

Bacillus subtilis

Probiotic Powder: *Bacillus subtilis* BS-GA28

Description:

BS-GA28 powder is a probiotic additive, containing *Bacillus subtilis* BS-GA28 and a dilution carrier (such as glucose anhydrous etc.). The *Bacillus subtilis* BS-GA28 is a bacteria with the below character:

Kingdom: Bacteria

Division: Firmicutes

Class: Bacilli

Family: Bacillaceae

Genus: Bacillus

Species: *Bacillus subtilis*

Gram-positive, Catalase-positive, with the spore form, Rod-shaped, metabolism prefers mesophilic temperature and aerobic condition. It is widely found in the outside environments, but also in animal and human bodies. The spore formed *Bacillus spp* have good resistance to in different environments; it can be stored for long periods of time at 60°C temperatures, and can even survive 20 minutes exposure to temperature above 120°C when the spore form is in stable condition. The animal/human gastric, water or humidity etc. can help to transfer the bacteria from spore form to active status. The *Bacillus* bacteria is using its vegetable cell which is composed of peptidoglycan to coordinate this inactive/active metabolism.

Bacillus subtilis is studied and used for long time, even before antibiotic discovery. Based on study results, the metabolism of the *Bacillus subtilis* has the following functions:

- ♦ Oxygen consumption by aerobic metabolism to help support the other anaerobic bacteria, especially the friendly lactic acid bacteria to grow up, the further metabolism from the lactic acid bacteria can also produce more organic acid to compete and inhibit the pathogens growing up.
- ♦ Enzyme production ability: the *Bacillus spp* is able to produce several types of enzymes, such as α -amylase, protease, lipase, cellulose etc., These enzymes can work together with other enzymes from animal/human bodies.
- ♦ Vitamins and anti-bodies production ability: *Bacillus subtilis* is able to produce sufficient amounts of vitamin B as well as different types of antibodies which have antibiotics-like functions (such as Chitinase, Gramidicin, Polymycin, Nystatin etc.). They have a good symbiosis with natural nutrition supplements as well as natural antibiotics.

Due to the strong surviving ability as well as its comprehensive metabolism ability, in the past years *Bacillus spp* has been widely used in the enzyme industry, animal nutrition and health, environment control, detergents, water cleaning etc. It is approved in EFSA-QPS list as well the US-GRAS list.

**Applications:**

- 1) Medication, Health Care, Dietary Supplements, in forms of capsules, tablet, sachets/strips, drops etc.
- 2) Animal nutrition products; Animal feed.
- 3) Animal feed starter cultures; Aquaculture feeds
- 4) Water treatment
- 5) Plant protection
- 6) Environment protection, waste degradation etc.

Health Benefits:

- (1) Enzyme production
- (2) Boosts the friendly lactic acid bacteria development
- (3) Vitamin production
- (4) Natural antibiotics, antibodies production
- (5) Help with the digestion; Promotes better absorption
- (6) Inhibits the pathogens to develop

Ingredients:

Bacillus subtilis BS-GA28
Carriers

Standard Specification:

5.0×10^{11} CFU/g
Overage potency provided.

Specification:

Items	Specification
Appearance	Yellow or brown powder
Genetic Identification	16s-rRNA method etc.
Strains IDA Deposit	CCTCC M 2015442
Live <i>Bacillus subtilis</i> potency	$\geq 5.0 \times 10^{11}$ CFU/g
Water content	$\leq 10.0\%$
Granularity	All through 1.25mm analysis sieve, not more than 10% above in the 0.80mm analysis sieve.
Solubility	Water soluble

Package: 5kg/Aluminum foil bag

Shelf life: 24 months in room storage, closed condition, avoid sunlight.

Safety Concerns:

The application of *Bacillus spp* is still in the documenting phase; The main concerns are with:

(1) Antibiotic and antibiotic resistance. Unlike the other friendly bacteria, the DNA analysis studies showed that there is some risks for the mobile plasmids from the *Bacillus spp* to transfer the antibiotic resistance to other microbes, especially the *Coccus spp* and *Coliforms*.

(2) *Bacillus spp* is not easy to be sterilized. Although *Bacillus* can be widely found in the environment not all the *Bacillus spp* has the probiotic character. The production control for the *Bacillus spp* must be very cautious to avoid the cross-contamination.

(3) Due to some special enzyme and antibody production abilities, some *Bacillus spp* might be used as a genetically engineered bacteria; if used as probiotic it is essential to demonstrate its non-GMO status.

Allergen List:

Allergen List EU Directive 2000/13	Presence or not
Cereals containing gluten (i.e. Wheat, rye, barley, oats, spelt, Kamut or their hybridized strains) and products thereof	no
Crustaceans and products thereof	no
Eggs and products thereof	no
Fish and products thereof	no
Peanuts and products thereof	no
Soybeans and products thereof	no
Milk and products thereof(including lactose)	no
Nuts i.e. Almond (<i>Amygdalus communis</i> L.), Hazelnut (<i>Corylus avellana</i>), Walnut (<i>Juglans regia</i>), Cashew (<i>Anacardium occidentale</i>), Pecan nut (<i>Carya illinoensis</i> (Wangen h.) K. Koch), Brazil nut (<i>Bertholletia excelsa</i>), Macadamia nut and Queensland nut (<i>Macadamia ternifolia</i>) and products thereof	no
Lupin and products thereof	no
Molluscs and products thereof	no
Celery and products thereof	no
Mustard and products thereof	no
Sesame seeds and products thereof	no
Sulphur dioxide and sulphites at concentrations of more than 10 mg/kg or 10mg/litre expressed as SO ₂	no

Note:

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