



Research Packet

Rev 1.0 | May 2017



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About First Endurance

Our Mission

Integrate our passion for racing, knowledge of sports nutrition, integrity, and values to provide endurance athletes with the ultimate, scientifically validated, high-performance racing formulations.

Research Philosophy

Research is the most important value at First Endurance. We are driven by a desire to ensure our products are proven to enhance endurance performance and have scientific validation. At First Endurance, we refuse to reduce costs by using "pixie dust" amounts of ingredients just to dress up the label. Our formulations include at least the same levels of the active ingredients that were used in the actual human scientific research, if not more. We ensure effective products by using the same formulation of ingredients used in the human clinical studies. We are meticulous about research and go out of our way to make sure we have addressed each of our stringent requirements. All products that First Endurance develops are based on human scientific research.

Commitment to Clean Products

First Endurance was built on the premise of offering a high end product line to professional athletes and endurance athletes training at a high level. We have worked with the world's best endurance athletes since 2002. During that time there has been over 1,000 doping tests performed on our athletes with no adverse findings. This is not a coincidence. Since inception, we have had a process-based approach that was developed to ensure no cross contamination. Third party testing does NOT guarantee products are 100% free of banned substances. It only guarantees a product is free of doping substances which they have tests for. Derivatives or analogs of banned substances that do not have a testing protocol can still show up in products. Following a process-based approach allows First Endurance to retain complete control. With our process methodology we remove the risk of cross contamination.

The Process-Based Approach:

- 1) First Endurance owns all of its intellectual property. This means we develop our formulas in-house, so we have complete control over sourcing our ingredients. This allows us to choose our manufacturing facilities to ensure they meet our standards and gives us the control to change ingredient suppliers at any point.
- 2) First Endurance quality standards require manufacturing facilities that are regulated by the FDA to be GMP (Good Manufacturing Practice) certified. In addition, we only use manufacturers that do not manufacture any products containing banned substances.
- 3) Our ingredients are sourced only from reputable companies that do not broker or source ANY banned substances or nutrients that have not undergone strict safety measures. Our suppliers only offer ingredients that are GRAS (Generally Recognized as Safe), have a CAS registry and offer an MSDS (Material Safety Data Sheet). In other words, we would never source an ingredient from an international distributor unless all of these processes were in place.
- 4) When ingredients are received they are tested for purity and potency before they can be released into our manufacturing facility. This two-pronged test ensures the ingredient is exactly as it states.
- 5) Every LOT of finished product produced has a corresponding Certificate of Analysis from a third party lab. This analysis assures the ingredients listed on the label are the only ingredients in the product.

Our strict standards completely eliminate the risk of inadvertent cross contamination, ensuring that our entire manufacturing process and product line remains clean and free of all banned substances.

Certificate of Analysis

A Certificate of Analysis (C of A) is a document which states every active and inactive substance used to manufacture a product, and also shows that there are no additional ingredients added to the formulation. In order to assure the safety and efficacy of First Endurance products, a C of A is made available with every jug and packet of EVO1.

CERTIFICATE OF ANALYSIS		
Product: Optigen-EP		Lot: 01255
Company: First Endurance		
Formula Ingredients	Specifications	Formula Amount
Pharmaceutical Excipients	USP 74 monobasic acid	amount
Water-soluble Excipients	USP 108 USP 109 USP 110	amount
Excipient Phosphate	USP 111 USP 112 USP 113	amount
Pharmaceutical Component	USP 114 USP 115 USP 116	amount
Excipient	USP 117 USP 118 USP 119	amount
Excipient	USP 120 USP 121 USP 122	amount
Excipient	USP 123 USP 124 USP 125	amount
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Excipient	USP 786 USP 787 USP 788	amount
Excipient	USP 789 USP 790 USP 791	amount
Excipient	USP 792 USP 793 USP 794	amount
Excipient	USP 795 USP 796 USP 797	amount
Excipient	USP 798 USP 799 USP 800	amount

The raw material specifications for each ingredient are based on the certification of each supplier. Each supplier has been carefully selected and approved for the production of this product to assure conformance with the Official Formulation and Production Specifications.

About EVO1

Unlike other vegan meals and products on the market, EVO1 is the first to address the protein needs of vegan athletes head-on with a raw and whole-food based formulation. EVO1's vegan protein blend is designed to deliver a PDCAA score of 1.0, which rivals that of the gold standard –whey protein. This score is critical to the anabolic needs of muscles so training results in improvement, and EVO1 is also designed with absolute health in mind.

Every ingredient in EVO1 is simply a concentration of what is naturally available in each of the formula's nutrients. The mix delivers two servings of fruits and two servings of vegetables per 200 calorie drink, plus a full 6g of healthy fats. These include MCTs, which are easily broken down and utilized so athletes can train right after consuming the drink, and 2g of omega 3/6 fatty acids derived from flax seed.

With no added sugars or artificial ingredients, EVO1 is lightly flavored and ready for mixing with fruits, veggies or nuts to create a smoothie or just water or almond milk in a shaker bottle. It's the first fully vegan, whole ingredient-based nutrition shake that can also keep up with the demands of hard-training athletes.

Vegan Proteins

Most would argue that whey protein easily rises to the top as the superior protein source to use for supplementation purposes, which left vegan athletes with only sub-standard options. In recent years, however, a number of changes have opened new doors for those athletes on a vegan diet. First, technological advancements in the food industry allow for the extraction of proteins from different food sources. Second, sustainability issues and a more informed consumer base has led the investigation into numerous and varied protein sources. Finally, a growing need has been identified for protein supplement sources that fit into a vegan and allergy-free diet.

There are now additional protein sources which have shown to have equivalent (and possibly even greater) merits when compared to whey. These include pea, rice, hemp, avocado, barley, buckwheat, cranberry-seed, goat milk, Brazil-nut, and even bug protein (thanks to reality shows like Fear Factor and Man vs. Wild). The strongest case is made for pea and rice protein compared to whey as the reference standard when methods of analysis are considered. These analyses include Protein Digestibility Corrected Amino Acid Score (PDCAAS), Protein Efficiency Ratio (PER) and Biological Value (BV), and allow for a commensurate comparison between the three proteins.

Whey Protein

Whey protein is a high quality complete protein containing all of the essential amino acids required by the body each and every day. There are several different methods that are used today to evaluate protein quality. No matter which method is used, whey proteins have been proven to be an excellent, pure source of protein. To help prevent the breakdown of muscle tissues, whey protein contains beta-lactoglobulin, a rich source of branched-chain amino acids (BCAAs). Whey protein is also a rich source of the amino acid cysteine and has been shown to increase glutathione levels in the body. Glutathione is an antioxidant that helps provide an added boost to the immune system.

Whey proteins have a Protein Digestibility Corrected Amino Acid Score (PDCAAS) of 1.14. The reported score is 1.0, which is the maximum value allowed by the USDA for reporting purposes. The PDCAAS is the USDA's officially approved method of scoring protein quality.

Whey proteins have a Protein Efficiency Ratio (PER) of 3.2, making it one of the highest single source proteins. The PER rating is based upon the evaluation of the growth of animals consuming a fixed amount of dietary protein from a single source. As the PER increases, so does the quality of the protein.

Biological Value (BV) is an evaluation of the protein quality that measures the amount of protein that is retained from the absorbed protein for maintenance and growth. It measures the fraction of nitrogen in the diet that remains after the nitrogen losses in waste products have been subtracted. The Biological Value (BV) of whey proteins is 100, which is higher than the value for casein (milk protein), soy protein, beef, or wheat gluten.

Protein Type	Protein Digestibility Corrected Amino Acid Score (PDCAAS) ¹	Amino Acid Score	Protein Efficiency Ratio (PER) ²	Biological Value (BV)
Whey Protein	1.00*	1.14	3.2	100
Whole Egg	1.00	1.21	3.8	88-100
Casein	1.00	1.00	2.5	80
Soy Protein	0.99	0.99	2.2	74
Beef Protein	0.92	0.94	2.9	80
Canned Kidney Beans	0.68	NA	NA	49
Wheat Gluten	0.25	0.47	NA	34

*Whey protein has a PDCAAS of 1.14. The reported score is 1.0, which is the maximum value allowed by the USDA for reporting purposes.

Pea Protein

Is a pea a vegetable? A fruit? The debate continues. Regardless, this legume contains a good deal of protein. Protein powder extraction typically begins with yellow peas (aka split peas). They are ground into a powder and concentrated/purified by removing a majority of the carbohydrates, leaving a powder that is approximately 90% protein. In general, it is a great source of protein for people who are vegan and seek an allergy free option. It is obviously not a good option for anyone with an allergy to peas.

Pea protein is particularly rich in the essential BCAAs leucine, isoleucine, and valine. Increases in leucine concentrations in the blood have shown to enhance muscle protein synthesis. Pea protein has also been shown to stimulate the satiety-related signaling. Studies have demonstrated that dietary replacement of animal protein with pea protein does not weaken gastrointestinal satiety signaling and has the potential to promote protein synthesis at similar levels as animal sources post exercise. It is important to recognize however, that legume proteins are low in methionine.

Rice Protein

Rice is not typically the first thing that comes to mind when one thinks about adding protein to a meal. Typically, rice is a great carbohydrate compliment to a protein due to the fact that it is a low-glycemic carb source. But the fact remains: brown rice does have protein in it. One cup of brown rice contains

roughly 5 grams of protein, so to get the post exercise required 20-25g of protein from rice, required consumption would be 4-5 cups. For this reason, rice as a whole food protein source is not the greatest option. However, when brown rice is processed and the carbohydrates are separated, the remaining product is a powder that is roughly 70% protein. Similar to pea protein, brown rice protein is a good alternative for those looking for a vegan allergy-free protein powder. One drawback to brown rice protein is its fairly bitter taste if mixed with water alone, however.

But one distinct benefit is that brown rice protein contains more arginine than any other protein powder. Arginine is converted to nitric oxide in the body which suggests that brown rice protein can enhance blood flow, which allows for superior nutrient delivery during and after exercise. Plus, brown rice protein also contains a great deal of glutamine, which promotes muscle growth and immune function and has also been shown to reduce fatigue during workouts in some studies. It's also been shown to have higher levels of the amino acid methionine than most other plant sources, and is rich in leucine with sufficient levels to promote hypertrophy (muscle growth) if consumed in combination with resistance training.

Comparison

Most researchers consider whey protein to be the standard protein supplement. Because of this, it is common for well-designed studies to have three groups when researching alternative protein sources: the test protein, whey protein, and a placebo carbohydrate group. This methodology helps us to compare both pea and rice protein directly to whey protein.

Pea protein has similar or higher levels of numerous essential amino acids including leucine, isoleucine and valine as noted above. Specifically, they have nearly three times more arginine as whey protein. Multiple studies have shown a similar rate of hypertrophy and strength gain as whey protein supplements, with no significant difference between whey and pea. The similar gains have been attested to the characteristics of both proteins. Protein synthesis is 20% higher after ingesting a protein source high in leucine, when compared to one without leucine. Pea protein has also shown to have similar digestion characteristics as whey. Whey signaled a higher insulin response but both proteins induced a large CCK (cholecystokinin) response suggesting both proteins have a high bioavailability. Numerous researchers have suggested pea protein as an equal alternative in protein supplements marketed for athletes.

Rice protein has also shown to compare well to whey protein. It is also high in leucine and has yielded similar results in hypertrophy and strength increases as whey protein. Rice protein has four times more arginine than whey protein. Although there are slightly lower levels of leucine in rice protein than whey, it has been demonstrated that there are sufficient levels of the amino acid in rice protein to optimize muscle growth.

Combination Profile

It is important to keep in mind that it is the composition of the nutrient and not just the net protein content that will affect protein balance. Studies have shown that only the essential amino acids can stimulate muscle protein synthesis. Also, the type of protein can significantly affect digestion characteristics, which will also affect the rate of muscle protein synthesis as well as the hormonal response post-ingestion. This is where most plant-based protein supplements fall short. They often lack specific amino acids necessary to stimulate protein synthesis. Furthermore, their PDCAAS score typically is not high enough to make it a good alternative to whey protein. However, combining plant protein sources in the right ratios offers an amino acid profile that mirrors whey protein. For example, combining pea protein with rice protein gives the following amino acid profile:

PDCAA

Rice Protein 90%	0.65
Pea Protein 80%	0.78
Rice/Pea Blend (55%/45%)	1.00
Whey Protein 90%	1.00

Medium Chain Triglycerides and Athletes

Composition of MCTs

Medium Chain Triglycerides (MCTs) are a type of fatty acid. Like all fatty acids, MCTs contain a glycerol backbone with three fatty acids attached. Unlike long-chain triglycerides, the MCT fatty acids are medium in length. Because of these shorter chains, the fatty acids are easier to break down to use as an energy source. Due to their unique structure and ease of assimilation, MCTs have been considered an alternative energy source to both fats and carbohydrates.

Milk fat, palm oil and coconut oil all contain some level of MCTs. Coconut oil has the highest level of this unique substance, though it's bound to the long chain triglycerides. Because of this, manufacturers must "fraction off" the MCT from the long chain fats in order to be used at functional amounts in supplements.

MCT Metabolism

MCTs have long been given to patients hospitalized for malabsorption of nutrients, especially fats. The ease of absorption allows for significant improvement in the patient's health.

Unlike long chain fats, MCTs do not require the presence of carnitine in order to be transported into the mitochondria. Because of this, MCTs are rapidly transported into cells and can be used by the body to help produce an alternative energy; researchers theorize it may help spare glycogen and boost endurance.

The ease by which MCTs are digested and absorbed led researchers to look at the role these fatty acids might have on athletes as an alternative fuel.

MCTs and Sport

It's been well-established that consuming fat as a fuel source does not improve endurance performance. In fact, several studies have shown that sprint performance at the end of endurance exercise may be compromised with the consumption of fat. However, the data on MCTs in sport is mixed. Some studies have found performance benefit through the suppression of lactate and improvement in high-intensity exercise. Other studies have produced evidence that MCTs do not support any true and meaningful performance benefit. A meta-analysis seems to suggest that MCTs may play a role in enhanced performance for aerobic activity by sparing glycogen.

A 2009 study compared the effects of MCTs to long chain triglycerides on athletes training over a 2-week period. The group ingesting MCTs did improve time to exhaustion at 80% of their VO₂ peak. Lactate concentration and rate of perceived exertion were also lower in the MCT group. The MCT group also burned fat more efficiently, sparing glycogen.

Research on Health

A 2016 study looked at the effects of MCTs on gut health. This study discusses the role of MCTs in improving the health of the gut. Resulting data from this study showed MCTs improved both intestinal ecosystem and permeability, thereby effectively improving gut microbiota.

Why MCTs?

Consuming long branched fatty acids prior to workouts has been shown to be detrimental to performance. MCTs, on the other hand, are far easier to absorb and may offer some health and performance benefit. MCTs are a healthy alternative to saturated fats and have the potential to improve gut bacteria and health. Some evidence suggests MCTs may also help athletes become leaner by catabolizing stored fat.

Plant-based diets and athletic performance

Within the past few years, plant-based diets have gained in popularity. They are recommended in various weight management programs and are the choice of environmentally-conscious individuals, animal right supporters and various religious practices. Plant-based diets are also the choice for many professional and amateur athletes alike.

Despite the initial concerns on malnutrition or performance-related issues from past years, the increasing number of successful vegetarian or vegan athletes has brought plant-based diets into the spotlight. And although the science has not definitively demonstrated an advantage or disadvantage in the performance of the non-omnivorous over the omnivorous athletes, some initial concerns have been addressed by leading-edge research.

Achieving a full vegan diet as an athlete

Is a full vegetarian/vegan diet achievable by athletes and endurance athletes in particular? Is it safe? Is it performance enhancing? There are no right or wrong answers to these questions because each individual athlete is unique. However, some facts do exist. The official position of the American Dietetic Association supports the well-planned vegetarian (lacto-, lacto-ovo-) or total vegetarian (i.e. vegan) diet as healthful, nutritionally adequate and with potential benefits to certain diseases [1].

As far as sports performance goes, the American College of Sports Science does not differentiate dietary needs for the vegetarian or vegan athlete compared to the omnivore ones. However, it brings into attention the reduced bioavailability of plant associated proteins and the possible lower intake of vitamins B-12, D, riboflavin, iron, calcium and zinc in the vegetarian diets. Because these macro and micronutrients are crucial for optimal nutrition, performance and recovery, the American College of Sports Science suggests that plant-based diets of athletes (compared to meat-based diets) should have an increased quantity of specific food families in order to succeed higher enrichment and digestion of the above nutrients. Supplementation is also suggested [2].

Protein digestion and bioavailability

When an endurance athlete follows a vegetarian or vegan diet, perhaps of highest importance is the consideration of protein digestion and bioavailability. An athlete may take enough protein from plant or

animal sources for their energy and recovery requirements but the plant-based proteins are not as well absorbed as the animal proteins. More importantly many plant based proteins lack a complete amino acid profile or more specifically some key amino acids that are beneficial to athletes training strenuously. Therefore, an athlete who depends on a solely plant-based diet should take careful action to optimize digestive tracts and increase protein intake by 10% to account for the possibility of incomplete protein digestion [2].

Plant-derived vitamins and iron

Athletes should also consider plant protein blends carefully to ensure the amino acid profile supports training. In addition to protein bioavailability, the bioavailability of the iron that comes from the plant food sources is of importance. Iron stores in the vegetarian population are generally lower than the non-vegetarian despite the fact that total iron intake is similar or even higher [3, 4]. So, when considering food sources, endurance athletes, and in particular female athletes, should consider the lower bioavailability of plant-diet derived iron. Additionally, vegetarian athletes need to take into account that the crucial vitamins B-12, B-2 and D, bone-strengthening calcium, and zinc are lower in plant-based products [2, 5]. Therefore, in many cases of vegetarian athletes, careful planning and supplementation is pivotal for optimizing performance.

On a positive note, current knowledge, advanced food resources and innovative supplementation have come a long way. Numerous successful professional athletes have experienced tremendous benefits from plant-based diets with minimal issues of malnutrition or decreased performance. For example, appropriate combinations of plant-based proteins (like rice and pea) may provide a Protein Digestibility Corrected Amino Acid Score (PDCAAS) – used by USDA as a protein quality score – equivalent to the PDCAAS of whey protein.

Plant-based diet and overall health

Despite the fact that presently there is not enough scientific evidence to support benefits of one diet vs. the other, carefully scheduled plant-based diets seem to improve the mood, health, training, recovery and performance on race day for an increasing number of athletes. For example, Lauren Goss, a successful First Endurance professional triathlete who is a multiple 70.3 Ironman distance champion, has recently converted to a vegan diet. Since eliminating meat, dairy, eggs and limiting gluten, she reports better sleeping, less digestive distress, brighter skin, faster recovery and high energy with no more bloating, full stomach or other digestive discomfort.

Supplement Facts Panel

Chocolate

Use Directions: Take one to two servings between exercise sessions. Mix with almond milk or water, if desired blend in fruits, vegetables or nuts.

Supplement Facts		
Serving Size: One packet (59g) makes 12 fluid ounces.		
	Amount Per Serving	%DV
Calories	240	

Calories from fat	60	
Total fat	6 g	9%
Omega 3 Fatty Acids	1.5g	*
Omega 6 Fatty Acids	0.5g	*
Medium Chain Triglycerides (MCT Oil)	3.0g	*
Total Carbohydrate	26 g	9%
Fiber	3g	12%
Sugars (cane, grains, fruit and vegetable)	20 g	*
Protein (from pea, rice, flax)	21 g	40%
Calcium	60mg	6%
Magnesium	118mg	5%
Sodium	210mg	8%
Potassium	220mg	4%
*Daily Value Not Established		

Ingredients (chocolate): Organic sugarcane, pea protein, organic brown rice protein, organic flax seed, medium chain triglycerides, fruit and vegetable blend (banana, apple, blueberry, carrot, spinach, broccoli, oats, amaranth, quinoa, buckwheat, chia, millet) cocoa powder (processed with alkali), silicon dioxide, inulin, sunflower lecithin, natural flavors, sea salt, monk fruit.

Vanilla

Use Directions: Take one to two servings between exercise sessions. Mix with almond milk or water, if desired blend in fruits, vegetables or nuts.

Supplement Facts		
Serving Size: One packet (59g) makes 12 fluid ounces.		
	Amount Per Serving	%DV
Calories	240	
Calories from fat	60	
Total fat	6 g	9%
Omega 3 Fatty Acids	1.5g	*
Omega 6 Fatty Acids	0.5g	*
Medium Chain Triglycerides (MCT Oil)	3.0g	*
Total Carbohydrate	26 g	9%
Fiber	3g	12%
Sugars (cane, grains, fruit and vegetable)	20 g	*
Protein (from pea, rice, flax)	21 g	40%
Calcium	60mg	6%
Magnesium	118mg	5%
Sodium	210mg	8%
Potassium	150mg	4%
*Daily Value Not Established		

Ingredients (vanilla): Organic sugarcane, pea protein, organic brown rice protein, organic flax seed, medium chain triglycerides, fruit and vegetable blend (banana, apple, blueberry, carrot, spinach, broccoli, oats, amaranth, quinoa, buckwheat, chia, millet), silicon dioxide, inulin, sunflower lecithin, natural flavors, sea salt.

Typical Amino Acid Profile

Alanine	1024mg	Lysine	1396mg
Arginine	1914mg	Methionine	329mg
Aspartic Acid	2415mg	Phenylalanine	1263mg
Cystine	310mg	Proline	1171mg
Glycine	960mg	Serine	1178mg
Histidine	520mg	Threonine	841mg
Isoleucine	992mg	Tryptophan	234mg

Valine	1189mg	Glutamine	4044mg
Leucine	1932mg	Tyrosine	995mg



FAQs

What's the best way to use EVO1?

EVO1 was designed to be a meal replacement as well as to fill in some additional high quality calories in-between meals. Most athletes will likely use a serving between meals in preparation for their next workout. Vegan athletes should use this as their recovery drink.

Can this be used in place of breakfast, lunch or dinner?

Yes, however with only 200 calories per serving of EVO1, it's best to mix in some fruit, almond milk, nuts and make a smoothie for equivalent calories to a meal.

What type of protein is in the EVO1 drink mix?

EVO1 uses a proprietary ratio of rice and pea protein. The combination of these two proteins at the proper ratio not only makes this a complete protein, but also a high quality alternative that rivals whey and egg proteins. At this ratio, EVO1's protein mix has a Protein Digestibility Corrected Amino Acid (PDCAA) score of 1.0, which is equivalent to whey protein.

What is the Omega-3 source in EVO1?

The Omega-3 in EVO1 comes from flax.

Why are there 20 grams of sugar in the formula?

Because all ingredients in EVO1 are whole food-based, there are naturally occurring non-processed sugars from the fruit, vegetable and organic cane used to formulate the mix.

Can I use EVO1 to lose weight?

Yes, if used appropriately with the right exercise program and eating plan. EVO1's medium chain triglycerides (MCTs) have been used effectively to help reduced unwanted fat.

Will EVO1 help me burn fat?

Yes, if used appropriately. Delivering nutrient-dense foods with the right combination and source of fats, carbohydrates and proteins is an effective way to help burn fat.

What are the endurance benefits of EVO1?

EVO1 delivers very healthy calories to an athlete prior to or post exercise, including MCTs which, as an alternative fuel source to fat or carbohydrates, have been shown to be an effective fuel for endurance training.

Why are there MCTs in EVO1?

MCTs are derived from coconut oil and have been shown to be an effective alternative fuel that is easily assimilated. It's a fuel source that can help energize workouts.

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