EXPANDING PROBIOTIC POSSIBILITIES

DE111 provides a host of benefits for digestive and immune health, crowding out bacterial pathogens and maintaining healthy gut flora.

What is DE111®?

DE111 is a strain of the probiotic *Bacillus subtilis*. The *Bacillus subtilis* species of microorganism has been known for almost 100 years, having first been isolated and described in 1915. It is considered to be a normal inhabitant of the gut in animals and humans[1].

Supporting Digestive and Immune Health

The human body carries nearly 100 trillion bacteria in the gut ... that's more than 10 times the total number of human cells in the entire body. Probiotics are those "good" bacteria that help keep the intestines healthy and assist in digestion and nutrient absorption. Researchers are also finding evidence that certain bacteria in the gut influence the development of aspects of the immune system[2,3]. In fact, the gut accounts for 25% of the immune cells in the body which provides 50% of the body's immune response.

The probiotic benefits of *Bacillus subtilis* for digestive and immune health include:

- Crowds out bacterial pathogens and maintains healthy gut flora[4,5]
- Supports the normal immune reaction of intestinal cells[6,7]
- Communicates with intestinal cells to maintain the gut barrier's function[8]
- Can persist in the GI tract, increase its numbers and then re-sporulate[9]

Deerland Probiotics & Enzymes

QUALITY CERTIFICATIONS

- Kosher
- Non-GMO Project Verified
- Health Canada approved (NPN 80077102)
- Non-Novel Food status, Health Canada
- GRAS Status: FDA No-Objection Letter

PRODUCT APPLICATIONS:

- Supplement Capsules, Tablets and Bulk Powder Blends
- Stick Packs
- Gummies
- Food and Beverage

INDUSTRY APPLICATIONS:

- Digestive Health
- Immune Health
- Sports Nutrition
- Pets

STABILITY ADVANTAGE: SPORE FORMING PROBIOTICS

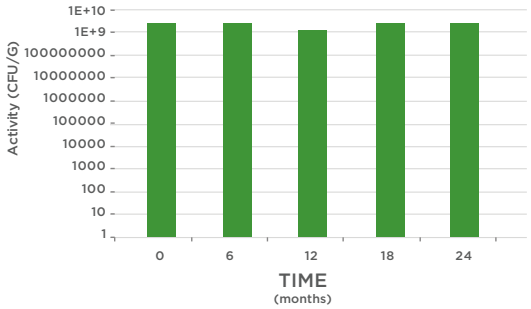
Spore forming bacteria are a diverse group of very hardy bacteria, characterized by their ability to form endospores to protect themselves in varying conditions such as high temperatures and the acidic environment of the gut.

Bacillus subtilis has the ability to form spores that protect the microbes from harsh conditions until they enter an environment ripe for germination, such as the GI tract. This means that DE111 remains viable under a wide temperature range, and doesn't require refrigeration[10]. It also survives passage through the acidic environment of the GI tract[11] While all spores are hardy, different strains thrive under varying conditions, and at different rates of growth. *Bacillus subtilis* grows quickly under physiological conditions, while some other spores grow best in temperatures below that of human body.

Because DE111 remains viable under a wide temperature and pH range, the probiotic is ideal for use in supplements, foods and beverages. In stability testing, DE111 experienced virtually no loss of colony forming units (CFU) over 24 months, when stored at room temperature (25°C).

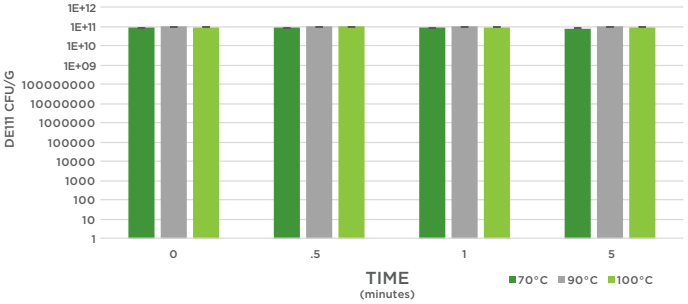
DE111 can also stand up to food and beverage processing and storage.

DE111 Shelf Stability



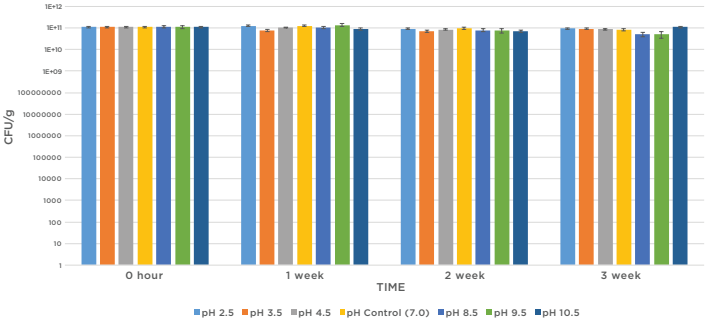
DE111 remains stable over 24 months at 25°C and 40% relative humidity.

DE111 Temperature Stability



DE111 viability is maintained under temperatures up to 100°C for up to 5 minutes.

DE111 pH Stability



DE111 viability is maintained under a wide pH range for a period of three weeks.

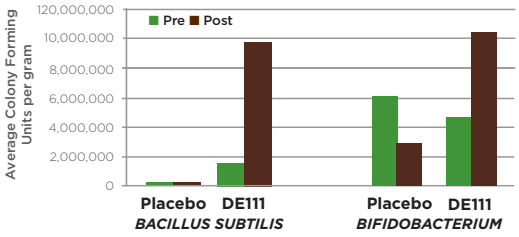
CLINICAL RESULTS: SAFETY AND EFFICACY

More than 30 studies have been performed to confirm the safety and efficacy of *Bacillus subtilis* DE111. A full genome sequencing confirmed the strain contained no plasmids, antibiotic resistant or deleterious genes. The genome sequence of DE111 has been uploaded to GenBank, the National Institutes of Health genetic sequence database.

Multiple human clinical studies support DE111's benefits to digestive and immune health, and Deerland is committed to continuously conducting additional studies. All studies are IRB-approved, double-blind, randomized and placebo controlled.

SUPPORTS DIGESTION

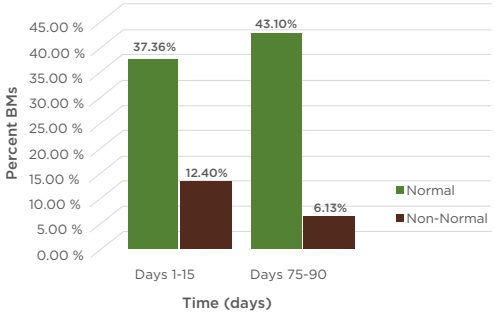
BACILLUS SUBTILIS & BIFIDOBACTERIUM



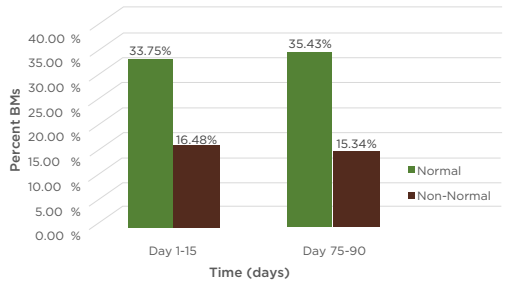
Subjects who were administered the placebo demonstrated a slight decrease in intestinal levels of the probiotics *Bacillus subtilis* and *Bifidobacterium*, while those who were administered DE111 experienced a significant increase.

SUPPORTS REGULARITY

DE111



PLACEBO



HUMAN CLINICAL STUDY: SUPPORTS DIGESTION

A clinical study evaluating the effect of DE111 on digestive health resulted in a significant influence on gut microflora measured prior to and after capsule consumption (5 billion CFU). Fecal samples showed an increase in the levels of *B. subtilis* and *Bifidobacterium* (good bacteria), and a slight decrease in levels of *E. coli* (bad bacteria). DE111 was also able to maintain healthy levels of cholesterol, glucose and triglycerides, indicating that DE111 supports the normal breakdown of complex carbohydrates, sugars and fats.

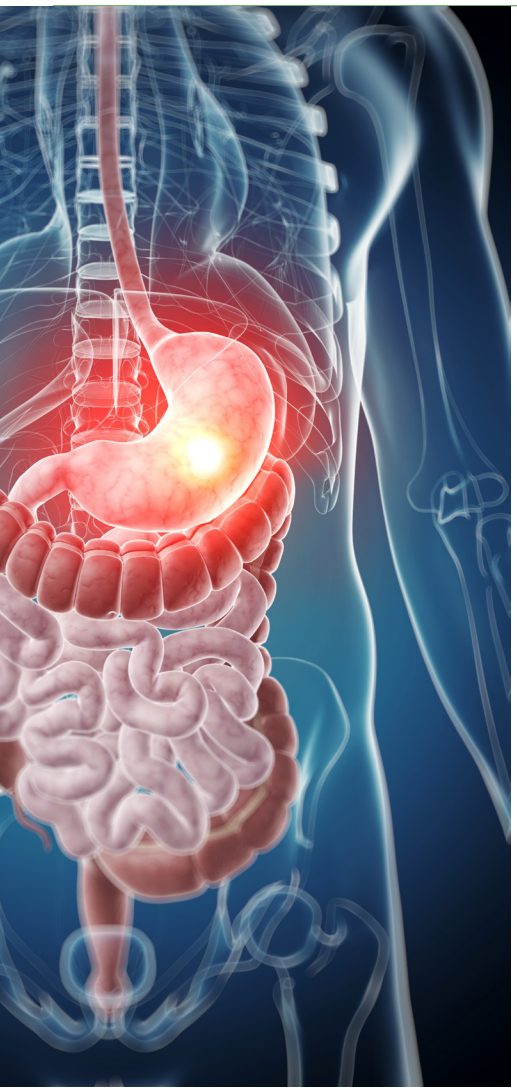
HUMAN CLINICAL STUDY: SPORTS PERFORMANCE, BODY COMPOSITION AND RECOVERY

In a study involving female collegiate athletes during offseason training, researchers found that DE111 (1 billion CFU), in conjunction with a protein drink supplement, can improve body composition and indices of athletic performance. The results of the study showed that compared to the placebo, the probiotic DE111 produced statistically significantly improvements in the reduction of body fat percentage, and a strong trend indicating improved performance of the deadlift exercise.

In a study involving male collegiate athletes during offseason training, researchers found that DE111 (1 billion CFU), in conjunction with adequate post-workout nutrition, can promote tissue recovery and reduce likelihood of injury. The results of the study showed that compared to the placebo, the probiotic DE111 produced a statistically significantly reduction of tumor necrosis factor alpha (TNA-α).

HUMAN CLINICAL STUDY: SUPPORTS REGULARITY

A clinical study showed a reduction of alternating constipation and diarrhea for the participants taking DE111 (1 billion CFU) when compared to participants taking the placebo. The proportion of normal stools (types 3 and 4) increased from 37% to 43% in the DE111 group, while the proportion of normal stools in the placebo group remained the same. In male participants specifically, the proportion of normal stools increased from 56% to 80%. In addition, a significant difference between the DE111 and placebo groups was observed in regards to normal and non-normal stool proportions in the 30+ age group.



References:

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