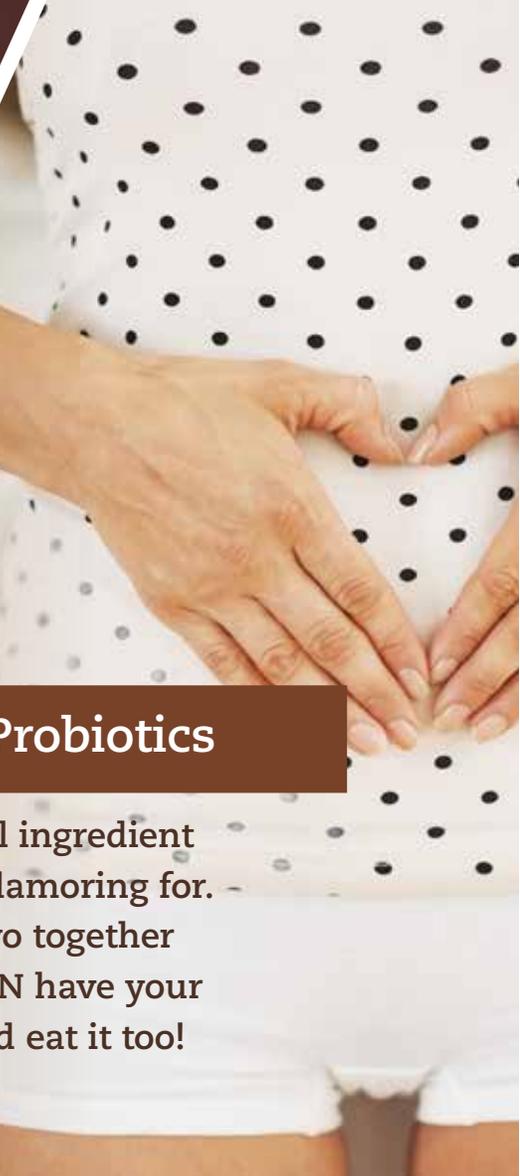


CHOCOLATE + PROBIOTICS

A sweet delivery system
with a bounty of health benefits





Rich, Luscious Chocolate

It's the most decadent dessert. And the average American consumes nine and a half pounds of chocolate each year.

Healthy Probiotics

A beneficial ingredient people are clamoring for. Put the two together and you CAN have your dessert and eat it too!

Dark Chocolate - Good for You!



If you pair dark chocolate with probiotics, you get two great things that go great together.

What makes chocolate so healthy? The answer lies with the flavonoids. Flavonoids are the phytonutrients in plants which give them their colors. Chocolate gets its flavonoids from the brown cocoa bean.

When it comes to chocolate, the darker the better. This is because dark chocolate has a higher percentage of cacao - which is where the flavonoids reside.

The flavonoids in cacao have been shown in studies to have positive effects on blood pressure, cholesterol, diabetes risk, and inflammation. Also, dark chocolate is high in magnesium. Magnesium supports heart health.

Dark chocolate also can help with weight loss! It helps people feel fuller so they eat less. (Milk chocolate, on the other hand, has a higher sugar content. It may make people eat more.)

Consumers know they crave sweets. When they replace cookies, donuts, candy bars (or anything else sweet), with dark chocolate, they feel better. This may explain why chocolate consumption is growing about 5 percent a year, according to a report by Candy Industry .



The global probiotic supplements market is projected to expand at a staggering 15.4% CAGR through 2027.

Future Market Insights

Probiotics – A Health Booster

Probiotics are bacteria. But not just any bacteria. They're beneficial bacteria your body needs for proper digestion.

Probiotics are found in many foods such as yogurt, kefir, sauerkraut, tempeh, and kimchi. They can also be taken as supplements.

Although both foods and supplements are efficient ways to get these good bacteria, foods with probiotics appear to be preferable to supplements, according to a study done in 2016.

Consumers are familiar with probiotics. They know probiotics are good for their gut and are actively seeking foods with probiotics in them. In fact, the global probiotic supplements market is projected to expand at a staggering 15.4% CAGR through 2027, according to a report by *Future Market Insights*.

Functional Foods vs. Supplements

Creating a functional food, instead of just popping pills, is preferred for three reasons:

- 1. Pill fatigue.** Pill fatigue is driving innovation in functional foods, according to a recent article in *Nutra-Ingredients*. Pill fatigue can cause people to stop taking pills due to the monotony and stress of swallowing a lot of pills.
- 2. Increasing Consumer Demand.** Since 1998, consumers have wanted functional foods – foods that confer a health benefit, seem natural, are easy to understand, and relate to their own needs.
- 3. A Broader Marketplace.** The market for functional foods is increasing as personalization and fragmentation create more opportunities for innovation.

One of the growing functional food sub-markets is for snacks and desserts. Convenience stores are taking much of Millennials' "share of stomach," according to a 2017 study by *Nutraceuticals World*. And Millennials want healthier choices. They want healthier grab-and-go options, and are willing to pay a premium for them.



Millennials want healthier grab-and-go options, and are willing to pay a premium for them.





TEAM UP PROBIOTICS WITH CHOCOLATE TO ATTRACT SPORTS ENTHUSIASTS

Probiotics help improve digestion. Especially the absorption of amino acids from protein that help athletes develop muscle growth. They also help strengthen the immune system. Sports enthusiasts know this and are seeking out products with probiotics.

Cocoa, in dark chocolate, contains antioxidants and helps inflammation. Both benefit athletes. Cocoa also helps blood flow, according to a study published in the *Journal of the American Heart Association*. Improved blood flow means blood vessels open up so blood pressure goes down. This increases the distance athletes can go - sometimes by as much as 11%.

Blending Chocolate & Probiotics for Better Health

Chocolate makes up a large part of the rising snack and dessert market. And, research suggests chocolate and probiotics really do go well together. This is because of the beneficial bacteria that live towards the end of the digestive tract. This bacteria ferments both the antioxidants, and the fiber, in cocoa.

This fermentation creates anti-inflammatory compounds. These compounds are linked to cardiovascular benefits, as well as improving vascular function, and increasing insulin sensitivity. These benefits help old and young alike.

Combining certain probiotics with chocolate multiplies the benefits of chocolate. This is because these probiotics work best at the end of the digestive tract. They crowd out bad bacteria and replace them with good bacteria. More friendly bacteria aids the cocoa fermentation process.

11%

ATHLETE-SPECIFIC CLINICAL RESULTS WITH DE111:

Regulates microbial populations in the gut.

Improves digestion of dietary fats and complex carbs.

Aids in the digestion of fats and sugars into beneficial small chain fatty acids.

Contains genes that produce butyric acid, a fatty acid that supports the health of the large intestine.

Has shown the ability to adhere to intestinal cells.

Contains genes that support the body's production of antibodies.

Produced statistically significant improvements in the reduction of body fat percentage.

Strong trend in improving weight training results.





Creating Products with Chocolate & Probiotics

One of the challenges of working with functional foods is that many nutraceutical ingredients can't handle the production process. Chocolate manufacturing can be complicated. It requires both heat and pressure – processes which make most probiotics inert.



However, there is another probiotic option. A strain with a tough “outer shell”. This shell protects the live bacteria from harsh conditions until it reaches an environment ripe for germination...the digestive tract.

This probiotic strain is called *Bacillus subtilis*. *Bacillus subtilis* has been studied since 1835. It's a friendly bacteria that's found in the GI tract of most animals and humans.

Bacillus subtilis is a probiotic that can fit into your current manufacturing process. It stays stable and viable on the shelf AND through heat and pressure treatments.

Bacillus subtilis DE111® is available from Deerland Probiotics & Enzymes

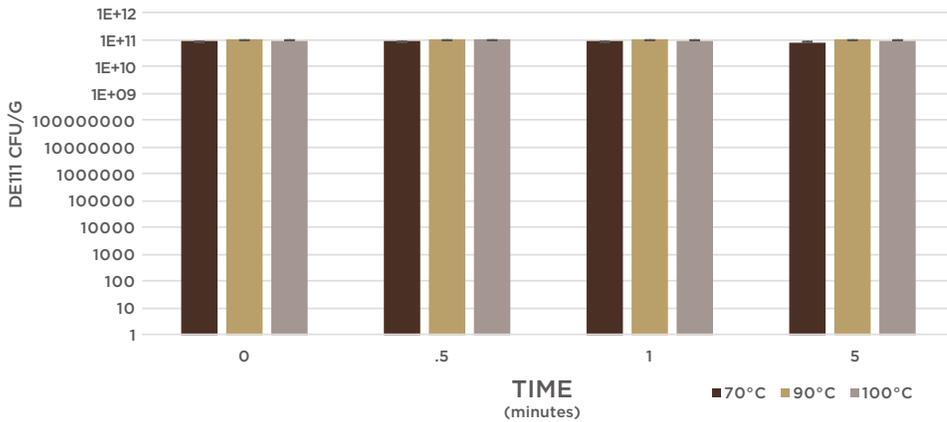
DE111 is a strain of *Bacillus subtilis* that's very stable. It promotes the growth of good bacteria and crowds out bad bacteria. It's been studied in vitro and in human clinical trials. It's also been genome sequenced for safety.

DE111 is an ideal addition to functional foods:

1. **Safe.** Genome sequenced and uploaded to GenBank.
2. **Efficacious.** More than 30 studies and three human clinical trials confirm benefits for digestive and immune health.
3. **Hearty.** Remains viable under a wide temperature and pH range.
4. **Stable.** Long shelf-life, no refrigeration necessary.
5. **Certified.** Non-GMO Project verified, Kosher and approved in Canada as a non-novel food.



DE111 Temperature Stability

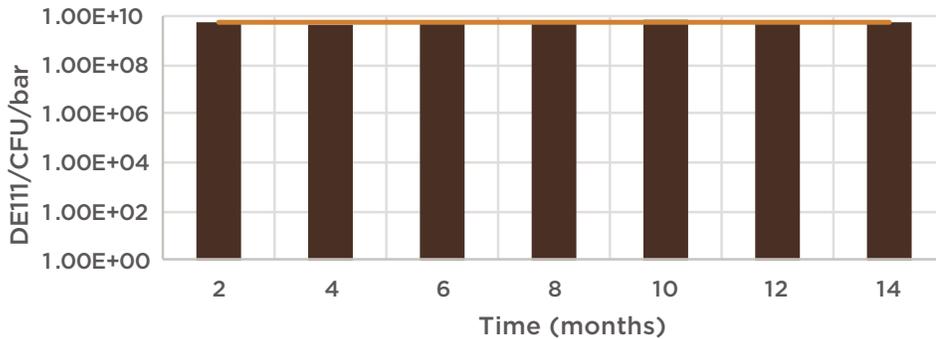


DE111 viability is maintained under temperatures up to 100°C for up to 5 minutes.



DE111 is a strain of *Bacillus subtilis* that's very stable. It promotes the growth of good bacteria and crowds out bad bacteria.

DE111 Chocolate Shelf Stability



DE111 viability is maintained in a chocolate bar for a period of 14 months, stored at room temperature.*

*Various chocolate formulations and manufacturing processes require individual stability testing.

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To learn more about *Bacillus subtilis* DE111 - and how it can help you sweeten up the possibilities for probiotics - contact Deerland Probiotics & Enzymes.

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