



Scientific Evidence for BellaVie STRESS

The BellaVie STRESS symbiotic is a broad-spectrum, high-CFU, multispecies probiotic supplement containing 10 intestinal microbial species, fibre, and supplements, each selected for well-documented supportive health benefits.

The formula has been developed with essential intestinal bacteria to support a more favourable balance of intestinal microbiota.

The formula is completed with fibres and nutraceuticals which work in synergy with probiotics and enhance their activity. BellaVie STRESS also contains vitamins B6 & B9 that contribute to the maintenance of the normal function of the neurological system.

The Link Between Stress and Disease

BellaVie STRESS has a positive effect on stress but also on anxiety and tiredness. Therefore, it's important to understand mood disorders, their causes, and consequences. Stress is a nonspecific response of the body against threatening demands, resulting in anxiety, discomfort, emotional tension, difficulty in adjustment.

The Mechanism of Stress

Stress is caused by a chemical reaction in the brain called cortisol. This hormone will then activate other areas of the brain in response to the perceived aggression, and this will have various repercussions on the metabolism. It is this corticosteroid-like hormone, produced by the adrenal glands, that sends information to the brain and causes stress.

Stress induces increased permeability of the gut allowing bacteria and bacterial antigens to cross the epithelial barrier and activates a mucosal immune response, which in turn alters the composition of the microbiome.

Stress can present itself in many different forms acute stress, vicarious trauma, episodic acute stress, chronic stress, eustress, and burn - out, and depression. The outcomes that are associated with these types of stress are as follows:

Psychological symptoms, emotional symptoms, physical symptoms, behavioral symptoms, neurological symptoms, and cognitive impairment.

Along with these effects, stress can induce many gastrointestinal consequences such as constipation, diarrhoea increased hunger and indigestion, loss of appetite, nausea, and stomach cramps.

The Link between Stress and the Gut: The Gut Brain Axis

The gut is considered as our second brain and is the origin of all diseases. Our gut (through its nervous system) and the brain are connected and constantly exchange information. This is called the "gut-brain axis". **Stress acting through the brain can lead to an alteration in the microbial composition of the gut, but there is increasing evidence**

that the bacteria in the gut can also influence the neurochemistry and behaviour of the brain.

Many studies have shown a correlation between anxiety, depression, and gut microbiota. There is already evidence that psychological stress can increase permeability of the gastrointestinal lining, and conversely, mounting evidence that the microbiome can influence and modulate emotional behavior.

Probiotics and The Reduction of Stress

Gut probiotics play a major role in the bidirectional communication between the gut and the brain. A psychobiotic is a live organism that, when ingested in adequate amounts, produces a health benefit in patients suffering from psychiatric illness.

As a class of probiotic, these bacteria are capable of producing and delivering neuroactive substances such as gamma-aminobutyric acid and serotonin, which act on the brain-gut axis. Psychobiotics can induce changes in human brain networks involved in emotional or cognitive responses.

Bellavie STRESS Capsule Composition

Each Bellavie capsule contains a symbiotic element (Probiotic and Prebiotic) along with a nutraceutical element to give the overall term 'synbioceutical'. Within the probiotic element within the capsule, there are 10 specially selected microorganisms chosen based on scientific evidence outlining their many health benefits.

For the prebiotic element of the capsule, inulin from chicory is used based on its ability to stimulate growth and give a synergistic effect to the probiotics.

For the nutraceutical element of the capsule, vitamin B6 and vitamin B9 are used for their well-documented positive impacts on stress and neurological function.

Probiotics

Each probiotic contained within the Bellavie STRESS capsule is based on scientific research that demonstrates how each probiotic makes a positive impact on immune health. The following facts about each probiotic has been backed up by extensive research and clinical trials.

- **Bacillus Coagulans**
 - *B. Coagulans* was safe for human consumption and efficacious in alleviating overall pathophysiological symptoms of irritable bowel syndrome including anxiety (1).
 - *B. Coagulans* showed robust efficacy for the treatment of patients experiencing irritable bowel syndrome symptoms with major depressive disorder. The improvement in depression and IBS symptoms was statistically significant and clinically meaningful (2).

- **Bifidobacterium**

- The consumption of *B. Longum* is associated with reduced stress and improved memory (3).
- *L. Helveticus* and *B. Longum* taken in combination display beneficial psychological effects in healthy human volunteers (4).
- *B. Longum* reduces depression and increases quality of life in patients with ibs (5).
- *B. Breve* has demonstrated potential in improving anxiety and depressive symptoms in patients with schizophrenia (6).
- Synbiotic nutritional supplements can improve anxiety, stress, and sleep quality, particularly in sportspeople, which appears to be linked to an improved immuno-neuroendocrine response in which il-1 β , crh, and dopamine are clearly involved (7).
- *B. Infantis* is effective in improving mental health of victims who developed irritable bowel syndrom after floods and this is maybe due to restoration of microbial balance and the gut-brain axis (8).

- **Lactobacilli**

- The daily consumption *L. Casei* preserves the diversity of the gut microbiota and may relieve stress associated responses of abdominal dysfunction in healthy subjects exposed to stressful situations (9).
- Daily consumption of *L. Casei* may help to main maintain sleep quality during a period of increasing stress (10).
- Probiotic administration in patients with major depressive disorder for 8 weeks had beneficial effect on beck depression inventory (11).
- Daily probiotics supplementation may have the potential to modulate the brain waves namely, theta (relaxation) and delta (attention) for better training, brain function, and psychological improvement to exercise (12).
- *Lactobacillus casei* was able to modulate the number of lymphocytes and cd56 cells in subjects under academic examination stress (13).
- *L. Paracasei* has the potential to improve resistance to common cold infections in susceptible subjects and maintain a desirable mood state, even under mental stress conditions (14).

- The intake a beverage fermented with *Lactobacillus plantarum*, *Lactobacillus paracasei* and *Lactobacillus brevis* suggests a modulation of gut microbiota and possible reduction in stress-related symptoms in university students, without changing their lifestyle or diet (15).
- *Lactobacillus plantarum* could be applicable as a natural strategy to improve psychological functions, cognitive health and memory in stressed adults (16).
- *L. Plantarum* is a feasible and natural intervention for the alleviation of selected stress, anxiety, memory and cognitive symptoms in stressed adults (17).
- Augmentation of ssri treatment with *Lactobacillus plantarum* improved cognitive performance and decreased kynurenine concentration in major depressive disorder patients. Decreased kynurenine concentration could contribute to the improvement of cognitive functions (18).
- Women who received *L. Plantarum* had significantly lower depression and anxiety scores in the postpartum period (19).

Prebiotic

Prebiotics are needed to provide nutrients to create an optimal environment and support the growth of the probiotics. Inulin was chosen as the prebiotic for this capsule as inulin increases the number of good bacteria in the gut, particularly *Bifidobacterial* and *Lactobacilli*.

The fibre in inulin is soluble, which means it dissolves in water and in the stomach and forms a gelatinous substance. Some of the functions of inulin include:

- Facilitates & slows digestion which enables the body to better absorb nutrients from the food.
- Helps modulate the immune system.
- Reduces cholesterol absorption as it passes through the digestive tract.
- Provides the body with nutrients and active elements.
- Facilitates the absorption of calcium and magnesium.
- Can be fermented into lactate and short chain fatty acids which impact the way energy is metabolised in the body and provides a protective effect against metabolic diseases and obesity.

Nutraceutical

Nutraceuticals are natural health supplements recognized for their effects on targeted functions. The Bellavie STRESS cap contains vitamin B6 and B9 as they are known for the beneficial roles that they play neurological function.

- **Vitamin B6**

- Vitamin B6 is an essential water-soluble vitamin that cannot be synthesized by the body. It is known to be essential for the **synthesis of certain neurotransmitters** such as **adrenaline, dopamine and serotonin, a mood mediator**.
- Vitamin B6 also **facilitates the synthesis of taurine, a calming agent that allows the body to adapt to a stressful situation and reduce its consequences**.
- Vitamin B6 is associated with magnesium, **particularly to fight against fatigue and stress**. In fact, the activation of vitamin B6 is dependent on magnesium

The European Food Safety Authority (EFSA) has validated that the nutritional intake of vitamin B6 has demonstrated health benefits by:

- Contributing to reducing fatigue and asthenia.
 - Normal energy metabolism.
 - Normal protein and glycogen metabolism.
 - Normal functioning of the nervous system.
 - Normal functioning of the immune system.
 - Regulation of hormonal activity.
- **Vitamin B9**
 - Vitamin B9 is a water-soluble vitamin that can be synthesized by plants and microorganisms. It plays an essential role in the production of genetic material (DNA, RNA) and amino acids necessary for cell growth.
 - Plays an important role in the formation of red blood cells, the functioning of the nervous system and the immune system, as well as in the healing of wounds and sores.
 - Reduces high blood pressure.
 - Reinforces the action of antidepressants.
 - Slows cognitive decline.
 - Participates in the synthesis of certain neurotransmitters: serotonin or acetylcholine.

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