

The Power of Fermentation

BENEFIT MORE FROM FOODS AND SUPPLEMENTS
BY CHOOSING FERMENTED



Fermentation is on fire ... and for good reason. The more that scientists unravel the science behind the microbiota, the clearer it is that it's time to take a closer look at fermented foods and supplements. The category is bursting with innovation, yet fermentation's story isn't new. Today's fermentation is about ancient art meeting modern science.

Thousands of years ago, fermentation happened by chance. Now scientists and fermentation enthusiasts understand a lot more about the dynamic process. This helps them control fermentation conditions and get consistent products with specific flavor characteristics and health benefits, such as supporting gut health and providing deep nourishment.

As the cuisines of different cultures continue to mix, we're seeing a greater variety of fermented foods on store shelves and in recipe books. At the same time, as technological capabilities have expanded, companies are able to offer a greater variety of packaged, fermented products. Fermented supplements are one of the newest innovations. Fermentation can be especially helpful for plant-based protein and greens supplements because it helps release a plant's full nutritional power.

Helping to drive this innovation is increased consumer awareness of the benefits of fermentation and the importance of nourishing and supporting the good bugs within us (bacteria, yeasts and other fungi), better known as the microbiota.

Fermentation can be especially helpful for plant-based protein and greens supplements because it helps release a plant's full nutritional power.

ABOUT OUR SPONSOR

Today, Natural Factors is one of the largest manufacturers of nutritional products in North America, and its origins reach back to the 1950s. From day one, the company has been fully committed to making products right. As a New Hope Network Inside the Bottle partner, Natural Factors is committed to supply chain transparency and manufacturing the highest quality products. Learn more about their story at newhope.com/quality-promise-farm-supplement



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Fermentation in Brief

The process

Fermentation happens when microbes such as bacteria or yeast munch on carbohydrates in foods and metabolize them in the absence of oxygen. Byproducts such as acids or alcohol result. This typically gives a pleasing, more complex (and often tart) taste to foods and beverages. Fermentation is how cabbage becomes sauerkraut and milk becomes yogurt.

Fermentation perks

Fermentation helps preserve foods naturally, but that's just the beginning. Fermentation has been described as a form of pre-digestion because the microbes produce enzymes that help break down proteins, starches and fibers. It also helps eliminate anti-nutrients that can block your body's absorption of minerals from plant foods, and enhances the content of vitamins, antioxidants and other phytochemicals.

"Fermentation also works wonders for your microbiome. Just a few of fermented foods' benefits include helping increase good bacteria while decreasing bad bacteria, strengthening the gut lining and predigesting food to lessen the burden on the digestive tract," says Kate Rhéaume, ND, health educator on behalf of Natural Factors.

Fermented foods versus probiotics

"By definition, probiotics are alive and the microbes have been specifically identified and tested for their health benefits," says Robert Hutkins, PhD, a fermentation expert at the University of Nebraska in Lincoln. "In comparison, the microbes that produce fermented foods aren't always individually identified or still alive when you eat the food, but the process may make the food more healthful or easier to digest." For example, the microbes used to make sourdough bread help break down phytates in the flour that otherwise would bind to minerals and inhibit absorption. But the microbes are no longer alive after baking the bread because they're heat sensitive.

Why the buzz?

"The products of fermentation—such as wine, cheese and sauerkraut—have never waned in popularity," says Sandor Katz, a fermentation expert and author of *Wild Fermentation: The Flavor, Nutrition, and Craft of Live-Cultured Foods, 2nd Edition* (Chelsea Green Publishing, 2016). "But, in the last couple of decades there's been an explosion of consumer interest in the process of fermentation. I think that's driven by awareness about temperature biome and the connection of bacteria to our overall health and wellbeing."



Did you know?

Different types of plants require different fermentation temperatures and fermentation times. Plants vary in their naturally occurring sugars and cellulose, so they can't all be fermented for the same amount of time at the same temperature. For products that include various ingredients, such as supplements, make sure the manufacturer understands the nature of the botanical that's being fermented and how it should be treated to optimize the process and health benefits. Natural Factors' Whole Earth & Sea Greens are the perfect example of this process done right.



Fast Stats

- Registered dietitian nutritionists have pegged fermented foods as the number one trending superfood.
- Analysis of ancient clay pots suggests people started making fermented beverages nearly 10,000 years ago.
- It's estimated that about 1/3 of all foods and beverages consumed globally are fermented.
- Kimchi has been dubbed one of the five healthiest foods in the world.

Fermented Supplements

You're probably already eating some fermented foods and are possibly taking probiotic pills, but have you tried fermented supplements? Organically produced whole foods, such as quinoa, carrots and kale, are now fermented and concentrated in powdered supplements. These make it easy to get the nutritional benefits of a wide range of organic fermented greens and other vegetables, fruits, herbs, legumes and cereal (grain) grasses in a single scoop on a daily basis.

TOP 10 REASONS TO GO FERMENTED

- 1. Helps reduce anti-nutrients.** "Fermentation is key for breaking down anti-nutrients, such as phytic acid, cyanoglucosides and lectins," says Dr. Rhéaume. "These anti-nutrients are natural substances found in plant materials, but can hinder mineral absorption." Scientists have compared fermented rice and legumes with nonfermented, and the fermented versions have much higher levels of iron, zinc and other minerals.
- 2. Increases vitamin and mineral levels.** "In the process of fermenting foods, certain microbes produce small amounts of some B vitamins, such as thiamin, riboflavin and niacin," says Hutkins. "In some cases vitamin B12 may be produced, which could be relevant to vegans and vegetarians who are more likely to fall short on B12." Fermentation also increases levels of vitamins A, C and K in some foods and improves mineral bioaccessibility.
- 3. Improves phytonutrient content and absorption, while supporting healthy inflammatory responses.** "By nature, many greens and other vegetables and fruits are rich in antioxidants and other beneficial phytonutrients," says Kalidas Shetty, PhD, a plant science expert at North Dakota State University in Fargo. "When these foods are fermented, the phytonutrients are better retained." For example, scientists have shown that fermenting fruit and herbal smoothies with *Lactobacillus plantarum* and other bacteria helps preserve their polyphenols, as well as antioxidant vitamin C. Therefore fermentation helps to support healthy inflammation response by helping to tackle clear free radicals that contribute to chronic disease risk. Fermentation can also help improve potency of phytonutrients.

- 4. Makes carbs easier to digest.** Fermented carbs are often easier to digest than unfermented ones. In part, that's because some microbes can produce enzymes, such as cellulases and pectinases, that people don't have. Such microbial enzymes help break down fibers in greens and other vegetables, fruits, legumes and grains. Similarly, microbes used to ferment dairy products produce enzymes that help break down lactose, the sugar in milk. This can help to reduce GI upset such as gas and bloating.
- 5. Enhances quality and absorbability of plant protein.** Fermentation may increase availability of certain amino acids. For example, when scientists fermented quinoa with *L. plantarum*, they found that the amounts of nearly all amino acids initially present in quinoa doubled in concentration. That included the essential amino acids lysine and phenylalanine, which are ones we have to get from food. Fermentation has been found to increase protein absorption by up to 40 percent. Combining fermented grains with fermented legumes further enhances the quality of plant proteins, providing all essential amino acids.
- 6. Promotes gut health and strengthens gut barrier.** Having a healthy microbiota is a key to gut health. "The fiber in vegetables and fruits act as prebiotics, nourishing the gut microbiota," says Hutkins. "But, there are also other components, such as polyphenols and B vitamins (such as riboflavin), in these foods that may promote a healthy microbiota in other ways." This is especially important today as factors such as stress and Western-style diets promote increased intestinal permeability or "leaky gut." "More than thirty years ago, in one of the first studies looking at traditional dietary patterns, researchers found that rural Japanese people who had a high-fiber diet rich in fermented foods, vegetables and fish had higher counts of beneficial Bifidobacterium and Lactobacillus species compared to North American urbanites," says Dr. Rhéaume. Consuming fermented products can also decrease the likelihood that you'll experience gas and bloating.
- 7. Supports healthy blood sugar levels.** "Fermenting legumes and grains, which have resistant starch, can help decrease their blood sugar impact," Shetty says. Additionally, studies suggest that some fermented foods, such as kimchi and vinegar, may help support insulin function, which is important for keeping blood sugar levels in check.
- 8. Promotes heart health.** Green leafy vegetables, such as kale, have been reported to support healthy cholesterol levels. They are also a rich source of potassium and magnesium, which are minerals that support healthy blood pressure levels. Studies suggest fermenting the greens can boost their quota of these minerals. That's not all. "Fermenting protein-rich foods, such as dairy products, can transform peptides into compounds such as ACE inhibitors, which have blood pressure lowering effects," Shetty says.
- 9. Supports emotional and cognitive (brain) health.** "When foods are fermented, new kinds of helpful compounds are created, including ones that have mental health benefits," Shetty says. Additionally, scientists know that our gut microbiota is tied to brain functions, such as our response to stress. Research suggests probiotic-rich diets may have positive effects on stress relief, as well as memory. Preliminary studies also suggest some fermented medicinal mushrooms may support cognitive function.
- 10. Guards against harmful bacteria and aids in detoxification.** During food fermentation, certain microbes produce natural antimicrobial agents such as bacteriocins. These small, heat-stable proteins (peptides) inhibit the growth of harmful bacteria. "These tiny, heat-stable peptides are very helpful to have in your system as they inhibit the growth of harmful bacteria," says Dr. Rhéaume.

What's fermented?

Chances are, you're consuming more fermented products than you realize. One of the benefits of consuming fermented foods is that they are gentle on the stomach and help support healthy digestion. Here are some popular ones, but almost any food can be fermented.

- Aged cheese
- Beer
- Bread (particularly traditional sourdough)
- Chocolate
- Coffee
- Fermented fish sauce
- Kefir (fermented milk drink)
- Kimchi (Korean fermented veggies)
- Kombucha
- Miso (fermented soybean paste)
- Olives
- Pickles
- Salami
- Sauerkraut
- Soy sauce
- Tempeh (loaf-like fermented soybeans)
- Vinegar
- Wine
- Yogurt



The Fermentation Movement

Whether you ask nutritionists, chefs, food scientists or everyday fermentation enthusiasts, they all say fermented products are popping up everywhere and are the food trend to watch. Here are six trends you may find:

- 1. Wider availability of food and supplements.** "Traditional fermented foods from other parts of the world, such as kimchi, miso and tempeh from Asia, are becoming more mainstream," says Hutkins. "Not only do you see these products in Asian food stores, but you also see them in American grocery stores." Beyond that, it's not just about foods. Fermented supplements are gaining momentum and providing an excellent and convenient way to reap the benefits of fermentation.
- 2. Fresh takes.** "We're in a period of great innovation with fermented products," says Katz. "I'm seeing people do all kinds of novel things, like making a powdered table condiment out of dehydrated kimchi or making raw, probiotic crackers with sauerkraut."
- 3. Going beyond kombucha.** "There's been an explosion of interest in kombucha over the past 20 years," Katz says. "But now we're starting to see greater variety in lightly fermented beverages, like water kefir and ginger beer."
- 4. Fizzy fruit and vegetable drinks.** "We're starting to see a wide variety of fermented fruit juice products, particularly coming out of northern Europe," says Shetty. U.S. stores are starting to sell such products, too.
- 5. Fermented legumes.** "In Brazil they use fermented black-eyed peas to make fry-breads called acarajé, which are a little like potato pancakes," Katz says. "People are doing that with other kinds of beans, too." In the U.S., you may see these served at vegetarian restaurants.
- 6. Pickle mania.** "Asian pickles are a hot trend," Shetty says. "Pickles from east Asia, such as Japan and Korea, are less spicy, while pickles from southeast Asia and India are a little more spicy." You can buy entire cookbooks devoted to making Asian pickles.

DID YOU KNOW?

Long before we discovered all of its health benefits, fermentation was one of the first food preservation methods.

Fitting in Fermented Fare

If you're not thinking "fermented" at meal and snack time, you could be missing out on the health benefits of fermentation. Try these tasty ideas to sneak in fermented supplements, foods and beverages any time of day.

BREAKFAST

Stir in a scoop. Add a serving of a powdered, fermented plant protein and greens supplement to oatmeal or a smoothie bowl.

Rethink breakfast. Take a cue from Korean tradition, which commonly includes kimchi with every meal. Top an omelet with kimchi or make a breakfast taco with scrambled tofu and kimchi, suggests Katz.

Go Greek. The combo of protein and carbs in Greek yogurt are a perfect way to jumpstart your day. Sprinkle yogurt with granola for a bit of crunch.

LUNCH

Serve it with sauerkraut. Katz suggests topping sandwiches and quesadillas with this tangy condiment. Look for "living sauerkraut" that's refrigerated to get the probiotics that are otherwise destroyed by heating the kraut.

Try tempeh. Top a leafy green salad with sautéed tempeh, or swap tempeh for meat on a sandwich.

Opt for fermented condiments. You can make (and sometimes buy) fermented ketchup, hummus, salsa and more.

DINNER

Make it with miso. Add miso to sauces, soups or stews. (Try the Miso-Glazed Halibut with Bok Choy on page 9).

Top salad with fermented dressing. Make your favorite creamy salad dressing, such as ranch or honey mustard, with kefir.

Treat yourself. Enjoy a creamy frozen kefir dessert.

SNACK

Take fermented greens on the go. Add a serving of a powdered, fermented greens supplement to water or juice or make a smoothie or smoothie bowl.

Swap fermented drinks for sodas. Quench thirst with kombucha, water kefir or fermented coconut water.



How and why to choose fermented supplements

"When looking for a fermented supplement, authentication is fundamental to optimal efficacy and safety for the consumer," says Dr. Rhéaume. "Supplement manufacturers must ensure products are contaminant-free and label ingredients are absolutely accurate using the most advanced technology available. Mass spectrometry is by far the most precise methodology to ensure the purity and potency of natural health products."

When choosing a supplement, Dr. Rhéaume recommends looking for third-party certifications, such as USP, NSF or ISURA.

- Fermented supplements accommodate a variety of dietary restrictions and preferences. You'll find options that are vegan, gluten-free, non-dairy, non-GMO and organic. (And that taste good, too!)
- By including dozens of different vegetables, fruits and plant proteins, fermented supplements provide a broad spectrum of phytonutrients that would be tough to get in a typical day's food intake.
- Some fermented foods are made with a hefty dose of salt. Fermented supplements are typically a lower-sodium option.

Tropical Feeling

SMOOTHIE BOWL



SERVINGS: 1

INGREDIENTS

- 1/3 cup full-fat coconut milk
- 1/3 cup frozen mango
- 1/4 cup frozen pineapple
- 1/2 frozen banana
- 1 scoop Whole Earth & Sea Protein & Greens—Organic Tropical flavor

Toppings: fresh pineapple, shredded coconut, raspberries and blueberries

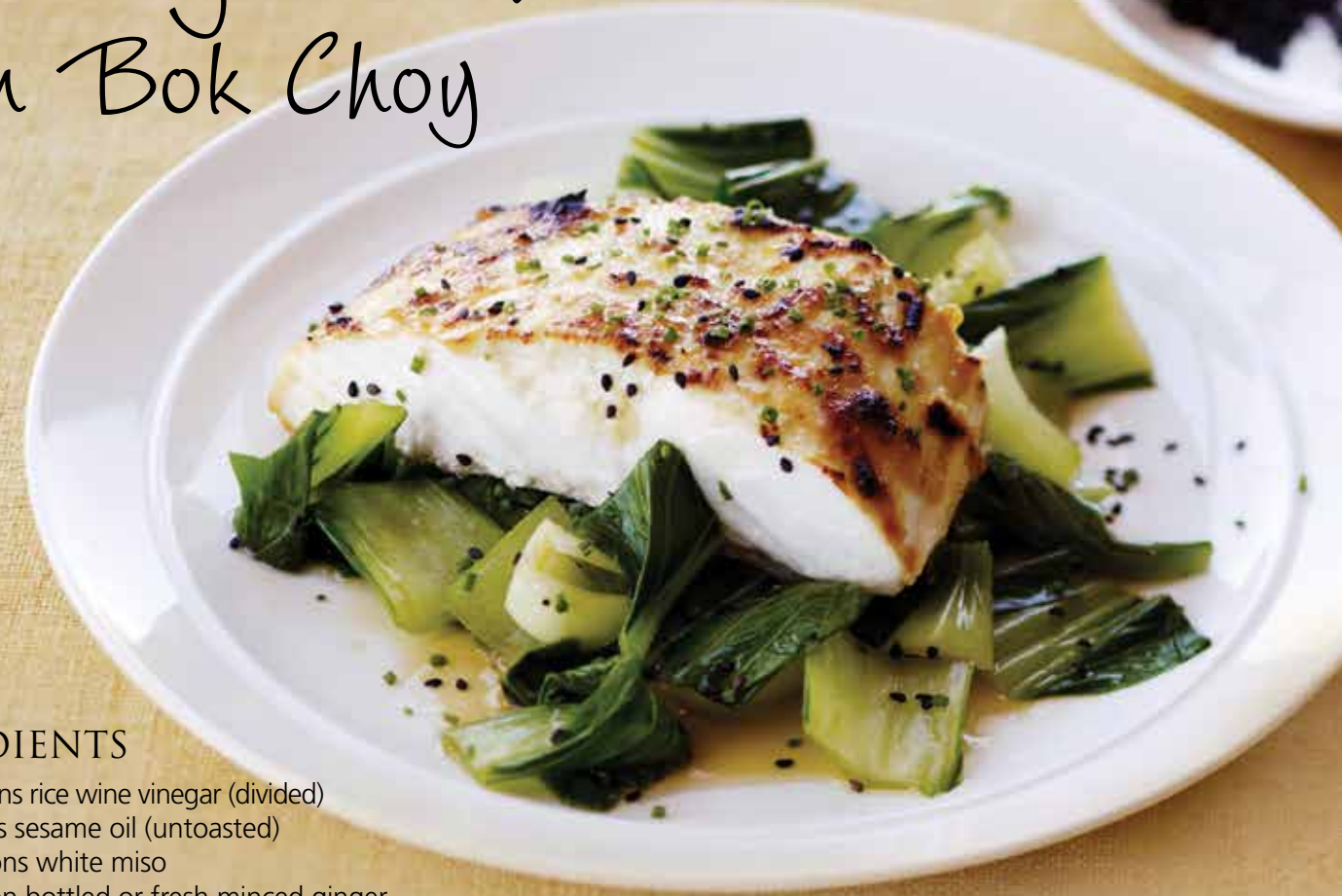
DIRECTIONS

1. Add all the ingredients into a high-speed blender, and mix until smooth and thick.
2. Serve in a bowl and add all the toppings.

Recipe provided by Karlene Karst, RD

Miso-Glazed Halibut

with Bok Choy



SERVES 4

INGREDIENTS

- 4 tablespoons rice wine vinegar (divided)
- 2 teaspoons sesame oil (untoasted)
- 2 tablespoons white miso
- 1 tablespoon bottled or fresh minced ginger
- 1 teaspoon crushed red pepper flakes
- 2 tablespoons olive oil (divided)
- 4 halibut fillets (4-5 ounces each)
- 1 pound bok choy (sliced crosswise into 1-inch pieces)
- 2 teaspoons low-sodium soy sauce
- 1 tablespoon fresh lemon juice
- 1/4 cup thinly sliced chives (divided)
- Black sesame seeds (for garnish)

DIRECTIONS

1. Whisk 2 tablespoons rice wine vinegar, sesame oil, miso, ginger and red pepper flakes in a small bowl until smooth. Set aside.
2. Place oven rack 6 inches from broiler. Preheat broiler and coat a baking sheet or broiler pan with 1 tablespoon olive oil. Arrange fish on pan and brush

- generously with miso mixture. Broil until opaque in centers and browned on top, 7–8 minutes.
3. While fish cooks, bring 1/4 cup water to boil in a medium pan. Add bok choy, cover and cook for 3 minutes; remove cover and let water boil off. Remove from heat. Add remaining 2 tablespoons rice wine vinegar and 1 tablespoon olive oil, plus soy sauce, lemon juice and 1 tablespoon chives; combine well.
4. Divide bok choy mixture among four plates. Place broiled fish on top of each. Garnish with remaining chives, and sprinkle with freshly ground black pepper to taste and black sesame seeds, if desired.

Mango Strawberry ENERGIZING SMOOTHIE

SERVES 1

INGREDIENTS

- 1 cup unsweetened almond milk
- 1 cup fresh hulled strawberries
- 1 cup frozen mango
- 1 tablespoon hemp seeds
- 2 tablespoons fresh squeezed lemon juice
- 6 cubes ice
- 1 scoop Whole Earth & Sea Fermented Greens – Organic Chocolate flavor

Optional toppings: hemp seeds, mulberries and fresh-sliced strawberries

DIRECTIONS

1. Starting with the almond milk, combine all the ingredients in a blender and mix until smooth.
2. Add more almond milk if you prefer to thin out the smoothie.

Recipe provided by Karlene Karst, RD



ABOUT OUR SPONSOR

OUR PRIVILEGE, OUR PASSION

Today, Natural Factors is one of the largest manufacturers of nutritional products in North America. But our origins reach back to the 1950s, and right from day one, we've always been fully committed to making products right.

A VERY SPECIAL PLACE

Natural Factors Farms is a very special tract of land, covering more than 1,000 acres. This exquisite certified-organic farmland gives Natural Factors complete control over securing the best quality raw materials possible. Literally, control from seed selection to finished product. Few, if any, companies in the world can demonstrate such a degree of control over their operations.

This farm has truly unique soil, built up over millennia from repeated flooding that deposited a tremendous amount of organic matter onto the land. The incredible top soil is more than six feet deep in places! We make sure to choose true "species" non-hybrid, non-GMO seeds and also have full control over the harvest.

BIG ENOUGH TO DO IT RIGHT

We have close to 900,000 square feet of space across North America and believe we need to be "big enough to do it right." This means bringing as many processes in-house as possible. We are one of the only nutritional companies to have our own organic farms, our own extraction, encapsulation and production facilities, our own

labs and research facilities and a vast network of academic, scientific and retail partners. We are also one of the few branded manufacturers of nutraceuticals in North America to have our own softgel encapsulation facility.

UNSURPASSED QUALITY ASSURANCE

Natural Factors facilities conform to all requirements of the Good Manufacturing Practices (GMP) of the FDA, as well as those set out by the Canadian government's Natural and Non-prescription Health Products Directorate (NNHPD). In addition, our facilities have been certified by the Therapeutic Goods Administration of Australia (TGA), one of the most stringent guidelines for manufacturing dietary supplements in the world.

ISURA THIRD PARTY PRODUCT VERIFICATION AND CERTIFICATION

Natural Factors chose ISURA™ to certify our products because they use state-of-the-art equipment. They also use mass spectrometry to test for up to 500 pesticides, solvents, heavy metals and other contaminants. The ISURA seal of approval is your guarantee that our products are non-GMO, safe, pure and potent.

OUR COMMITMENT TO SCIENCE

One of the things that sets Natural Factors apart from others in our industry is the breadth of knowledge represented by the scientific experts that work for us. Drawn from around the world and chosen for their unique training and background, our scientists and quality control specialists are recognized experts in their fields.

REDUCING OUR FOOTPRINT

Natural Factors is working to reduce our footprint in all areas of our operations. Our newest production facility in Monroe, WA, is LEED (Leadership in Energy and Environmental Design) Gold certified. We have found ways to reduce waste and improve energy efficiency at both our offices and our manufacturing facilities and are working toward zero waste.

GIVING BACK

We quietly do our part to make this world a better place. Whether it's supporting research and education, making charitable donations or giving product to people in need, Natural Factors gives back in many ways locally, nationally and around the world.



FROM FARM TO FERMENTATION

Natural Factors' Whole Earth & Sea 100% Fermented Organic Greens and Protein & Greens supplements offer the best of fermented nutrition in a convenient and tasty powdered form. The supplements feature a grass, vegetable and herb blend that's mostly grown on Factors Farms in the beautiful Okanagan Valley in British Columbia. These 100 percent fermented, 100 percent organic supplements also provide a blend of micronized mushrooms for immune support.

Here's a look at Natural Factors' True Fermentation Process:



STEP 1

GROW & HARVEST

Packing a powerful nutrient punch with organic whole foods

- Organic, non-GMO grasses, fruits, vegetables, legumes, herbs and medicinal mushrooms
- True "species" non-GMO seeds
- Nourished in rich alluvial soil, fertilized with compost and nitrogen-rich sea plants
- Hand harvested when key compounds are at their peak



STEP 2

ENVIROSIMPLEX

Preserving the vibrant goodness of whole foods

- After harvesting, the plants are immediately processed by EnviroSimplex.
- This cultures, protects and concentrates the plants and their delicate phytonutrients and enzymes.



STEP 3

FERMENTATION

Optimizing the plants' potential

- The plants are fermented in a carefully controlled true fermentation process using traditional methods.
- Clinically-studied probiotic strains and organic molasses are added to facilitate fermentation.
- Each ingredient is fermented at a specific temperature for a specific length of time at a specific temperature for peak phytonutrient potency based on its individual requirements.



STEP 4

PASTEURIZATION

Ensuring safety while maintaining nutrient integrity

- Fermentation is stopped with a brief burst of flash heat
- This ensures food safety but doesn't harm the plant components



STEP 5

QUALITY CONTROL AND THIRD-PARTY CERTIFICATION

Delivering on product promises

- Undergoes rigorous testing to ensure purity and potency
- Products are also third-party certified by ISURA, which tests for up to 500 potential contaminants to ensure they're pure. This confirms they don't contain GMOs, pesticides and other undesirable substances.



STEP 6

PACKAGING

Bringing more sustainable products to the market

- The supplements are packaged in bottles made of 100 percent post-consumer recyclable materials.
- The bottles are completely recyclable and certified BPA-free.

Why Choose Natural Factors' Greens

- 28 grasses, fruits, and vegetables, the majority of which are grown on Factors Farms
- 5 powerful micronized mushrooms
- 1 scoop = 8 servings of fruits and vegetables
- Greens: available in Organic Chocolate, Tropical and Unflavored
- Protein & Greens: 21g of protein, available in Organic Chocolate and Tropical
- Vegan, non-GMO, gluten free, dairy free; contain no artificial colors, sweeteners or preservatives; naturally sweetened
- Third-party certified by ISURA to ensure purity and potency



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