

References

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Gammanol Forte™

Nutrition Support for Athletic Performance

Gammanol Forte™ supplies gamma oryzanol and a proprietary form of free transferulic acid (FRAC®) in a specially prepared vegetable culture base containing antioxidant enzymes, superoxide dismutase (SOD) and catalase. In addition to being a powerful antioxidant, **Gammanol Forte™** is used to increase lean muscle mass, enhance endorphin release, support normal, healthy cholesterol levels, increase human growth hormone activity and normalize gastric functioning, particularly on gastric and duodenal mucosa.^{1,2}

What is Gamma Oryzanol

Gamma oryzanol is a naturally occurring mixture of plant sterols and free transferulic acid esters derived from rice bran. Research indicates that gamma oryzanol has a number of functional effects, its best-known being that it promotes the increase in lean muscle mass and enhances endorphin release. The sterol components of gamma oryzanol have noted effects on testosterone, estrogen, progesterone and DHEA. It has been known to provide support for those having hormonal fluctuations associated with menopause, increase human growth hormone activity (as measured using insulin growth factor 1 [IGF-1]), and act as a potent antioxidant. Studies suggest gamma oryzanol also supports heart health in humans.³

Benefits of Added FRAC®

When taken orally, absorption of gamma oryzanol is less than 10% since it has a fat-soluble sterol. Absorbed gamma oryzanol is then split into its two halves by an enzyme



called non-specific esterase in gut and liver cells, releasing free ferulic acid (water-soluble) and a sterol (removed via bile).

Gammanol Forte™ is intensified with FRAC®, a unique mixture of water-soluble, free ferulic acid and free sterols prepared from natural plant sources produced by a proprietary fractionation process developed by Biotics Research. FRAC® provides free ferulic acid with a complex mixture of polyphenolics, including free sterols and triterpenoids. Therefore, the inefficiency of ferulic acid delivery from gamma oryzanol is bypassed, and a defined source of natural, free ferulic acid is produced. FRAC® is natural and non-toxic. Unlike synthetic ferulic acid, which exists in a mixture of cis- and trans- forms, FRAC® is in a natural trans- form. It possesses free-radical scavenging properties, similar to that of silymarin and α-tocopherol, as measured by its ability to quench the organic DPPH (1,1 diphenyl 2-picrylhydrazyl) free radical.⁴



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*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

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Athletic Studies

Effects of gamma oryzanol on weightlifters have been measured with positive results, although all but one study included additional supplementation. These studies lasted eight to sixteen weeks and involved 184 subjects and, later, an entire professional football team chose these products to be their official nutritional supplements.⁵

In another study, a combination of nutritional supplements including free-form amino acids, octacosanol, gamma oryzanol, vitamins, digestive aids, glandulars and plant porphyrins was administered to 13 male college athletes for 8 weeks in an open study. Controls represented 20 male college athletes who were not supplemented. Measurements were taken before and after an 8-week period. A significant decrease ($P < 0.001$) in body fat percentage was observed in the supplemented group (-3.4% compared to +0.25% for controls). Increases in muscle girth measurements for biceps, forearms, thighs, calves and chests were significant ($P < 0.005$) for the supplemented group when compared to controls and pre-supplementation values.⁵

In his book, "Gamma Oryzanol: The Facts," Dr. OJ Bruni illustrates how gamma oryzanol functions as a true adaptogen by augmenting the ability of the autonomic nervous system to respond to stress. Exercise, especially anaerobic tasks such as weightlifting, is a major stress. As a response, the body releases hormones such as endorphins, corticosteroids, androgens and growth hormones with roles in managing pain, inflammation and stimulation of tissue repair. By enhancing the effect of key brain neurotransmitters, both gamma oryzanol and FRAC® are able to increase synthesis of growth hormone and possibly endorphins. Both of these hormones have anabolic or anticatabolic properties, optimizing results of resistance training.⁶

Key Benefits for Athletes:*

- Increased muscle mass
- Decreased body fat
- Increased strength
- Improved recovery from workouts
- Less post-workout muscle soreness

Although a study with weight-trained men found that 500 mg of gamma oryzanol daily for nine weeks did not affect exercise performance,⁷ that particular study did not use gamma oryzanol combined with FRAC®, which appears to offer synergistic benefits by increasing the absorption of gamma oryzanol.

Growth Hormone Production

Growth hormone promotes cell growth by increasing protein synthesis; it causes cells to switch from relying on carbohydrates for energy to burning fat by stimulating fat breakdown. Growth hormone levels generally decline with age, and this may contribute to the reduced bone formation and increased bone loss frequently observed in elderly women.

A small study conducted by Dr. David Brownstein demonstrated that women taking **Gammanol Forte™** for five weeks showed an increase in insulin-like growth factor-1 (IGF-1), and by inference growth hormone (GH), which directs the production of IGF-1.⁸ The most potent regulator of IGF-1 in postnatal life is GH and it has been shown that total IGF-mRNA levels increase after administration of GH. Preliminary evidence has shown that the start site of exon 2 is GH dependent and primarily found in the liver, the major site of production of circulating IGF-1.⁹ A significant increase in serum IGF-1 was seen in 8 out of 10 women following supplementation with an average increase of 45%. Results suggest that supplementation with **Gammanol Forte™** increases growth hormone production in women.

Immune-Boosting Benefits

Among elderly patients, lowered serum IGF-1 also correlates with reduced immune function, as indicated by reduced proliferation of activated T-cells, thus, maintaining healthy IGF-1 levels is also important for immunity.¹⁰

Post-Exercise Stress Management

Based on animal studies of somatotropin synthesis and release, ferulates (ubiquitous plant phenolics) augment endorphin release by hypothalamic modulation of catecholamine neurotransmitters. In a double-blind crossover study, the beta endorphin, cortisol and testosterone levels were measured in six, highly trained male distance runners before and after intense workouts after supplementation with placebo or ferulate (50 mg daily).¹¹ Each test period lasted three weeks, with regular training the first two weeks.

The third week comprised 3 intense workouts (8X400m sprints with 200m interval jogs), separated by 48 hours each. Workout resulted in 95-100% of maximum heart rates. Crossover of supplements followed a two-week washout period. Blood was collected before and after the first and third workouts of the third week to observe possible training effects. All subjects showed significant increases in cortisol, testosterone and beta endorphin as a result of the workouts. There was no difference between the placebo and supplemented periods for cortisol or testosterone changes, although a trend towards greater testosterone increases post-workouts was seen in the supplemented period. After the third workout, beta endorphin levels post-workout were significantly greater during the supplemented period than the placebo period ($p < 0.05$ by paired, two-tailed t-test). Highest post-workout endorphin levels were found in 5/6 subjects after ferulate supplementation. Results support the postulated mechanism of action of ferulates.

An Example of Nutritional Supplements Used by Two Successful, Drug-Free Bodybuilders	
Between meals	free-form amino acid mixtures [4-6 capsules]
Before workouts [1-2 hours]	gamma oryzanol (100 mg), FRAC (200 mg), L-carnitine (900 mg), multiple vitamin/mineral, antioxidant mixture
After workouts	gamma oryzanol (100 mg), FRAC (200 mg), L-carnitine (900 mg), multiple vitamin/mineral, antioxidant mixture



Available in a 90T (#6710) and 180T (#6711) bottle

FRAC®/Gamma Oryzanol vs Anabolic Steroids

Anabolic steroids cause well-known adverse side effects, especially psychological dependency. However, their use runs rampant among competitive bodybuilders, making the need for alternatives critical. Although doing a side-by-side comparison study is not feasible, literature reports can be reviewed on self-administration of large, stacking doses of anabolic steroids for four to twelve weeks and compare with studies on gamma oryzanol and FRAC®. While body weight gains are less with supplements, body fat decreases are more consistent (-4%), strength gains are almost as large (5-15%) and most importantly, no side effects were seen. Larger weight gains from steroid users are partly due to water retention, a known side effect of steroids. Blood analysis from FRAC® users showed normal reproductive hormone levels and normal blood chemistries. They have even been shown to benefit those with elevated cholesterol. Furthermore, gamma oryzanol and FRAC® break down into normal dietary metabolites, excreted in the urine.

Supplement Facts

Serving Size: 1 Tablet

	Amount Per Serving	% Daily Value
FRAC® (from rice) †	50 mg	*
Gamma oryzanol (from rice)	25 mg	*

* Daily Value not established

Other ingredients: Cellulose, vegetable culture ‡, magnesium stearate (vegetable source), silica, stearic acid (vegetable source) and modified cellulose gum.

† FRAC® (a registered trademark of Biotics Research Corporation) is a mixture of water soluble, free transferulic acid and free sterols prepared from rice bran by an exclusive fractionation process developed by Biotics Research Corporation.

‡ Specially grown, biologically active vegetable culture containing naturally associated phytochemicals including polyphenolic compounds with superoxide dismutase and catalase, dehydrated at low temperature to preserve associated enzyme factors.

This product is gluten and dairy free.

Directions for use: For athletes use 2-4 tablets before and after a workout and 2 tablets at bedtime. For elevated blood fats use 4 tablets after each meal. For patients who experience muscle soreness after sleeping, use 4 tablets after each meal.

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