capsule 2 times per day is the suggested dose. When more aggressive probiotic supplementation is needed, 2 capsules 2 or 3 times per day may be used.

Active Ingredients: **Daily *L. Salivarius*** (*L. salivarius*) is a symbiotic nutritional supplement containing both a probiotic (*L. salivarius*) and a prebiotic (fructooligosaccharide or FOS). **Daily *L. Salivarius*** is a highly stable and vigorously reproducing lactic acid bacteria originally isolated and characterized at the University of Nebraska. At the time of manufacture, **Daily *L. Salivarius*** capsules contain a minimum of 2 billion live bacteria. Counts at time of use depend on storage conditions and length of time after manufacture. Most of the bacteria should be live and viable for up to 2 years, if the product is stored in a refrigerator or freezer. **Daily *L. Salivarius*** also contains FOS, a complex carbohydrate that can not be digested by humans and only by a limited number of bacteria. *Bifidobacteria* seem to be the best at digesting FOS and FOS supplementation has been shown to increase the gut *Bifidobacteria* counts.

Inactive Ingredients: Inactive ingredients (excipients) present in **Daily *L. Salivarius*** are used to keep the active ingredients in an easy-to-use and accurately measured dosage form.

Vegetarian Capsules: Size “0”, made from plant derived cellulose.

Microcrystalline Cellulose: A source of hypoallergenic dietary fiber made from the pulp of evergreen trees. Used to increase the bulk of the capsule and protect the active bacteria.

Silicon Dioxide: Keeps the powder dry protecting the viable bacteria from moisture damage.

Description: **Daily *L. Salivarius*** is a dry powdered supplement in a two piece vegetarian capsule. The clear capsule has a white color when filled. Each bottle contains 120 capsules (a 30-60 day supply). **Daily *L. Salivarius*** is packaged in a white HDPE bottle with an inner freshness seal and an outer tamper-evident band. A lot number and expiration date is printed on the bottom of the bottle. Keep refrigerated.

Precautions: **Daily *L. Salivarius*** is milk-free and does not contain any major allergens. Over consumption of any probiotic has the potential to cause excessive bacterial growth which could result in loose bowels and/or flatulence. If loose bowels and/or flatulence are experienced, discontinue use until the symptoms have disappeared, and reduce the dose when use of the product is resumed. **Daily *L. Salivarius*** should not be used to treat serious medical conditions in place of professional medical care.

Normalizing Intestinal Function with *Lactobacillus salivarius*

Intestinal Bacteria: There are 400-500 different species of bacteria inhabiting the human intestinal tract. Most have neither harmful nor beneficial effects. Some however, are associated with illnesses when present in large quantities and some are beneficial. The number of bacteria can reach as high as 100 trillion, much more than the total number of cells in the body. The role of probiotic and prebiotic supplements is to increase the number of beneficial bacteria while decreasing the harmful bacteria.

Stability of *L. salivarius*: *L. salivarius* is a facultative anaerobe capable of living in oxygen rich and depleted environments. This makes it capable of living in many different bodily locations, including: the mouth, small and large intestine, and vagina. *L. salivarius* is also not susceptible to anti-fungal drugs which makes it a potentially useful co-treatment with drugs for candida albicans infection¹. *L. salivarius* is moderately heat tolerant, but over months of non-refrigerated storage it will die off in significant amounts, thereby reducing its effectiveness². *L. salivarius* is also tolerant of high salt conditions and should not be greatly affected by eating salty foods³. It is also tolerant of bile salts⁴. *L. salivarius* CRL 1328 appears to grow best at pH 6.5 and grows reasonably well over the 5.0-8.0 range. With this range in pH tolerance it should be able to inhabit and grow in the entire large and small intestine⁵, assuming that other strains have similar pH tolerance. It has been demonstrated that *Lactobacillus* species, including *L. salivarius*, survive acidic environments (such as in the stomach) much better if they have a source of metabolizable sugar, and can survive in the stomach reasonably well for at least 45 minutes with a source of glucose⁶. It would probably be ideal to take *L. salivarius*, and most other probiotics, on an empty stomach with a glass of non-acidic juice such as apple juice.

***L. Salivarius* and Undigested Protein:** It is commonly stated that *L. salivarius* is useful for digesting undigested putrefactive proteins and other material coating the intestinal tract. This is said to be due to the proteolytic enzymes produced by the bacteria. Thus far, we have been unable to find documentation to either confirm or refute this claim, although enough health professionals testify to this use of *L. salivarius* to make it impossible to dismiss easily. We do know that some proteolytic enzymes are produced by *L. salivarius*, however⁷. Therefore, *L. salivarius* should be seriously considered as an addition to any intestinal cleansing program.

Anti-Microbial Properties of *L. Salivarius*: One of the most important functions of probiotic bacteria is to help reduce the levels of pathogenic bacteria in the intestinal tract. Yogurt and individual probiotic capsules have both been shown to reduce intestinal bacterial counts of harmful microbes, including *Helicobacter pylori*⁸. There are several ways that probiotic bacteria and *L. salivarius* can eliminate harmful bacteria, including: lowering pH, by forming aggregates with other bacteria that are eliminated⁹, competing for space and food, and producing bacteriocins (proteins that kill specific species of other bacteria). *L. salivarius* has been

shown to inhibit the growth of *Salmonella typhimurium*, *Clostridium perfringens*, and *E. coli* in chicken feed¹⁰. In chickens, *L. salivarius* has been shown to reduce the counts of enterococci and coliforms in the crop and cecum¹¹, and “restored the microbial balance” in heat stressed chickens¹². Other microorganisms of humans that *L. salivarius* is effective against include *E. coli*, *Salmonella dublin*¹³, and the yeast, *Candida albicans*⁹.

***L. Salivarius* and Inflammation:** *L. salivarius* has been shown to prevent or reduce the severity of inflammatory diseases of the intestinal tracts of rats and mice^{14,15}. The degree of damage in such diseases is closely related to the production of pro-inflammatory substances (cytokines) by immune cells. *L. salivarius* has been shown to significantly reduce their production in mice with a spontaneous colitis due to underproduction of interleukin-10¹⁴. In another study of similar mice, 2 out of 10 mice without *L. salivarius* died before the end of the study (16 weeks) whereas none of those supplemented with *L. salivarius* died¹⁶. Also 5 (50%) of the mice in the non-supplemented group developed colon cancer compared to only one (10%) in the supplemented group. These studies, among others, show that probiotics, including *L. salivarius*, have great promise in the control of inflammatory bowel disease.

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Caution: These studies are only preliminary or animal studies, caution must be observed in applying them to humans.

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