LACTOBACILLUS PLANTARUM LM

Introducing: Vivoflora *Lactobacillus plantarum* LM. This versatile strain was isolated in 2005 by the Biotechnology faculty at the Kiev National Technical University from a soy flow fermentation which consisted of a combination of strains from commercial products. *L. plantarum* LM exhibits anti-pathogenic activity, immune supportive function and combines and works well with less active strains. This strain demonstrates the ability to stabilize fermented plant based food products and is also highly adapted to vegetarian diets.

TARGET APPLICATION: Good for daily health maintenance and the prevention of serious health problems. This strain can be used for milk, soy and other vegetable products.

FUNCITONAL CHARACTERISTICS AND EFFICACY

L. plantarum LM assists the restoration and balancing of intestinal microbiota, inhibition of growth of pathogenic bacteria, supports the immune system, works well in combination with less active probiotic strains, and is highly adapted to vegetarian diets.

Digestive Health Functionality

L. plantarum LM has high levels of survival in the human intestine as well as high resistance to bile salts, gastrointestinal enzymes and acids, and exhibits good adhesion properties in vivo. It also exhibits significant levels of proteolytic activity to allow for better digestion of plant and animal protein.

L. plantarum LM is highly adapted to vegetarian diets.

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Protective Functionality

L. plantarum LM demonstrates antagonistic activity against pathogenic and conditionally-pathogenic microorganisms and thereby creates favorable conditions for the development of useful gastrointestinal microflora and stimulates the growth of the host microbiota. This strain exhibits effective levels of antagonistic activity against Gram positive and Gram Negative pathogens including pathogens found in hospital infections, post operative infections and complications such as Salmonella, Escherichia, Staphylococcus, and Proteus genus. Good antagonistic activity is also demonstrated against food spoilage microorganisms.

Immune Modulation

L. plantarum LM demonstrates a high level of non-specific immune activity. It stimulates phagocyte activity, induces IFN and NK cells production.

Anti-Mutagenic and Antibiotic Tolerant Properties

L. plantarum LM exhibits significant anti-mutagenic properties, good tolerance to Amikacin, Streptomycin, Gentamycin, and low sensitivity to Penicillin and Levofloxacin.

CLINICAL STUDIES

Lactobacillus plantarum LM was derived from a root *L. plantarum* strain for which clinical studies have been conducted.

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STRAIN ORIGIN & HISTORY

This strain was isolated in 2005 at the Kiev National Technical University by the Biotechnology faculty. The strain was isolated from a soy flow fermentation in which a combination of strains from commercial products was used. The *L. plantarum* LM strain was chosen to isolate and research because of its fast and impressive growth qualities in soy based media. It was found that the soy components induce the immune activity of this strain. The immune activity was found to be higher when grown in soy based media than in casein (milk) based media.

The strain was included in PhD research (Starovoitova Svetlana, Kiev Technical University, Biotechnology Department). This research focused on the adhesion, antagonistic and immune activity of some strains, including new isolated *L. plantarum* LM. This strain was originally an industrial strain, so it was used as a reference strain, is known to be safe for human consumption and has shown promising therapeutic qualities.

STRAIN AUTHENTICITY & DEPOSIT

According to FAO/WHO, this strain has been identified as *Lactobacillus plantarum* by use of phenotypic characterization, carbohydrate utilization or fermentation profile, and genetic ribotype techniques. This strain has been deposited in the NTU Biotechnology Department Collection as *L. plantarum* LM.

SAFETY ASSESSMENT

A safety assessment has been performed for acute and chronic toxicity using rats and mice. The LD50 in acute testing was >20g/kg body mass. A culture of this strain is safe and non-toxic. *Lactobacillus plantarum* is a strain commonly used in food culture and found in plant material and is generally regarded as safe (GRAS).

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LIST OF PUBLICATIONS

1. Starovoytova S., Gorchakov V. Lactic Acid Bacteria strain Selection for Effective Probiotics Compositions. 2006, Scientific News of NTU "KPI", v5, pp.100-103

2. Starovoytova S, Timoshok N, Gorchakov V, Spivak N. Interferon induction activity of Lactic Acid Bacteria; 2007, Immunology and Allergy (Ukrainian), #4, pp. 24-27

3. Starovoytova S., Oryabinska L, Gorchakov V. Cholinesterase and protease activity of Lactic Acid Bacteria in vitro ; 2007, Environment and Health ,#4 (43), pp.68-71

4. Starovoytova S, Timoshok N, Spivak N. Influence of Lactic Acid bacteria associated cultures at mice experimental meningoencephalytic herpes infection; 2008, In Abstracts of International Conference "Antibacterial and anti-viral therapy on hospital treatment" , Charkov, Ukraine, pp.316-317

5. Timoshok N, Shynkarenko L, Starovoytova S, Spivak N. Investigation of interferon induction activity of new Probiotic composition and strains L.delbrueckii 86, L.rhamnosus to compare with Del-Immune V and Lactobacterin (L.plantarum); 2009, IIX Congress of Ukrainian Microbiological Society , Abstracts Book, p.264

6. Starovoytova S, Timoshok N, Gorchakov V, Spivak N. Immunomodulating abilities of Lactic Acid Bacteria.2009; Microbiol.J., V71, #3, pp.41-47

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