Pre/Probiotic Tincture Whitepaper

Background

Gut health plays a pivotal role in overall well-being, influencing not just digestion, but also immunity, mental health, and disease prevention. The gut, home to trillions of microorganisms, forms a complex ecosystem known as the microbiome. This microbiome aids in breaking down food, absorbing nutrients, and protecting against harmful pathogens. A balanced gut microbiome is crucial for maintaining a strong immune system, as it helps to ward off infections and reduce inflammation. Emerging research also highlights the gut-brain axis, illustrating how gut health significantly impacts mood and cognitive functions. Therefore, maintaining a healthy gut is essential for holistic health, impacting various aspects of our physical and mental well-being.

Bifidobacterium lactis[1-5]

Bifidobacterium lactis is a highly regarded probiotic bacterium known for its wide-ranging benefits to human health, particularly in improving gut health and enhancing immune function. This versatile bacterium belongs to the Bifidobacterium family, which is crucial for processing dietary fiber, fighting harmful bacteria, and supporting the immune system. Bifidobacterium lactis is renowned for its robustness and ability to withstand the harsh conditions of the gastrointestinal tract, ensuring its survival from the mouth to the colon, where it exerts its beneficial effects. Its resilience, combined with its health-promoting attributes, makes Bifidobacterium lactis a valuable addition to dietary supplements and functional foods aimed at promoting digestive well-being and immune resilience.

EFFICACY/APPLICATIONS

Bifidobacterium lactis plays a critical role in enhancing gut health by improving intestinal barrier function and promoting a balanced gut microbiota. It supports lactose digestion and may reduce symptoms of lactose intolerance. Additionally, it has been shown to alleviate constipation by improving bowel regularity. Bifidobacterium lactis has been demonstrated to have immunomodulatory effects. It boosts the body's defense mechanisms by enhancing the activity of macrophages and lymphocytes, and increasing the production of immunoglobulins. Supplementation with Bifidobacterium lactis can help mitigate the adverse effects of antibiotic therapy on gut microbiota. It helps restore the balance of beneficial bacteria and reduces the risk and severity of antibiotic-associated diarrhea.

Safety/Side Effects

Bifidobacterium lactis is recognized for its safety profile. It is considered safe for consumption in food and dietary supplements, with a history of safe use in both adults and children. It is also included in the list of probiotics that are Generally Recognized As Safe

(GRAS) by health authorities. Generally, Bifidobacterium lactis is well tolerated by most individuals. Side effects may include digestive discomfort such as gas, bloating, or an upset stomach. These symptoms are typically temporary and resolve as the body adjusts to probiotics. People with weakened immune systems, existing health conditions, or those who are critically ill should consult a healthcare professional before starting supplementation to avoid any potential adverse effects.

Bifidobacterium breve[6-10]

Bifidobacterium breve plays a crucial role in human health, particularly within the gut microbiome. It is naturally present in the human digestive tract, where it contributes to the balance of the gut flora, supports the immune system, and aids in the digestion and absorption of nutrients. B. breve has been extensively studied for its potential benefits in promoting gastrointestinal health, preventing infection, and supporting overall well-being.

EFFICACY/APPLICATIONS

Bifidobacterium breve can help maintain and restore the natural balance of the intestinal flora, which is essential for optimal digestive health. It has been associated with reduced symptoms of gastrointestinal disorders, such as irritable bowel syndrome (IBS) and diarrhea, by inhibiting harmful bacteria and enhancing gut barrier function. B. breve plays a significant role in modulating the immune system. It can enhance the body's defense mechanisms against pathogens by stimulating the production of antibodies and promoting immune cell activity. Emerging research suggests that Bifidobacterium breve may have a positive effect on preventing and managing allergic conditions in infants and allergies in adults, by modulating the immune response to reduce inflammation.

Safety/Side Effects

Bifidobacterium breve is generally considered safe for consumption when used in appropriate amounts, including in vulnerable populations such as infants and the elderly. It is a naturally occurring component of the human gut microbiome and has a long history of use in probiotic supplements and food. Side effects are rare and typically mild, including gastrointestinal symptoms such as gas and bloating. These are usually transient and occur as the body adjusts to probiotics. However, individuals with compromised immune systems or existing health conditions should consult a healthcare provider before beginning supplementation as there is a low risk of infection.

Lactobacillus casei[11-15]

Lactobacillus casei is a well-researched probiotic bacterium that is extensively used in fermented dairy products and probiotic supplements. L. casei is renowned for its ability to survive the acidic conditions of the gastrointestinal tract and effectively colonize the intestines. It plays a significant role in promoting gut health, enhancing immune function, and potentially reducing the risk of certain infections.

EFFICACY/APPLICATIONS

L. casei is instrumental in maintaining a healthy balance of the gut microbiota. It competes with pathogenic bacteria for adhesion sites on the intestinal mucosa, thereby preventing the growth of harmful microorganisms. This action is crucial for enhancing digestive health, and can help in the management of diarrhea, constipation, and other gastrointestinal disturbances. By modulating the immune response, L. casei can enhance the body's resistance to infectious diseases, particularly respiratory infections, and common gastrointestinal disorders. It stimulates the production of specific antibodies and has been linked to improved immune activity. Some studies suggest that L. casei may contribute to reducing diabetes type 2 symptoms.

Safety/Side Effects

Lactobacillus casei is generally regarded as safe for most people, including children and the elderly, when consumed in amounts typically found in food and supplements. It has a long history of use in fermented dairy products with no significant adverse effects. While adverse effects are rare, some individuals may experience mild digestive symptoms, such as gas, bloating, or upset stomach, especially during the initial phase of supplementation. These symptoms usually resolve independently as the body adjusts. However, people with underlying health conditions or compromised immune systems should consult healthcare providers before administering probiotics.

Lactobacillus plantarum[16-20]

Lactobacillus plantarum is recognized for its exceptional ability to adhere to the intestinal mucosa and survive in the harsh conditions of the gastrointestinal tract. Resilience enhances its probiotic effectiveness, allowing it to confer various health benefits. L. plantarum is widely studied for its positive impacts on gastrointestinal health, anti-inflammatory properties, and potential to improve nutrient absorption.

EFFICACY/APPLICATIONS

L. plantarum has been shown to significantly improve symptoms of irritable bowel syndrome (IBS), such as bloating, gas, and abdominal pain. It helps in maintaining a healthy gut flora balance, reducing inflammation, and strengthening the gut barrier

function, which can mitigate the symptoms of gastrointestinal discomfort and disorders. L. plantarum possesses natural anti-inflammatory properties, making it beneficial for reducing systemic inflammation and potentially benefiting conditions associated with chronic inflammation, such as certain autoimmune diseases. By supporting a healthy gut environment, L. plantarum can enhance the body's ability to absorb essential nutrients, minerals, and vitamins from food, contributing to overall health and well-being.

Safety/Side Effects

Lactobacillus plantarum is generally considered safe for consumption, with a history of use in various fermented foods and probiotic supplements. It is well tolerated by healthy individuals, including children and adults, when administered in appropriate amounts. Side effects are rare and typically mild, but may include temporary digestive symptoms such as gas, bloating, or an upset stomach. These symptoms are generally a sign of the body adjusting to the probiotic, and often resolve with continued use. Individuals with compromised immune systems or severe underlying health conditions should consult a healthcare professional before administering L. plantarum to avoid potential complications.

Lactobacillus acidophilus[21-25]

Lactobacillus acidophilus is widely recognized for its probiotic potential and beneficial impact on human health. L. acidophilus is particularly notable for its ability to adhere to the intestinal walls, resist gastric acidity, and survive in the bile acids of the gastrointestinal tract, which allows it to effectively colonize the gut. L. acidophilus has been extensively researched for its roles in supporting digestive health, enhancing immune function, and contributing to the maintenance of a healthy vaginal microbiota.

EFFICACY/APPLICATIONS

Lactobacillus acidophilus contributes to the maintenance of a healthy digestive system by enhancing gut flora balance, reducing intestinal inflammation, and alleviating symptoms of gastrointestinal disorders such as bloating, gas, and abdominal discomfort. It may also help in managing diarrhea, including antibiotic-associated diarrhea, by restoring gut microbiota balance. L. acidophilus may modulate the immune system and enhance the body's natural defense against pathogens. Therefore, L. acidophilus can potentially stimulate the production of antibodies and activate immune cells, potentially reducing the frequency and severity of respiratory infections and other common illnesses.

Safety/Side Effects

Lactobacillus acidophilus is generally considered safe for most people when administered at the recommended doses. It is commonly found in fermented foods, dairy products, and probiotic supplements and has a well-established safety profile. While L. acidophilus is safe in the majority of cases, some individuals may experience mild side effects such as gas, bloating, or an upset stomach. These symptoms are usually temporary and diminish as the body adjusts to probiotics. Individuals with weakened immune systems, severe health conditions, or those on immunosuppressive therapy should consult a healthcare provider before initiating supplementation to mitigate the risk of adverse effects.

Lactobacillus rhamnosus[26-29]

Lactobacillus rhamnosus is one of the most extensively studied and widely used probiotic bacteria, renowned for its health benefits and robustness in surviving the acidic environment of the stomach and presence of bile in the intestines. This resilience enables L. rhamnosus to effectively colonize the gastrointestinal tract, where it exerts numerous beneficial effects on human health. Originating from human intestinal flora, L. rhamnosus has a well-documented history of safe use in foods and supplements, and boasts a variety of health-promoting properties.

EFFICACY/APPLICATIONS

L. rhamnosus is highly effective in treating and preventing various forms of diarrhea, including infectious diarrhea, antibiotic-associated diarrhea, and travelers' diarrhea. It helps restore the natural balance of the gut microbiota, which may be disrupted by antibiotics or pathogens. Furthermore, L. rhamnosus has shown promise in managing the symptoms of irritable bowel syndrome (IBS) and reducing the incidence of gastrointestinal infections. Some studies have suggested that L. rhamnosus may help with respiratory infections and contribute to managing the symptoms of allergic rhinitis. L. rhamnosus enhances the body's immune response by improving the function of mucosal immune cells and increasing the production of antibodies. This immunomodulatory effect can help reduce the frequency and severity of respiratory infections, and may offer protection against allergic conditions.

Safety/Side Effects

Lactobacillus rhamnosus is generally recognized as safe for most people, including infants, children, adults, and the elderly, when consumed in amounts typically found in foods and dietary supplements. It has been extensively researched and utilized in various probiotic products with a long history of safe use. For healthy individuals, Lactobacillus rhamnosus is considered safe and has a low risk of causing adverse effects. Although Lactobacillus rhamnosus is generally safe for most individuals, some may encounter mild side effects including gas, bloating, or diarrhea, particularly during the initial stages of supplementation. These symptoms typically subside as the body acclimates to the probiotic. On rare occasions, individuals with compromised immune systems or severe health conditions may face an increased risk of infections, emphasizing the importance of

consulting a healthcare provider before starting supplementation to ensure safety and suitability.

Bifidobacterium longum[30-33]

Bifidobacterium longum is a well-researched probiotic with a history of safe use in food and supplements. Originating from the human intestine, B. longum is renowned for its ability to withstand gastric acid and bile, enabling effective colonization of the gut. B. longum has been studied for its beneficial effects on intestinal health, immune system support, and allergy relief.

EFFICACY/APPLICATIONS

B. longum is effective in promoting a healthy balance of intestinal flora, contributing to improved bowel movements and alleviation of constipation. It enhances gut barrier function, which can help prevent the translocation of harmful bacteria and toxins across the intestinal lining, thereby reducing the risk of gastrointestinal disorders. B. longum may help alleviate the symptoms of allergies, including allergic rhinitis, by modulating the body's immune response to allergens. It has shown potential in reducing the incidence of allergic reactions, making it a promising adjunct for the management of allergies. B. longum supports the immune system through its actions on the intestinal barrier and gut microbiota. Improved barrier function and a balanced microbiota can help prevent the translocation of pathogens and modulate immune responses, potentially enhancing the body's defense mechanisms against infections and contributing to overall immune health.

Safety/Side Effects

B. longum is considered safe for consumption across different age groups, from infants to the elderly, when taken in appropriate amounts. It has a long-standing history of use in probiotic formulations, without significant adverse effects. Side effects associated with B. longum are rare and typically mild, including digestive discomfort such as gas or bloating at the start of supplementation. The symptoms usually diminish as the body adjusts. However, individuals with compromised immune systems or existing health conditions should consult a health care provider before starting supplementation to ensure safety and appropriateness.

Lactobacillus reuteri[34-39]

Lactobacillus reuteri was originally isolated from the human gastrointestinal tract. L. reuteri is noted for its unique ability to produce reuterin, a compound with antimicrobial properties that inhibits the growth of harmful bacteria. L. reuteri has been the subject of numerous studies highlighting its benefits for gastrointestinal health, dental health, and its role in modulating the immune system.

EFFICACY/APPLICATIONS

L. reuteri has been shown to effectively play an important role in gastrointestinal health, particularly in the treatment of diarrhea in children and adults. It also contributes to the maintenance of healthy gut microbiota and may alleviate symptoms of functional gastrointestinal disorders, such as irritable bowel syndrome (IBS). L. reuteri also exhibits benefits for oral health, including the reduction of plaque accumulation and prevention of dental caries (tooth decay). It has been found to combat the growth of oral pathogens and to promote a healthy balance of microbes in the mouth. L. reuteri has been shown to modulate the immune system, for example by reducing the production of pro-inflammatory cytokines. It stimulates the production of protective antibodies and enhances the activity of immune cells, supporting overall immune health.

Safety/Side Effects

L. reuteri is generally recognized as safe for consumption by people of all ages, including infants, when used in amounts typically found in food and supplements . The long history of its use in probiotic products attests to its safety profile. Side effects are uncommon and usually mild, often limited to temporary digestive discomfort such as gas or bloating. These effects typically occur when the body adjusts to probiotics. However, individuals with compromised immune systems or underlying health conditions should consult a healthcare provider before initiating L. reuteri supplementation to ensure safety and appropriateness.

Oyster Mushroom[40-43]

Oyster mushrooms (Pleurotus ostreatus) are edible fungi that are known for their nutritional value and health benefits. They are rich in proteins, vitamins, minerals, and antioxidants, making them popular dietary supplements.

EFFICACY/APPLICATIONS

Oyster mushrooms have been shown to enhance the immune system by increasing the levels of interferon-gamma (IFN-γ) and interleukin-12 (IL-12), which are crucial for a strong immune response. The addition of oyster mushrooms to the diet significantly increased the intake of dietary fiber, vitamins (such as riboflavin and niacin), and minerals (such as copper, phosphorus, potassium, and selenium). This improves overall nutrient adequacy without affecting energy, carbohydrate, fat, or sodium intake. Consumption of oyster mushrooms has been associated with significant reductions in fasting blood glucose, total cholesterol, triglycerides, and LDL cholesterol in individuals with diabetes, indicating potential benefits for metabolic health and diabetes management. The regular consumption of oyster mushrooms can help reduce visceral fat and improve lipid profiles, making them beneficial for weight management and reducing the risk of obesity-related diseases.

Safety/Side Effects

Oyster mushrooms are generally safe for consumption and well tolerated. However, they can cause allergic reactions in some individuals, particularly in those exposed to mushroom spores. This can lead to respiratory issues such as asthma and allergic alveolitis.

Agaricus Blazei[44-47]

Agaricus Blazei Murill (ABM) is a medicinal mushroom known for its significant health benefits, particularly immunomodulatory and anticancer properties. It is rich in β-glucans, antioxidants, and other bioactive compounds that contribute to its therapeutic effects.

EFFICACY/APPLICATIONS

ABM extract has shown potential in normalizing liver function in patients with chronic hepatitis B. In a 12-month study, patients exhibited significant reductions in alanine aminotransferase and aspartate aminotransferase levels, indicating improved liver health. ABM supplementation improves insulin resistance in patients with type 2 diabetes, and a previous study showed significant reductions in the Homeostasis Model Assessment for Insulin Resistance index and increased adiponectin levels, suggesting better glycemic control and metabolic health. Furthermore, ABM extract exhibits antitumor effects, improving immune function and quality of life in patients with cancer. A study of cancer patients in remission showed significant improvements in both physical and mental health components after ABM supplementation. ABM has also been shown to enhance natural killer cell activity and improve the quality of life of gynecological cancer patients undergoing chemotherapy. Patients reported fewer chemotherapy-associated side effects and improved overall wellbeing.

Safety/Side Effects

ABM are generally considered safe for consumption. However, there have been reports of adverse effects, such as hepatic dysfunction, in cancer patients, indicating the need for caution and monitoring, especially in individuals with liver conditions or those undergoing intensive treatments. The side effects are generally mild and include digestive discomfort, such as nausea and diarrhea.

Turkey Tail[48-55]

Turkey tail, also known as Trametes versicolor or Coriolus versicolor, is a mushroom found growing on dead hardwood trees throughout the world. Despite its name, it is completely vegan and does not contain any animal parts. The mushroom is known for its distinctive layered stripes of brown, tan, gray, and white which can be quite striking. In Japan, it is called "kawaritake" or

"cloud mushroom" due to its resemblance to swirling clouds. In many Asian cultures, turkey tail is believed to symbolize longevity, health, spiritual attunement and infinity.

In Chinese culture, it is known as Tun Zhi and has been used for centuries by practitioners of Traditional Chinese Medicine as an immunomodulator that supports immune function and helps fight infections. Many people brew it into a tea to clear dampness, increase energy, and strengthen the lungs, stomach and spleen. Its ability to support the health of both an underactive and overactive immune system is unique and has long been valued by traditional medicine practitioners.

EFFICACY/APPLICATIONS

Turkey tail is one of the most extensively researched functional mushrooms, known for its natural polysaccharides, such as polysaccharide K (PSK) and polysaccharide peptide (PSP). These protein-bound polysaccharides help to support a healthy immune response and manage inflammation at the cellular level. It also contains a wide range of natural compounds that help to improve stamina and support gut health, which in turn positively impacts the immune system. Turkey tail is rich in antioxidants, including powerful flavonoids and more than 35 phenols, that help to manage inflammation and stimulate the release of immune-supportive compounds. It also contains prebiotics, which nourish the beneficial bacteria in the gut and help to restore a balance of good flora in the gastrointestinal tract, supporting improved digestion and a healthy immune response.

SAFETY/ABSORPTION/METABOLISM

The consumption of up to 9 grams of Turkey Tail mushroom daily for a period of 6 months by women with breast cancer has been found to be well-tolerated and without any significant negative side effects. Turkey tail mushroom products have a long history of safe usage in traditional medicine in East Asia and have been found to alleviate side effects associated with chemotherapy in randomized controlled trials. However, it should be noted that the effectiveness of the mushroom may vary depending on the preparation used.

Maitake[56-62]

The mushroom commonly known as "Maitake" in Japanese translates to "dancing mushroom", so named due to the joyous reactions of those who discovered it in the wild. This mushroom possesses exceptional healing properties and is classified as an adaptogen, which are substances that aid the body in coping with stress and restoring balance to various bodily systems. While it can be used for culinary purposes, it is primarily utilized for its medicinal properties.

Maitake mushrooms are found growing in the wild in certain regions of Japan, China, and North

America, specifically at the base of Oak, Elm, and Maple trees. While it can be cultivated, it typically does not thrive as well as it does in its natural habitat. The mushroom is typically available during the autumn months.

Although maitake mushrooms have been utilized in traditional medicine in Japan and China for thousands of years, it has only recently gained popularity in the United States over the past two decades. It is widely praised for its potential to promote health, vitality, and longevity.

EFFICACY/APPLICATIONS

Maitake extracts are commonly available as dietary supplements that are marketed to improve immune function and to treat ailments such as AIDS and cancer. The active ingredient in these supplements has been identified as beta 1,6-glucan, a protein-bound polysaccharide. Preclinical studies have demonstrated various benefits from maitake extract, including protection against parasites, diabetes, and high cholesterol, hypertension, and inflammation. Additionally, it has been shown to have potential in reducing the growth of tumors, enhancing bone marrow colony formation, reducing the toxicity of a specific cancer treatment, and increasing the activity of a certain protein that helps the body fight off infections. In animal studies, oral administration of the extract has been found to mature certain cells in the blood, improve the recovery of certain blood cells after injury, and protect against suppression of the immune system caused by a specific chemotherapy drug. In small studies, some subjects who took maitake extract had regression of tumors or significant improvements in symptoms. In a small number of trials, oral maitake extract was found to have an effect on the immune system in postmenopausal breast cancer patients and enhance the function of certain immune cells in patients with a specific blood disorder.

SAFETY/ABSORPTION/METABOLISM

The consumption of Maitake mushroom is considered to be generally safe for the majority of individuals, however, limited information is available regarding potential side effects. Some individuals have reported experiencing nausea after consuming Maitake mushroom. The most commonly used form of Maitake mushroom is an extract, which is typically taken orally in a dose of 1-1.5 grams per day for a period of up to 2 years. However, there is insufficient reliable data to determine appropriate dosing for other forms of the mushroom.

Conclusion

Mushrooms have been used in medicine for centuries, particularly in Asia, where they have a long history of safe use in treating various illnesses. Currently, they are being studied for their potential in treating lung diseases and cancer. These powerful mushrooms are packed with antioxidants, polysaccharides, and other unique compounds that may provide a variety of benefits such as enhancement of cognition, mood-boosting, immune-strengthening, stress-relieving, and anti-

aging. Not only are medicinal mushrooms safe to consume, they are also becoming increasingly popular as a natural addition to anyone's wellness routine.

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