Sports Nutrition Concepts & Formulations
Evolution of Sports Nutrition and Emergence of Active Nutrition

The sports nutrition market was reported to be worth $12bn in 2016, with projected growth at a CAGR of 8-10% until 2021. This growth has been fuelled by an increase in the number of consumers who are interested in benefits of exercise and nutrition as part of a proactive approach to health and wellness. Consumers are now also looking to reduce the impact of aging and are interested in emerging needstates such as inflammation, joint and brain health.

As sports nutrition has evolved, the consumer has segmented into three core markets:

- **Performance nutrition**: the core market for sports nutrition focused on products that improve performance in the acute periods before, during and after exercise
- **Active nutrition**: a focus on the generational shift of consumers who exercise and are looking for nutrition solutions to promote the desire to be “ageless”
- **Health and wellness**: high protein and high nutrient value products that offer consumers convenient solutions to improve the quality of their everyday diet

Gencor and its partner Pharmako Biotechnologies, have clear expertise in a variety of sports and active nutrition ingredients as well as technology solutions. The novel LipiSperse® delivery system created by Pharmako Biotechnologies increases the dispersion of crystalline lipophilic agents in aqueous environments, enabling enhanced bioavailability and functionality.

Gencor specializes in three key commercial platforms:

- Muscle Health
- Joint Health
- Nootropic

Clinically backed by double-blind placebo-controlled studies, Gencor offers a range of products that support today’s active consumer and athlete. Gencor’s ingredients are GRAS-affirmed, Non-GMO Project Verified and WADA-approved, making them ideal for sports nutrition powders, RTD, gels, gummies, capsules and functional foods and beverages.

Discover the science, applications and formulation concepts using Gencor’s ingredients to augment recovery, endurance, energy, weight loss and joint health.
HydroCurc™

Derived from the dried rhizomes of Curcuma longa, HydroCurc™ utilizes LipiSperse®, a dispersion technology that allows the curcumin to easily disperse in water. Delivering up to 90% curcuminoids with only 10% excipients, HydroCurc overcomes the challenges found in standard curcumin: bioavailability and efficacy. Another unique functionality of HydroCurc is its ability to be used in several delivery systems including, tablets, capsules, powders, and functional foods and beverages.

Product Benefits

HydroCurc’s myriad of health benefits can be attributed to its anti-inflammatory and antioxidant properties, reducing oxidative stress and inflammation caused by exercise.* This in result reduces muscle soreness and fatigue, enabling athletes to recover faster and increase workload.* In addition to muscle health, curcumin has also been documented to enhance endothelial function, minimize loss of aggrecan in cartilage for joint issues and provide neuro-protective benefits.*

Awards

- NutraIngredients Awards Finalist Botanical Product of the Year (Europe)
- NutraIngredients Award Winner Editors Award for Functional Food Innovation 2018 (Europe)
- NutraIngredients Awards Winner Botanical Product of the Year 2018 (Asia)

Example Finished Products:

1. HydroCurc™ + Whey Protein Isolate (muscle recovery powder*)
2. HydroCurc™ + Levagen® (muscle recovery capsule*)
3. HydroCurc™ + CoQ10 + CHO (endurance gel*)
4. HydroCurc™ + Glucosamine + Omega-3 (joint health capsule*)
5. HydroCurc™ + Guarna Extract + L-Citrulline (pre-workout shot*)
6. HydroCurc™ + Electrolyte Blend [Mg, Na, K, Ca, Cl] + Vit C (Hydration effervescent*)

* 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.
Science Application

Pharmacokinetic Trial

- Higher plasma curcuminoid concentration compared to standard curcumin
  - 807 vs 240ng/mL (threelfold increase in Cmax)
- More than double Total AUC after 6-hr compared to standard curcumin
  - 1,857 ng/mL vs 875 ng/mL


Exercise Recovery Study

A double-blind, randomized, placebo-controlled study to evaluate the effect of orally-dosed HydroCurc™ on exercise recovery in healthy males

500mg HydroCurc significantly:

- Lowered pain score post-exercise (DOMS)*
- Reduced lactate levels post-exercise*
- Lowered inflammatory markers (IL-6)*
- Reduced thigh circumference (back to baseline)*

Internal summary report of clinical trial currently under peer review.

Translating Science into Performance

- Higher bioavailability for increased functionality
- Lower build up of lactate allowing athletes to perform at higher thresholds for longer*
- Reduced DOMS suggesting quicker return to training and improved training adaptations*
- Quicker return to baseline thigh circumference indicating less swelling*

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Testofen®

Derived from a culinary herb, Trigonella foenum, Testofen® has an impressive safety background and is a standardized aqueous extract of Fenugreek with 50% content of furostanol saponins. Testofen is not a testosterone mimic, but gradually displaces a very small amount of bound testosterone and down-regulates 5-alpha reductase expression. These two complementary mechanisms lead to a slow increase in free testosterone towards the top of the normal range.

Numerous clinical studies have shown Testofen increases testosterone levels naturally. The anabolic and androgenic properties it provides can help an athlete increase lean muscle mass, strength and stamina, whilst also reducing body fat.* This results in enhanced sports performance and body composition.*

Awards

NutraIngredients Finalist - Healthy Aging Ingredient of the Year 2018 (USA)

Example Finished Products:

1. Testofen® + Whey Protein + Creatine Monohydrate + CHO (weight gainer powder*)
2. Testofen® + Whey Protein Isolate (lean recovery powder*)
3. Testofen® + Vit B Complex + Zn (anabolic capsule)
4. Testofen® + Guarana Extract + Mg + Vit B Complex + L-Arginine (RTD vitality/pre-workout shot)

Science Application

One 8-week, randomized, double-blind, placebo-controlled clinical study showed positive results in three main areas

600mg Testofen® significantly:

- Increased free testosterone levels*
- Decreased body fat*
- Increased lean muscle mass*

Testofen for increasing muscle strength, endurance and lean body mass in men.* A double-blind, randomised, placebo-controlled interventional study

- Improved lower body strength in cyclists*
- Increased aerobic endurance*
- Improved body composition (decreased body fat and increase LMM)*
- Increased functional threshold power*

Internal summary report of clinical trial currently under peer review.

![Graphs showing changes in FTP (Watts) from baseline to week 8](image)

Translating Science into Performance

- Increased strength, power and endurance for improved athletic performance*
- Positive effects on aerobic capacity for endurance athletes*
- Improved body composition for increased metabolism and sports performance*

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Levagen®, also known as Palmitoylethanolamide (PEA), is the first of the next generation anti-inflammatory analgesics.* It is an endogenous fatty acid amide produced by the body in response to stressors, pain and inflammation as a biological response and repair mechanism.* Levagen combines high analgesic and anti-inflammatory efficacy for recovery and discomfort relief.* This product is a great alternative to NSAIDs which can cause a myriad of adverse effects.

Levagen is also available in cold water dispersible format under Levagen+™. Levagen+ is powered by LipiSperse® technology and is specifically designed to increase bioavailability of PEA for food and beverage applications.

Product Benefits

Studies on osteoarthritis patients have shown Levagen to reduce joint pain and stiffness, which tends to be the result from mechanical stress induced by exercise.* Results from a recovery study also found Levagen to reduce lactate levels and muscle damage, shortening down-time after training and enabling a more intense and sustained performance.* The endocannabinoid receptors that PEA acts on also allows Levagen to improve sleep quality, thereby being an ultimate recovery ingredient.*

While the most obvious application is in elite sports where injury is a frequent challenge, Levagen is still appropriate for the everyday active individual.*

Example Finished Products:

1. Levagen® + HydroCurc™ + Omega-3 (joint care capsule*)
2. Levagen® + Glucosamine + Collagen (joint care powder*)
3. Levagen® + BCAA/WPI (intra- or post-workout powder*)
4. Levagen® + Mg + Vit B Complex (pain relief effervescent*)
5. Levagen® + ZMA + Melatonin (sleep recovery formula capsule*)
Science Application

Osteoarthritis Study

A double-blind, randomized, placebo-controlled study to demonstrate the safety and efficacy of Levagen® for the management of mild to moderate osteoarthritis symptoms*

- Reduced pain*
- Reduced stiffness*
- Increased function*

Exercise Recovery Study

A double-blind, randomized, placebo-controlled study to evaluate the effect of orally-dosed Levagen+™ on exercise recovery in healthy males

150mg Levagen+ significantly:

- Decreased myoglobin levels 1-, 2- and 3-hrs post-exercise*
- Reduced lactate levels post-exercise*

Internal summary report of clinical trial currently under peer review.

Translating Science into Performance

- Reduced joint pain and stiffness for improved mobility and function*
- Reduced muscle damage and blood lactate levels, suggesting Levagen® supplementation may enable athletes to withstand higher exercise intensity for longer*
- Beneficial for individuals who exercise in quick succession or who compete in back-to-back events
- Reduce daily discomfort for enhanced well-being*

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ActivAMP® is extracted from Gynostemma pentaphyllum, an adaptogenic herb containing a family of compounds that upregulate sestrins. These sestrins activate AMPK, often known as the “master metabolic regulator,” and switches on the same fat-burning and energy producing processes that exercise does.* By diverting metabolism towards energy production, ActivAMP can influence athletic performance by controlling glucose uptake, fat oxidation, and appetite.

Additionally, AMPK activation has a role in promoting genes that increase autophagy, mitochondrial neogenesis and antioxidant production, as well as down-regulate those that cause inflammation.* Studies on ActivAMP has shown its efficacy in decreasing body weight, fat and food intake, hence this unique ingredient has the ability to regulate healthy glucose metabolism and energy production, vital for any active consumers endurance and body composition.*

Example applications:

- Individuals who need to achieve better blood glucose control
- The overweight who want to reduce adipose tissue without losing muscle
- Today’s urban, sedentary population who are at risk of metabolic syndrome
- Those who cannot exercise (hemi- and quaroplegics/neurological disorders)
- Athletes who want to trigger autophagy and pre-train the muscle prior to competition

Awards

- NutraIngredients Finalist for Healthy Ageing Product of the Year 2018 (Asia)

Example Finished Products:

1. ActivAMP® + Green Tea Extract + Chromium + L-Theanine + Vit B Complex (fat burner capsule*)
2. ActivAMP® + CoQ10 (energy gel*)
3. ActivAMP® + Vegan Protein Blend + Probiotic & Enzyme Blend + Greens Formula (meal replacement powder)*

Science Application

Weight Loss Study

Antiobesity Effect of Gynostemma pentaphyllum Extract: A Randomized, Double-Blind, Placebo-Controlled Trial

450mg ActivAMP® significantly decreases:

- Body fat mass*
- Percent body fat*
- Body weight and BMI*
- Total abdominal fat area*

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Translating Science into Performance

- Improve body composition for improved athletic performance*
- Supports metabolic processes for optimal energy production*
- Triggers autophagy for better pre-activation of muscle cells*


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