

Unlocking Nature's Potential?

Explore

BIOTRANSFORMATION

with Targeted Probiotics



Evolved
PROBIOTICS™



AGENDA

- **Meet the Team**
- **Consumer Insights Guiding Development**
- **Biotransformation with Evolved Probiotics™**
- **Introducing Polyphenols**
- **Formulated for What's Next**
- **Proven Concepts: What Consumers Love**



This presentation is only intended to provide scientific and educational information for business-to-business use. The information contained herein is based on our current knowledge and contains scientific, quality and technical information to help our trade customers to understand more about our ingredients and the science behind them. All content referenced is reflective of what is considered appropriate for the U.S. market where the site content is maintained and may not align with regulations outside the U.S. Not all statements have been evaluated by the U.S. FDA, European Food Safety Authority or the European Commission or any other applicable regulatory body. The products described are not intended to diagnose, treat or prevent any disease. It is your responsibility to comply with all relevant national laws when issuing commercial communications directed at consumers about any finished products containing these ingredients. EU and country specific legislation should also be considered when labelling and/or advertising to final consumers.



ARM & HAMMER™ Performance Products

Innovating with Expertise and Science

A Part of

Church & Dwight

One of America's oldest and most recognized companies, rooted in quality, purity, integrity, and performance.



1 of 3 Groups Within the C&D

Specialty Products Division (SPD):

the business-to-business arm of Church & Dwight



SPD is a

Market Leader

in probiotic strain development delivering high-quality, science-backed solutions.

A Dedicated and Comprehensive Team:

Nutritional innovators and microbial pioneers at our ScienceHearted Center in Waukesha, Wisconsin, come together with Sales, R&D, Marketing, Customer Care, and Technical Services.



Science**Hearted** Center



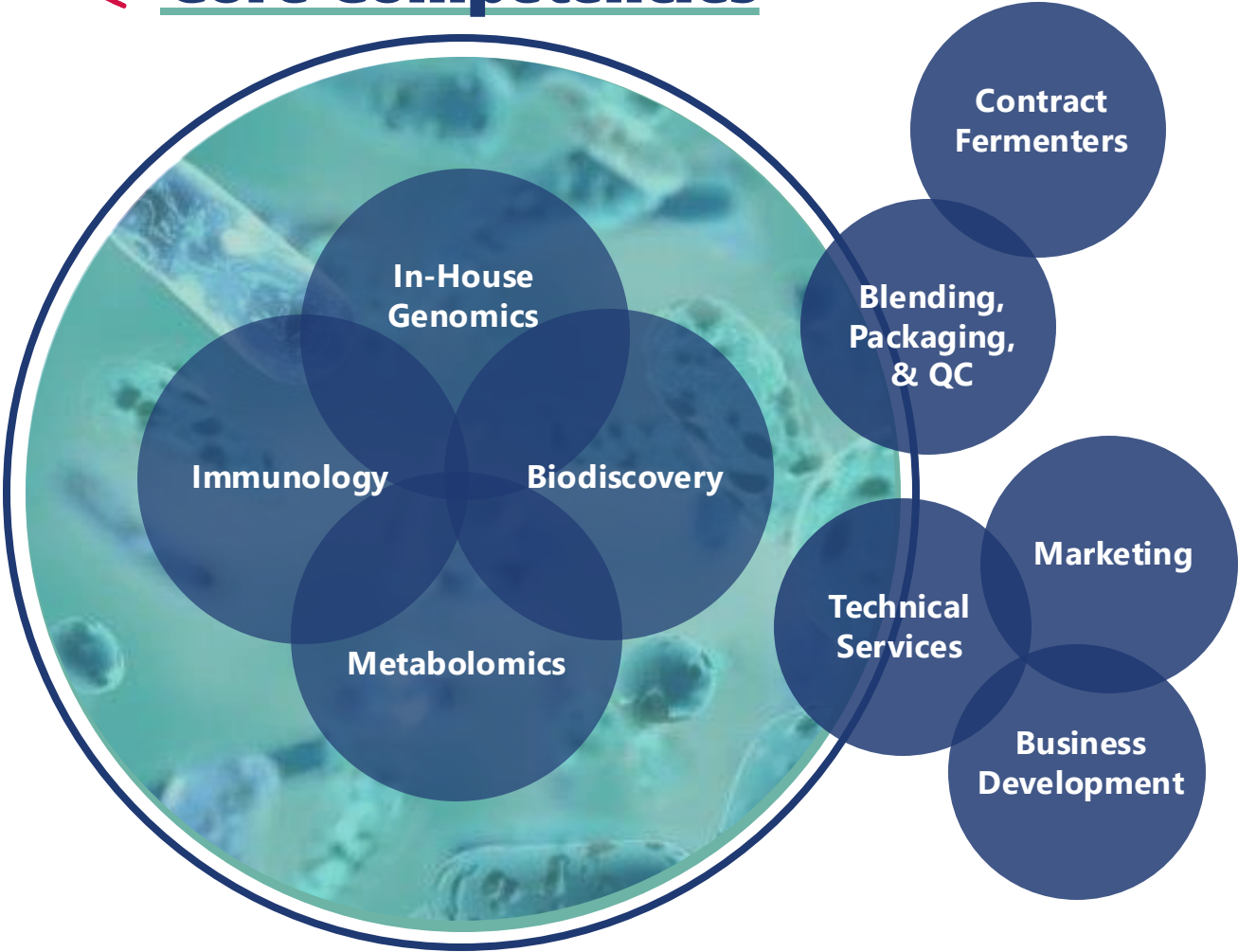
Over **100,000 Potential Probiotic Strains** Backed by Rigorous Scientific Research.

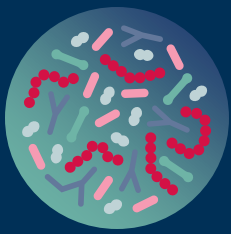


Located in Waukesha, WI



Core Competencies





Selecting Probiotic Strains for **MARKET SUCCESS**

We ensure our strains are safe, effective, scalable, and aligned with market demand through:



Functional Validation

to verify the health benefits



Comprehensive Genome Sequencing

to confirm the safety of each strain



Scalability Assessment

to ensure efficient production



Market Alignment

to meet consumer needs and trends





CONSUMER INSIGHTS Guiding Our Development

Post-Pandemic Consumers Take Preventative Health Measures, Make Healthier Choices

61%

of US female consumers say they would like to **improve their digestive health** over the next 12 months and

64%

say they have **improved their dietary habits** to benefit their health¹

75%

US probiotic consumers use them as part of a **healthy lifestyle**, while

50%

of the consumers purchased probiotics **without symptoms**²



health
goals



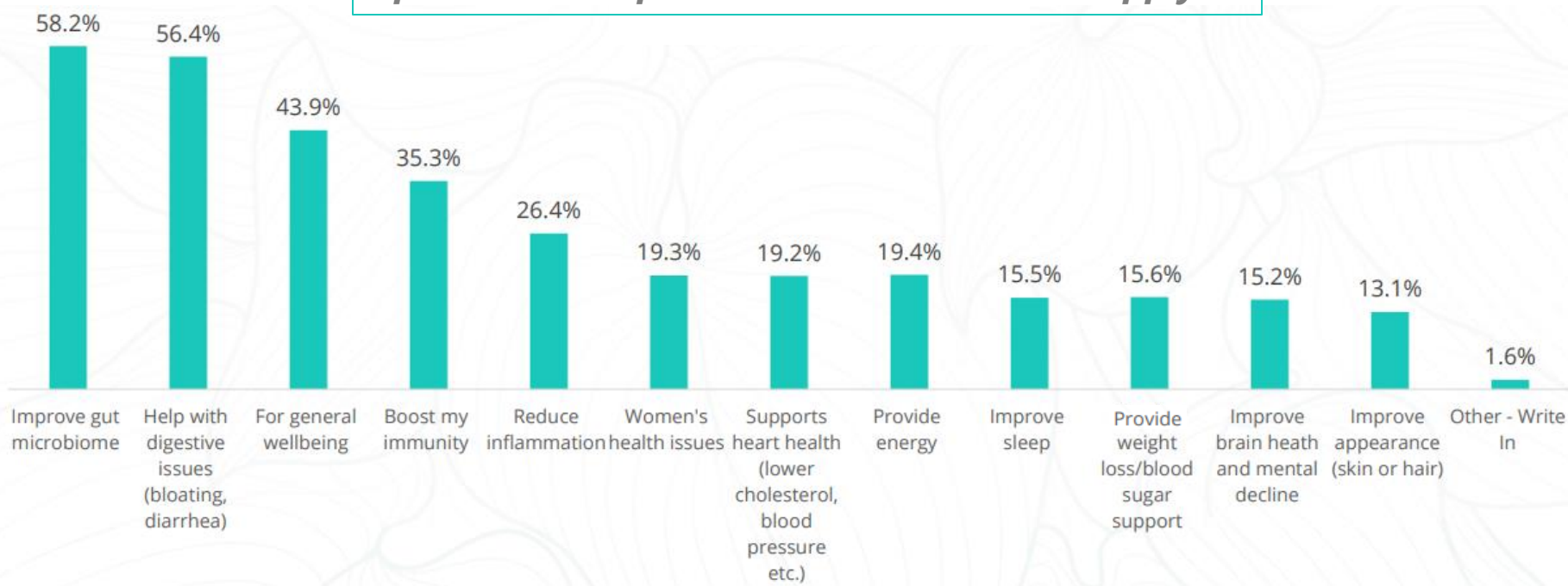


TOP REASONS Why Consumers Use Probiotics

BRIGHTFIELD GROUP

NutraIngredients
USA

Why does your household use probiotics, postbiotics or prebiotics? Choose all that apply.³



Key Takeaways:

- **Top reason** for use is **improving gut microbiome and digestive issues.**
- **35%** are using for **immunity.**
- **26%** are using for **inflammation.**
- **20%** are using for **energy, heart health and women's health issues.**

Sources: ³Consumer Insights on -biotics" May/June 2024 Brightfield Group NutraIngredients, Stephen Daniels, presented at Probiota June 12, 2024



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BIOTRANSFORMATION

of Polyphenols with Targeted Probiotics

Through biotransformation, healthy fruits and vegetables are optimized for enhanced nutrient absorption, unlocking the antioxidant benefits of a wholesome diet.



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Bacillus subtilis 1579

*Increased Biotransformation
of Quercetin to PCA*



Bacillus velezensis 839

*Increased Biotransformation of
Glucoraphanin to Sulforaphane*

What are Polyphenols?

- **Naturally occurring** compounds found in many fruits, vegetables and cereals.
- Contribute to different aspects of our food such as color, flavor & bitterness.
- Are well known for **providing health benefits**, but multiple studies demonstrate that many of these polyphenol compounds are **poorly absorbed** into the body.⁴
- Other work demonstrates that the majority of benefits may come from the smaller, more well absorbed bacterial metabolites rather than from the parent compound.⁵

There
are over
8,000
Known
Polyphenols



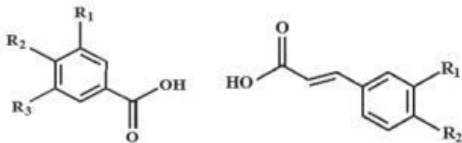


Polyphenol Classes

- Phenolic rings with one or more sugars linked to hydroxyl groups
- Classified by the number of phenolic rings

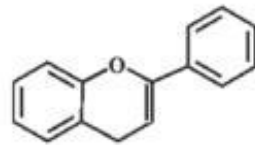
PHENOLIC ACIDS

*Onions and
Black Radish*



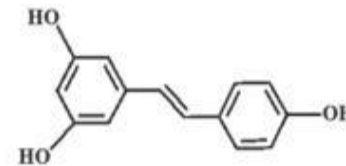
FLAVANOIDS

*Color of Fruits
& Flowers*



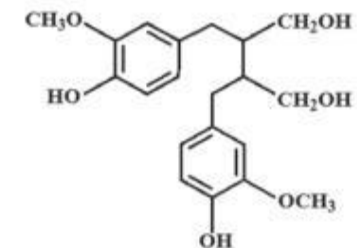
STILBENES

Grapes & Wine



LIGNANS

Phytoestrogens



- Most foods or plants contain a variety of polyphenols





Potential Polyphenol Health Benefits



Inhibit LDL Oxidation and
Platelet Aggregation^{6,7}
Heart Health



Induction of Phase II Enzymes^{8,9}
Cellular Health



Decrease in Blood Glucose Transport^{10,11}
Blood Sugar Management



Strong Antioxidant Properties
Aging Health



Anti-inflammatory Properties
Brain Health



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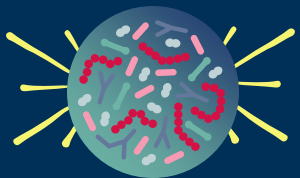
Critical Barriers to Polyphenol Efficacy

- Very ***low bioavailability***.⁴
 - Negligible levels found in blood and tissue.
- Many health benefits have only been shown ***in vitro***.
- ***High inter-individual variability*** in pre-clinical and human clinical trials.¹²



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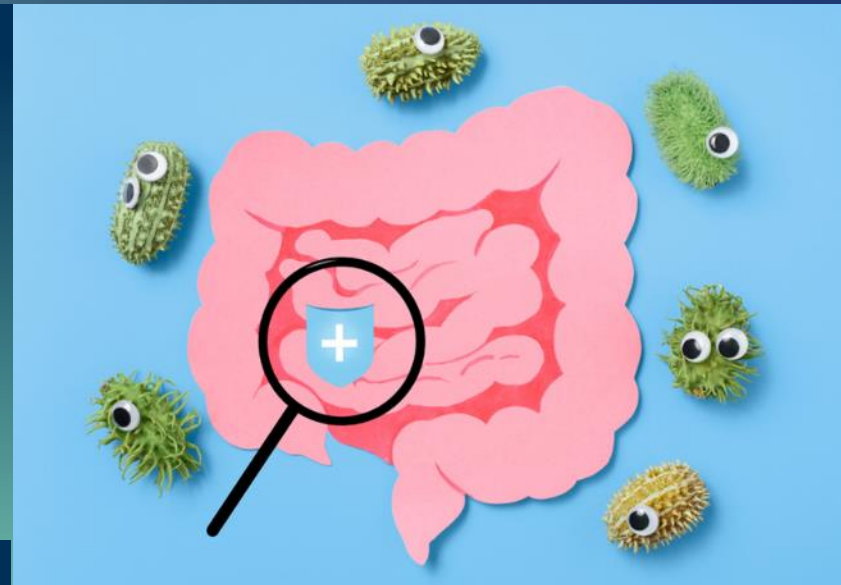




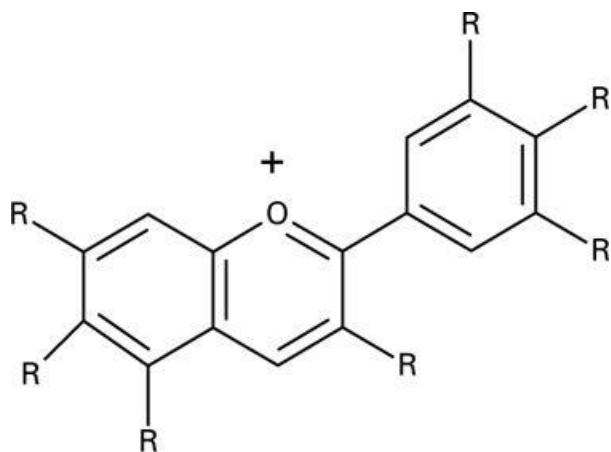
Microbial Biotransformation

Enteric bacteria are imperative in processing polyphenols to the functional metabolite

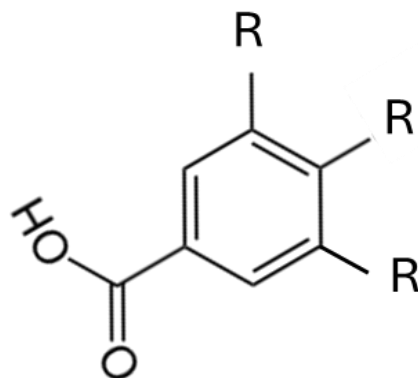
- Increased functionality with metabolites
- Smaller molecule, lesser charge, more bioavailable

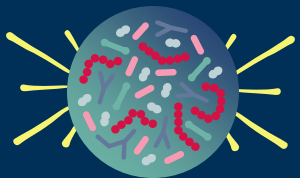


FLAVANOID



SIMPLE PHENOL





How the Process Works



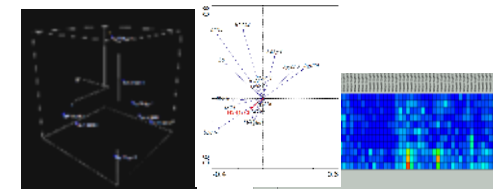
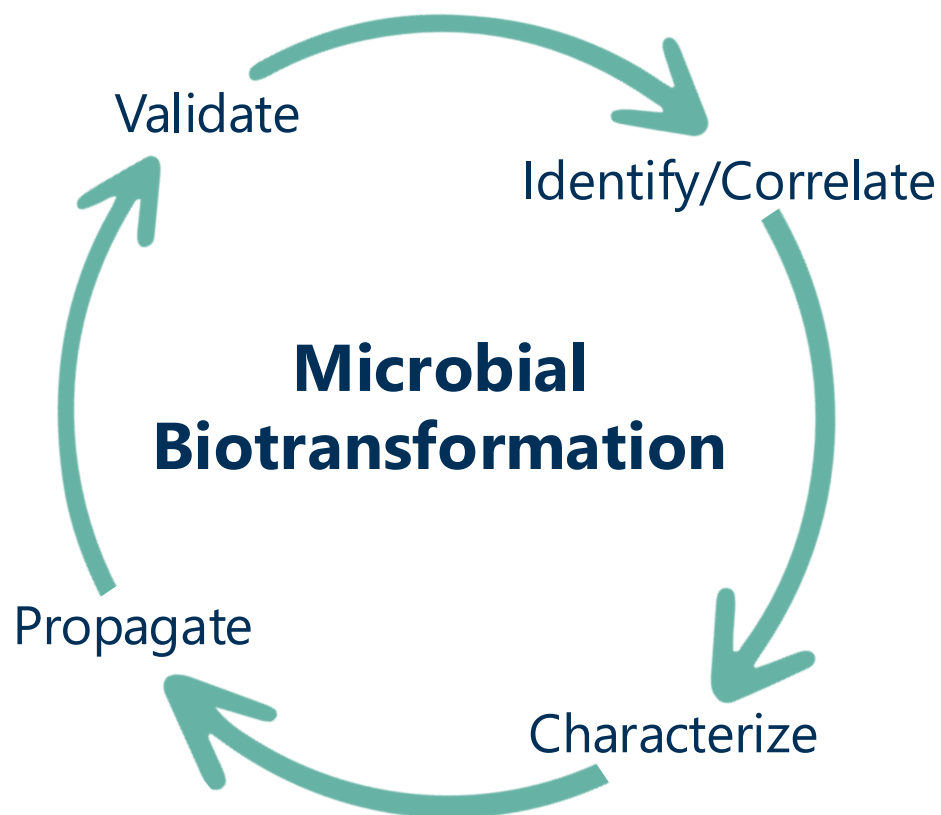
Conduct Application Trials

Biotransform under customer conditions.



Grow Selected Organisms

Produce pilot scale cultures for validation testing.
Scale-up desired strains.



Microbes and Metabolites

Using enzyme specific primers we can identify potential candidate strains.



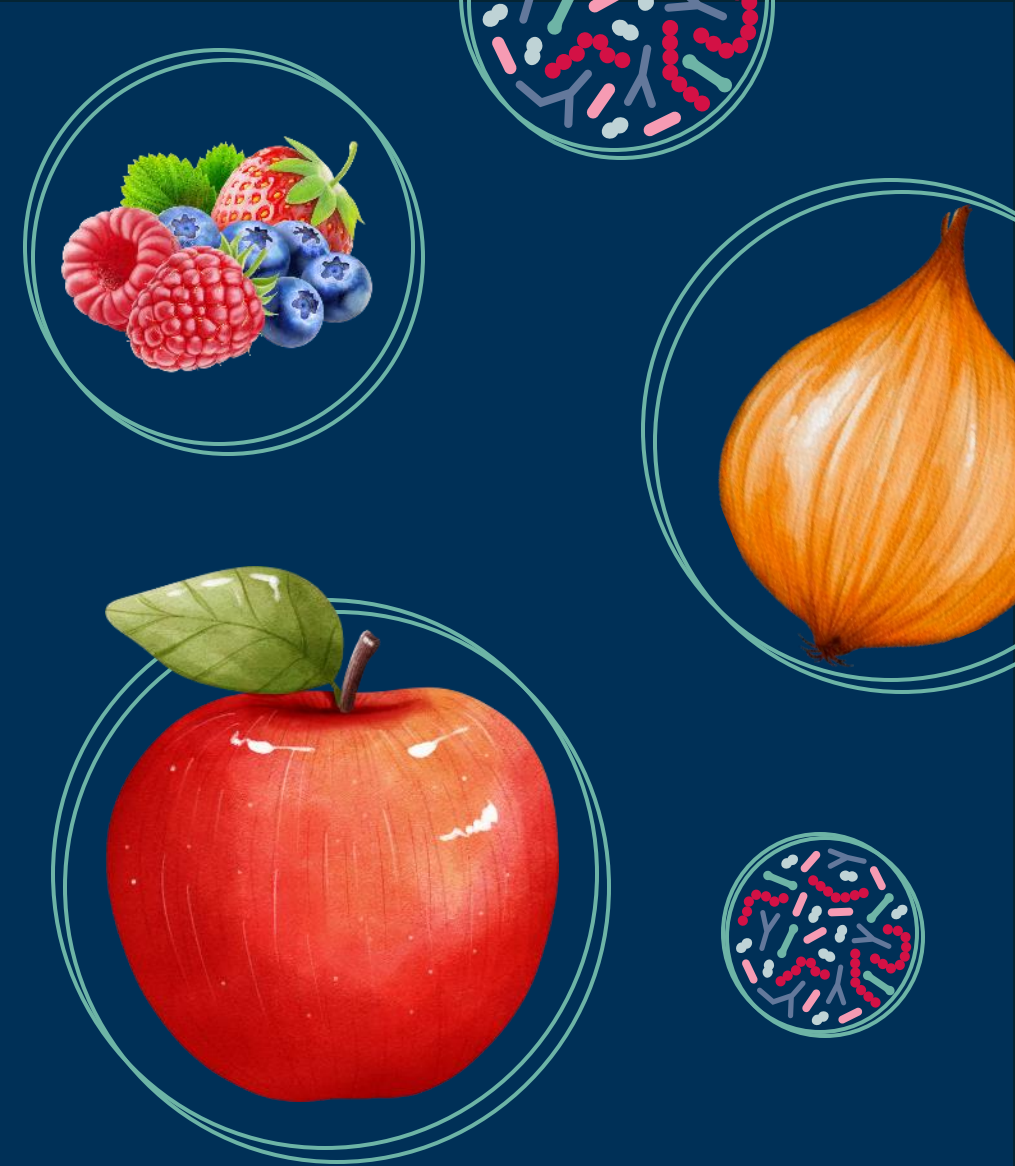
Functional Assays & Metabolomics

Using HPLC, biochemistry, and next gen sequencing

Biotransformation of Quercetin

Objective: To provide bacteria capable of biotransforming quercetin to Protocatechuic acid (PCA).

- Quercetin accounts for 50% of your polyphenol intake.
 - Present in berries, apples, onions, kale, alfalfa, cereals, and green tea.
 - Natural absorption is only ~3-10% in the small intestine¹³
- Protocatechuic acid (PCA) is significantly more bioavailable than quercetin^{14,15}
 - Anti-inflammatory and pro-apoptotic
 - Acts as an analgesic
 - Published studies associate PCA with support of cardiovascular health in large part due to the anti-inflammatory and anti-oxidant properties.





Evolved Probiotics *Bacillus subtilis* 1579

Increased Biotransformation of Quercetin to PCA



Mouse Trial

Converts dietary quercetin to protocatechuic acid (PCA)

- in vivo mouse model confirms conversion¹⁶

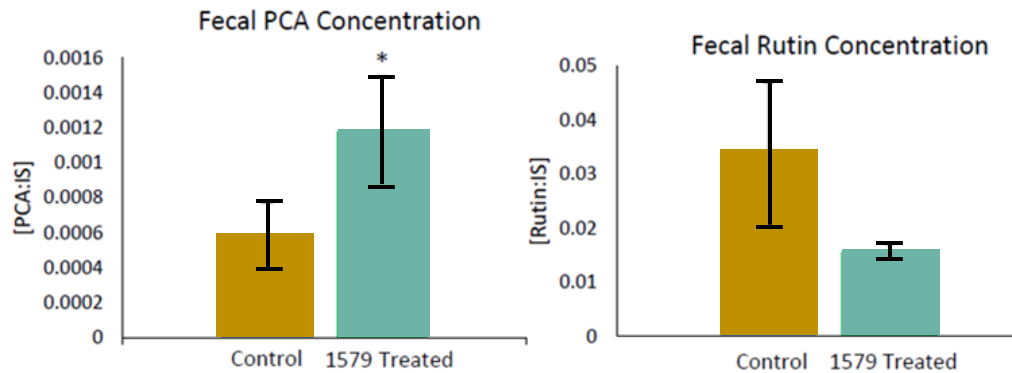


Figure 1. PCA and rutin concentrations in mouse feces. Animals fed *Bacillus* 1579 showed a significant increase in PCA production in the feces compared to control animals. Consistent with rutin acting as the source of PCA there is a trend toward less rutin in 1579 treated animal feces. * Significant difference from control ($p < 0.05$)



Proof of Concept Study

Spore former

- Increased conversion of quercetin to PCA in humans¹⁷

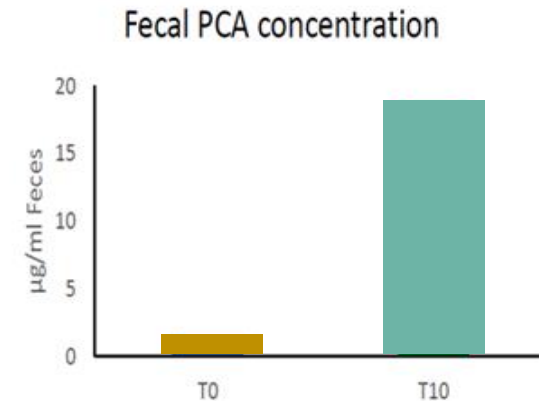


Figure 2. PCA concentrations in human feces. People treated with *Bacillus* 1579 for 10 days (T10) demonstrated greater PCA concentrations in feces than when they had quercetin alone (T0).



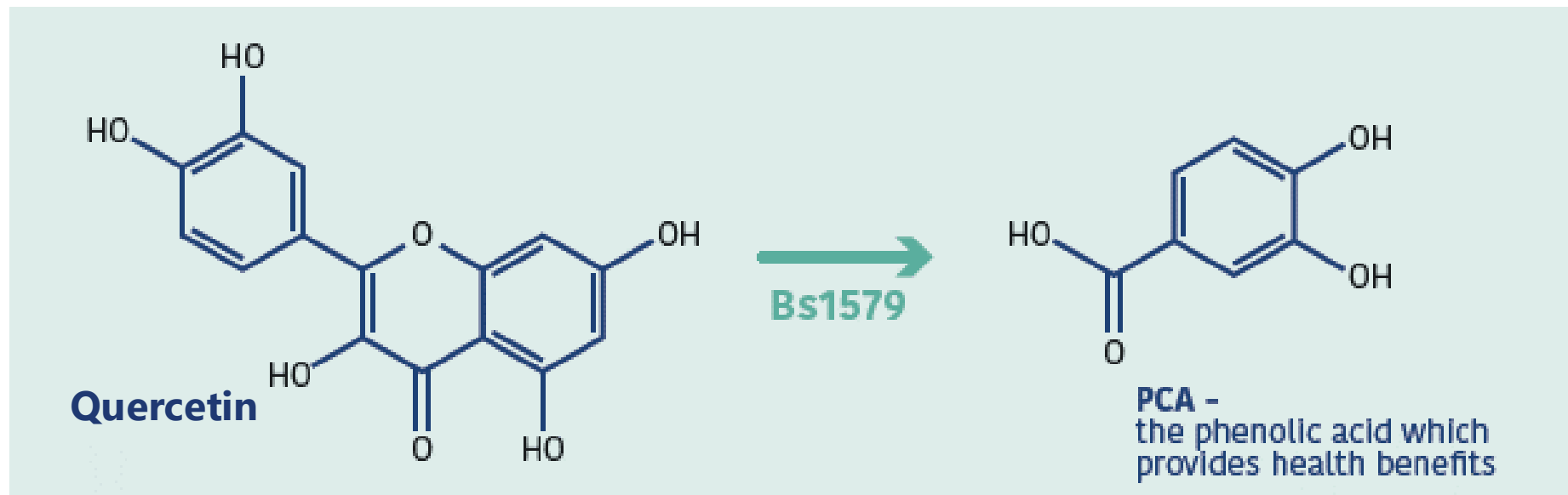


Evolved Probiotics *Bacillus subtilis* 1579

Increased Biotransformation of Quercetin to PCA

Evolved Probiotics *Bacillus Subtilis* 1579 offers Better Nutrition through Biotransformation

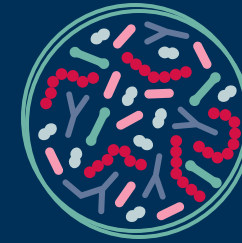
Biotransform healthy fruits and vegetables for better & easier nutrient absorption to activate the antioxidant effect from a healthy diet



✨ Biotransformation ✨ of Glucoraphanin and Sulforaphane

Objective: To provide bacteria capable of biotransforming glucoraphanin to sulforaphane.

- Glucoraphanin - **potent polyphenol** found in cruciferous vegetables.¹⁸
- Glucoraphanin is metabolized to sulforaphane, the compound responsible for responsible for the positive health effects.¹⁹
- Clinical trials associate sulforaphane activity with **significant health benefits and support of healthy aging**.^{20,21}



Evolved Probiotics *Bacillus velezensis* 839

Increased Biotransformation of Glucoraphanin to Sulforaphane



Proof of Concept Study

Converts dietary glucoraphanin to sulforaphane

- Small Proof of Principle shows increased conversion of glucoraphanin to sulforaphane in humans²²

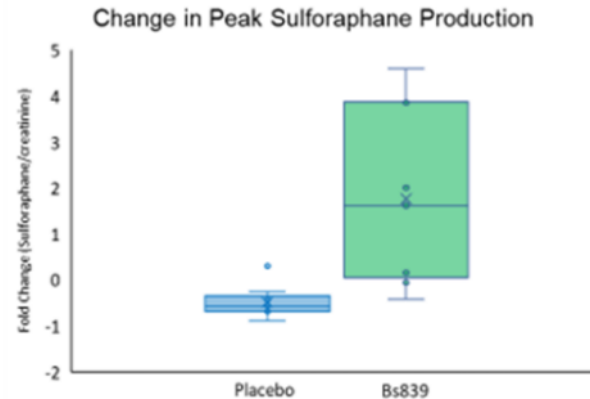
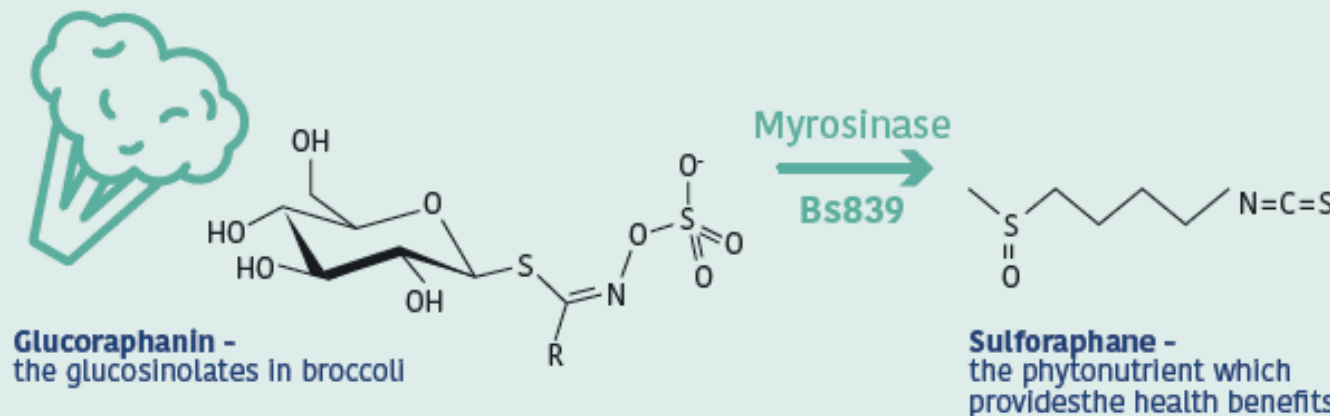


Figure 1. Peak production of sulforaphane metabolites. Placebo and Bs839 were given daily for 7 consecutive days. Prior to urine collection ~150mg glucoraphanin was given and levels of sulforaphane were determined by UHPLC and normalized against creatinine levels. Boxes around data points delineate the 25th and 75th percentiles of values and whiskers delineate the 5th and 95th percentiles. The solid lines in the center represent the median, x represents the mean value. The Bs839 cohort demonstrated a statistically significant increase in the fold change of sulforaphane production from initial to final values within treatment tests compared to the placebo cohort (1.75 fold vs -0.49 fold, $P < 0.008$).

Bacillus Subtilis 839 offers Better Nutrition through Biotransformation

Biotransform healthy vegetables for better & easier nutrient absorption to activate the antioxidant effect from a healthy diet.



Human Clinical Trial

- **Planned for 2025**
- **Spore former:** Survives the harsh conditions of the gastrointestinal tract²³

Formulated for What's Next

*Our spore-forming probiotic strains are **naturally resilient**, making them well-suited for a variety of product formats:*

- Nutritional powders and mixes
- Snack bars and shelf-stable foods
- Refrigerated functional beverages
- Dietary supplements (capsules, gummies, tablets)

Protected by a durable spore coat, **these strains are built to withstand heat, moisture, and processing stress**—offering formulation flexibility and shelf stability without refrigeration.





Today's Probiotic Consumer Seeks *Functional Foods & Beverages* as a Source of Probiotics

60%

of US consumers
purchased a probiotic
during the last 12 months²⁴

74%

of US consumers would
rather ***get their probiotics***
in Food & Beverage

82%

of ***probiotic sales***
are through food
and beverages²⁵

TOP 3 PROBIOTIC FOODS & BEVERAGES⁴

1



Yogurt

2



Ready to Drink
Products

3



Yogurt Drinks

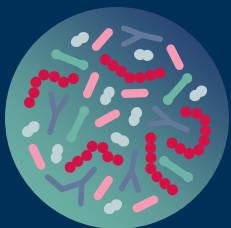
***Taste, more natural
approach, and ease of
incorporating into daily
diet are driving
Food/Beverage sales.***

Sources: ²⁴Top 10 Trends for 2023, FMCG Gurus, Nov 2022; ²Health and Wellness: 2023, The Great Wellness Reset", Hartman Group, March 2023. n=2,175; ³Euromonitor Passport, 2021; ⁴2023 Food and Health Survey, International Food Information Council, April 2023. n=1,022 ; FMCG GURU'S Probiotics A & U 2023



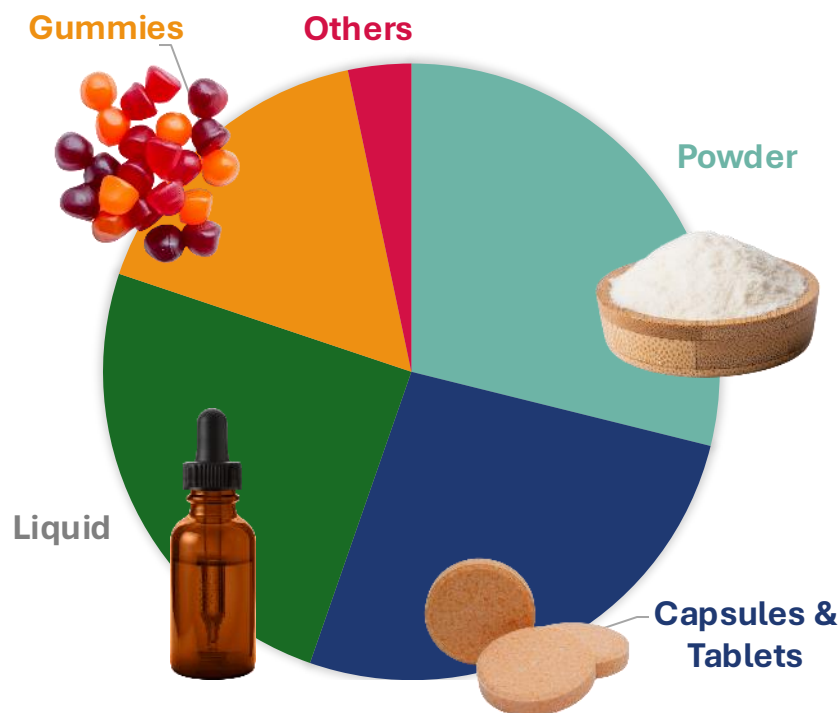
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CURRENT TRENDS in Probiotics and Supplements

Probiotic Strains Market Revenue Share by DS Product Form (2022)¹



SUPPLEMENTS AND PROBIOTICS CONTINUE TO PLAY AN IMPORTANT ROLE



of US consumers take supplements daily ²



of users consider them essential to maintaining their health ²



of women prefer dietary supplements tailored for the female body ³





CONSUMER VALIDATED CONCEPTS REVEAL: High Purchase Intent, High Believability



CONSUMER RESEARCH VALIDATES CONSUMER INTEREST

Consumer concept testing validates that the new claims that Evolved Probiotics deliver are innovative, relevant, worth paying more for and drive strong purchase intent scores!



stated that the concepts tested offer more benefits and are more effective than others currently in the market.



believe that these products are worth paying more for!



Well4 Daily Multi-Vitamins
With Evolved Probiotics



Well4 Protein Powder
With Evolved Probiotics



Well4 Nutrition Bars
With Evolved Probiotics





CONSUMER VALIDATED CONCEPTS



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Introducing Well4 Daily Multivitamins

You are working hard at improving your health. You are exercising more and eating healthier. But let's face it, no one is perfect.

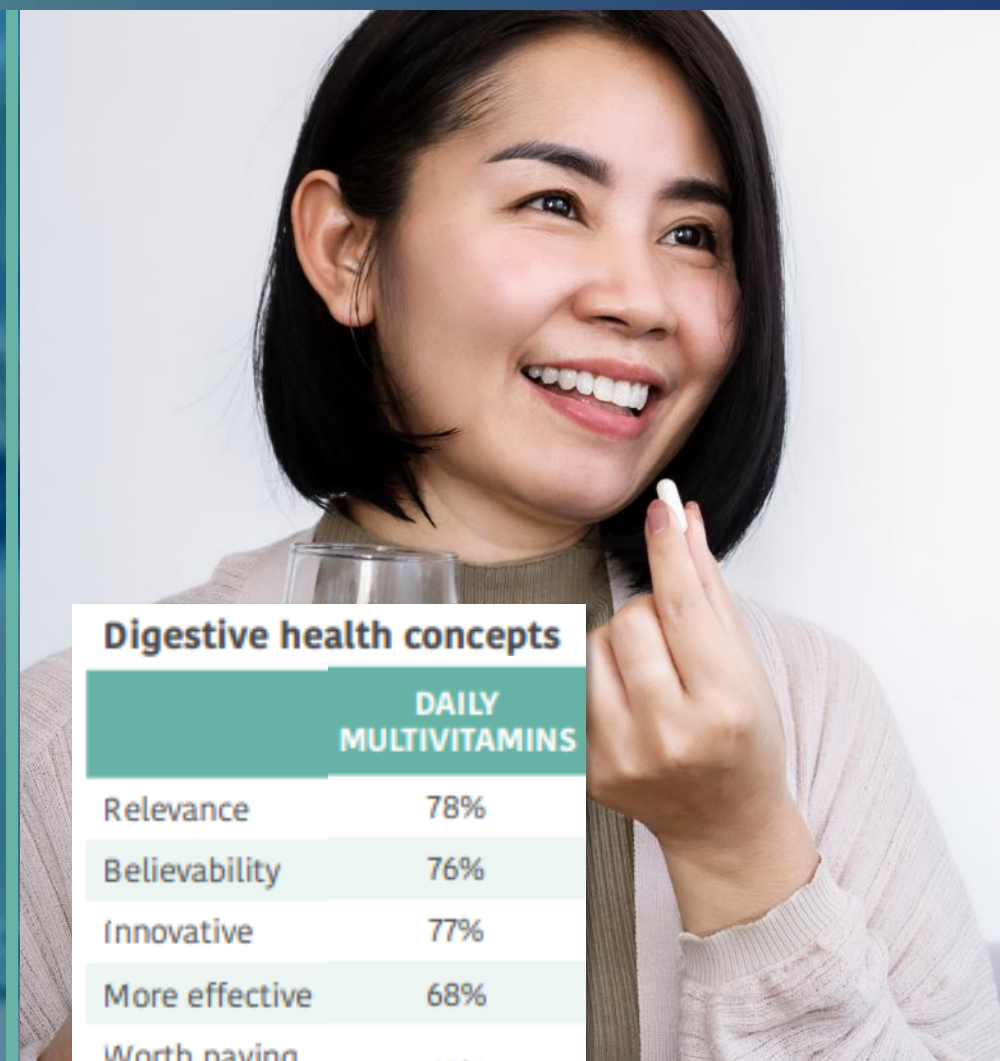
Introducing **Well4 Daily Multi-Vitamins** with **Evolved Probiotics™*** to provide even more support to keep your health on track. That's because Evolved Probiotics boosts the good bacteria in your gut to:

- Naturally build and support a strong and healthy digestive and immune system
- Support Gut Health to improve overall well-being
- Help maximize absorption of important nutrients from your diet that your healthy body needs

**Evolved Probiotics Bacillus subtilis 1579, Plantarum 276*

Stay on track for a healthier you!

Not all statements have been evaluated by the U.S. FDA, European Food Safety Authority or the European Commission or any other applicable regulatory body. The products described are not intended to diagnose, treat or prevent any disease. It is your responsibility to comply with all relevant national laws when issuing commercial communications directed at consumers about any finished products containing these ingredients. EU and country specific legislation should also be considered when labelling and/or advertising to final consumers.



Digestive health concepts

	DAILY MULTIVITAMINS
Relevance	78%
Believability	76%
Innovative	77%
More effective	68%
Worth paying more for	61%
Purchase intent	72%



CONSUMER VALIDATED CONCEPTS



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PROBIOTICS™

Introducing Well4 Protein Powder

Eating a healthy diet is a good first step toward better health but it might not be enough to keep you healthy. Unfortunately, your body cannot readily absorb all the nutrients from the healthy food you are eating.

Now with **Well4 Protein Powder** with **Evolved Probiotics™***, you can make your healthy diet healthier! With 21 grams of plant protein, Well4 boosts good gut health bacteria with 2 billion CFUs of Evolved Probiotics to:

- Help your digestive system work better
- Help improve absorption of important nutrients from your healthy diet

**Evolved Probiotic Bacillus subtilis 1579 & Plantarum 276*

Because Your Body Deserves More

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Digestive health concepts

	PROTEIN POWDER
Relevance	72%
Believability	80%
Innovative	70%
More effective	66%
Worth paying more for	62%
Purchase intent	73%



CONSUMER VALIDATED CONCEPTS



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PROBIOTICS™

Introducing Well4 Nutrition Bars

Eating a clean and healthy diet takes a bit of effort and on your busiest days. Keeping your body nourished and energized isn't easy.

Now, maintain your health and energy throughout the day with **Well4 Nutrition Bars**. Maximizing nutrition and taste, Well4 Nutrition Bars contain **Evolved Probiotics™** plus 10 grams of protein to:

- Keep you feeling full and energized
- Support your gut health to improve overall health & wellbeing
- Help maximize nutrient absorption to help keep you healthy

**Evolved Probiotics Bacillus subtilis 1579, Plantarum 276*

Keep going – healthy strong – all day long!

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Digestive health concepts

	NUTRITION BARS
Relevance	77%
Believability	80%
Innovative	74%
More effective	60%
Worth paying more for	65%
Purchase intent	79%

Let's Connect!



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