

DIGESTIVE HEALTH



Inside Out Digestive Health Solutions

Explore the cutting-edge microbiome solutions revolutionizing digestive health support. Discover how these scientifically validated ingredients enable you to deliver the innovative dietary supplements and food and beverage formulations consumers demand.



Probiotic Functionality for Food & Beverages





Microbiome Solutions ES1 Probiotic

READ NOW



BPL1[™] Postbiotic





PROBIOTIC FUNCTIONALITY FOR FOODS & BEVERAGES



Good Health Starts in the Gut

The demand for functional foods and beverages is a growing trend as consumers seek convenient and tasty ways to support their overall health. The probiotic DE111[®] can enhance a food or beverage by bringing wellness attributes to the forefront of your product.

WHAT IS DE111®?

Stable under a range of temperatures, pH changes, and water activity, DE111[®] is a clinically studied strain of *Bacillus subtilis* that safely and effectively adds in-demand digestive and immune functionality to a variety of applications.

DE111[®] has a protective shell which keeps the spore dormant under unfavorable conditions. This strong shell allows it to withstand the rigors of food and beverage processing, remain on the shelf for extended periods of time, and withstand stomach acid until it reaches the right conditions for germination – the intestines, where nutrients are absorbed.

BACILLUS SUBTILIS: HISTORY OF USE

Bacillus subtilis is a soil-based organism and is naturally occurring in the gut of most animals and humans. It has been consumed for centuries in Japan through the pantry staple natto, sticky fermented soybeans. *B. subtilis* is one of the first bacterial species to be studied, having been first isolated and described in 1872.

DE111[®] can enhance a food or beverage by bringing wellness attributes to the forefront of your product.

DE111[®] is stable under a range of temperatures, pH changes, and water activity.



More Applications, More Benefits

Probiotics were popularized in the dairy category, but with the advancements of spore-forming probiotics like DE111[®], a wide range of applications can now benefit from the addition of probiotics.



ACCEPTABLE HEALTH CLAIMS FOR DE111®*:

- Contains probiotic cultures
- Supports healthy gut function
- Promotes digestive health
- Supports regularity
- Supports immune health
- Supports exercise recovery
- Supports digestive and immune health in young children

*Label claims are based on a minimum of 1 billion CFU at the end of shelf-life, and require prominently displayed disclaimer: When consumed daily as part of a balanced diet and healthy lifestyle

WHY CHOOSE DE111® PROBIOTIC?

Backed by Clinical Science

DE111[®]has been extensively studied in clinical trials, which have demonstrated positive effects on digestive and immune health parameters in adults and young children, as well as factors related to muscle recovery.

Fast Benefits

DE111[®] grows quickly and most optimally at 37°C (body temperature), while some other spores grow best at temperatures above or below the human body, taking up to 72 hours to begin growing. The sooner it grows, the greater the likelihood for functional benefits.

Cost Efficient

Per serving, the cost of adding a clinically supported amount of DE111[®] to food and beverage products is more effective than many other spore probiotics on the market.

Application and Stability Support

QPS Listed (EU)

The probiotic experts at ADM will work with you through the technical aspects of adding DE111[®] to your products, including CFU and stability testing.

Certified & Notified

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DE111[®] is supported by more than 30 safety and efficacy studies, and is:

• FDA-Notified GRAS ingredient

Non-GMO Project Verified

- Certified Kosher and Halal
- Organic
 - Health Canada Non-Novel Food

DE111® is available as a powder in 5kg and 25kg drums

Options include: DE111[®] FiN (organic inulin carrier), and DE111[®] FB (organic maltodextrin carrier).

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MICROBIOME SOLUTIONS ES1 PROBIOTIC



The Importance of a Healthy Gut

Today's consumers have a great understanding of the connection between gut health and overall wellness. Gut health is a key driver for consumers as pre-clinical and clinical research continues to show that the gut microbiota has important influence on overall health, including digestive health, mental health, immune health and more.

Now more than ever, consumers are turning to probiotics to support their gut health. Over half of consumers have added probiotic-enriched food or supplements to their regimen.¹

A NEW ERA FOR DIGESTIVE HEALTH

ADM's science-backed, exclusive *Bifidobacterium longum* CECT 7347 (ES1) probiotic represents an entirely new era of digestive health, featuring the ability to reduce irritable bowel syndrome symptoms from moderate to mild in 12 weeks and significantly improve bowel habits.

Our gold-standard science shows our ES1 probiotic from the ADM line of microbiome solutions is an ideal solution for digestive health formulations. ES1 probiotic supports not only digestive health, but has also been shown to provide a significant reduction in stress as well as self-reported quality of life improvements including reduced dysphoria, an improved body image and more. 78% of consumers understand the link between digestive health and overall health¹

More than half of consumers consider digestive health the key reason to start taking probiotics¹

51%

of consumers have used probiotics in the past 12 months to address their digestive health¹

¹FMCG Gurus, (2022) Global Digestive Health Survey



One Supplement for Numerous Digestive Health Benefits

ES1 is backed by gold-standard human clinical trials. Pre-clinical trials and human clinical trials demonstrate support for digestive health and microbiome-modulating effects of this strain.^{2,3}

The digestive health and microbiome-modulating effects of *Bifidobacterium longum* CECT 7347 ES1 may support:

- Digestive health
- Overall gut health
- In-vitro data suggests gut microbiome modulation
- Gastrointestinal health in gluten-sensitive individuals

Participants with moderate IBS-D (Irritable Bowel Syndrome with Diarrhea) who consumed ES1 probiotic reduced their IBS-SS score from moderate to mild in 12 weeks.

- ~3x better IBS-SS score
- Significant reduction of occasional diarrhea (65.8%)
- Significant improvement in digestive comfort (34%)

Unlike other digestive health aids, ES1 probiotic was also shown to provide:

• Significant reduction in stress versus placebo

Composition: Bifidobacterium longum ES1 probiotic Concentration: 100B CFU/g

CERTIFICATIONS

- QPS Listed
- GRAS
- Non-GMO
- Gluten Free
- Kosher
- Halal





THE SCIENCE BEHIND ES1

Our exclusive ES1 probiotic is ideal for dietary supplements and is comprised of *Bifidobacterium longum* ES1, which is a probiotic strain isolated from a healthy breast-fed infant.

Pre-clinical trials and human clinical trials have demonstrated—via both primary and secondary endpoints statistically significant results for supporting digestive health, including:^{4,5,6}

- Reduction of occasional diarrhea
- Improved quality of life
- Increased digestive comfort
- Microbiome-modulating effects

Consumers supplementing their diet with ES1 may experience digestive health benefits including:

- Approximately three times better IBS-SS (Irritable Bowel Syndrome Severity Scale) score (versus placebo)
- 59.56% reduction of IBS-SS score after 84 days of use

And, participants with moderate IBS-D (Irritable Bowel Syndrome with Diarrhea) who consumed ES1 probiotic reduced their IBS-SS score from moderate to mild in 12 weeks.

Dosage: 1bn CFU/day



Change in mean IBS-SSS total score in the two groups at Day 28,56,84. The mean change in IBS-SSS total scsore compared to baseline scores for each treatment group on Days 28, 56 and 84 are presented. Error bars represent the SD. p-values were calculated using paired t-test(T).







Change in the mean IBS-QoL total score in the two groups. The mean change in IBS-QoL total score compared to baseline for each treatment group on Days 28, 56 and 84 are presented Error bars represent the SD. p-values were calculated usinng paired t-test (T).

P=0.0017 P=0.0001 P=0.0001 P=0.0001 P=0.0024 P=0.0001 -H -40 STAI-AD S-Anxiety Score 30 (Mean ±SD) 20 10 0 Day 28 Day 56 Day 84

Mean reductions in S-Anxiety score compared to baseline are presented. Error bars represent the SD and p-values were calculated using paired t-test (T).



Change in the mean APS-NRS total score in the two groups.

APS-NRS, Abdominal Pain Severity-Numeric Rating Scale; ES1 Bifidobacterium longum (group 2); SD, standard deviation.

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SELF-REPORTED RESULTS OF IMPROVED QUALITY OF LIFE

In an IBS-QOL (Irritable Bowel Syndrome Quality of Life) questionnaire, participants who consumed *Bifidobacterium longum* ES1 reported significant improvements to their overall well-being against a placebo. Improvements included:

Dysphoria was reduced

Body image was improved by 132%

Food avoidance was reduced by



Interference with

Health worry was reduced by



Celiac & Gluten Intolerance Studies



In a double-blind, randomized, placebocontrolled intervention trial to evaluate the effects of *Bifidobacterium longum* ES1 in 33 children with newly diagnosed celiac disease following a gluten-free diet, participants saw:⁴

- Decreased immunological parameters such as CD3+ T lymphocytes
- Reduced numbers of the unwanted bacteria Bacteroides fragilis (P=0.020) and the concentration of secretory IgA in stools (P=0.011) compared to the placebo group⁴

Inhibuts growth of C. difficile⁵ and decrease B. fragilis.⁴



*compared to baseline

In a human clinical study in healthy adults observing the effects of ES1 symptoms attributable to non-celiac gluten sensitivity (NCGS), when ES1 supplements were combined with a gluten-free diet, participants experienced *Bifidobacterium longum* ES1 inhibiting the growth of *C. difficile* and decrease in *B. fragilis*:³

Dosage: 1bn CFU/day

In regard to their non-celiac gluten sensitivity (NCGS) symptoms, participants saw improvements in their:

- Abdominal pain
- Constipation
- Feelings of incomplete evacuation
- Swelling

² Genovés, S., et al. (2016) Nutrafoods. 15: 157–160

³ Di Pierro, F. et al. (2020) Minerva Gastroenterol Dietol. DOI:10.23736/S1121-421X.20.02673-2

⁴ Olivares, M., et al. (2014) Br J Nutr. 112: 30-40

⁵ Sanz, Y., et al. (2009) Patent WO 2009/080862 A1





MICROBIOME SOLUTIONS ES1 PROBIOTIC



Cutting-Edge Microbiome Solutions

Through pre-clinical discovery and clinical validation, ADM has the depth and breadth of expertise to support our growing range of microbiome solutions, including *Bifidobacterium longum* CECT 7347 (ES1).

ADM MICROBIOME SOLUTIONS

Our premier and comprehensive line of microbiome modulating solutions includes pre, pro and postbiotics, alongside bacteriophages and enzymes. Powered by consumer demand, and fueled by gold-standard science, our portfolio gives you the microbiome solutions of tomorrow, today, with the science to support consumers on their wellness journey.

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ADM DELIVERS FOR YOU

An innovative leader in the microbiome field, ADM delivers future-forward nutrition fueled by science, with a complete range of solutions from prebiotics, to probiotic and postbiotic strains, all clinically documented to deliver health & wellness benefits.

An expansive pantry of health & wellness ingredients including biotics, botanical extracts, vitamins, minerals and more means you can deliver innovative, science-driven supplements and food and beverage formulations to meet consumers' evolving functional nutrition needs. With our vertically integrated supply chain to ensure the reliability and availability of high-quality products and our dependable customer service, you get industry-leading quality solutions to ensure your success.

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MICROBIOME SOLUTIONS BPL1[™] POSTBIOTIC



Metabolic Wellness: Consumers Weigh Their Options

What it means to be healthy has changed significantly over the years, with consumers taking a more holistic approach. Metabolic well-being, encompassing five crucial health indicators, provides a holistic perspective of an individual's overall health condition. Consequently, it is emerging as a more **effective predictor of sustained well-being over the long term.**

A healthy weight is often perceived as an indicator of overall health, but our understanding has evolved to recognize it as just one facet of the broader wellness puzzle. Consumers now know that adopting healthy lifestyle practices like proper diet and exercise are crucial for optimal metabolic health. Today's modern consumer not only looks beyond the scale for support, they're seeking **science-backed solutions** to help them win on their wellness journey.



¹The World Health Organization, (2020) Fact Sheet on Obesity. https://www.who.int/newsroom/fact-sheets/ detail/obesity-and-overweight





BPL1™ Postbiotic: A Formulator's Dream

BPL1[™] postbiotic is backed by ADM's gold-standard human clinical trial and is currently being investigated in additional human clinical trials, with emerging and *in vitro* evidence that supplementation may help support:

- Visceral fat reduction in combination with diet and exercise
- A healthy waist circumference in conjunction with diet and exercise
- Metabolic health pathways

WINNER: NutraIngredients Awards in 2020 as Ingredient of the Year in Weight Management

MORE APPLICATIONS, MORE BENEFITS

BPL1[™] postbiotic is ideal for use in food, beverage and dietary supplement formulations. And since BPL1[™] Postbiotic is heat treated, it has the ability to be used in a wider variety of food & beverage products.

BPL1[™] postbiotic can be incorporated into the following applications:

- Sports nutrition
- Better-for-you snacks
- Beverages
- Dairy & plant-based chilled or non-chilled
- Dietary supplements
- Specialized nutrition

Concentration: BPL1[™] postbiotic: 100B cells/g, 300B cells/g

CERTIFICATIONS & RELEVANT INFORMATION

- QPS and GRAS
- Non-GMO
- Halal
- Kosher
- Gluten free
- Lactose free
- Dried powder





The Science Behind BPL1[™] Postbiotic

BPL1[™] postbiotic (*Bifidobacterium animalis* subsp. *lactis CECT 8145*) is the heat- treated version of ADM's awardwinning probiotic strain with clinically documented results in aspects related to metabolic health. Clinical evidence suggests BPL1[™] postbiotic may help support visceral fat reduction in combination with diet and exercise.

A randomized double-blind, placebo-controlled clinical trial to understand BPL1[™] postbiotic's role in the support of metabolic health:²

- Studied women and men with waist circumferences greater than or equal to 88cm and 102cm, respectively
- Intervention: BPL1[™] postbiotic 10¹⁰ cells daily for 12 weeks
- Multiple outcomes assessed, including anthropometric biomarkers and microbiome analysis



In a human clinical study, BPL1[™] HT postbiotic resulted in a significant

decrease of waist circumference compared to the placebo after 12 weeks.²

After 12 weeks, subjects in the BPL1[™] postbiotic intervention group showed a significant reduction in abdominal visceral fat area.^{*} Overall, 55% of participants taking BPL1[™] saw a reduction in visceral fat area.²



*Compared to baseline ** p<0.05 compared to placebo

² Pedret, A; et al. (2019) Int J Obes (Lond). 43: 1863-1868



Study Design



Inclusion: aged > 18 with a waist circumference (WC) \geq 102 cm for men and \geq 88cm for women. Exclusion: WC < 102 cm for men and < 88cm for women, and > 150 cm for both gender; BMI \geq 40 kg/m² antibiotic treatment, diabetes, pregnancy, abnormal thyroid, anemia, alcoholism, hypocaloric diet, intake of food supplements, intestinal disease.





*p<0.05 compared to placebo





ADM'S Gold-Standard Science

ADM has 15+ years of experience and an advanced level of expertise in conducting proprietary microbiome research to deliver cutting-edge products in the marketplace.

BEYOND DIGESTION: ADM'S UNMATCHED MICROBIOME RESEARCH

Scientific exploration of the microbiome is on the rise, unveiling its capacity to positively affect various facets of metabolism and overall human wellness. Whether through the generation of bioactive metabolites, alteration of cell signaling pathways or other potential functions, the microbiome is becoming a focal point for solutions to promote metabolic health.

POSTBIOTIC SOLUTIONS OF TOMORROW

Consumers recognize the wellness benefits of probiotics. However, probiotics lack the versatility required to include them in food & beverage products without compromising overall quality. According to the International Scientific Association for Probiotics & Prebiotics. postbiotics are a "preparation of inanimate microorganisms and/or their components that confers a health benefit on the host." As such, they are an exciting breakthrough in microbiome technology. With new, innovative postbiotic technology, this opens the door to incorporating postbiotics into a diverse range of food & beverage applications, offering consumers more convenience when looking for products with similar benefits.



MICROBIOME SOLUTIONS BPL1[™] POSTBIOTIC



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