NATURAL PRODUCTS INSIDER®

SupplySide®

A SPECIAL ALL-DIGITAL ISSUE VOLUME 3 ISSUE 4 $20.75 US June 2013

Faster, Stronger, Harder

Optimizing performance with natural sports nutrition ingredients

See Inside:

Advanced Nutrition for the Evolving Athlete

"Athlete" is no longer just the NFL quarterback or the gymnast who podiums at the Olympics. The term now encompasses those champions as well as the everyday heroes, such as the politician who uses P90X to stay in shape, the retail worker who unwinds with yoga and the editor who spends weekends with a race number pinned to her shirt.

All of them, and the slew of athletes in between, can tailor their nutrition to reach their ultimate performance goals. Nutrients from foods and dietary supplements can help build muscle so exercisers are stronger, aid in weight management so they are lighter and faster, give them energy so they can complete each workout with vigor, cushion their joints so they avoid injury, and promote recovery so they can get back to the sport they love sooner.

But not just any old ingredients will do. Consumers demand research-backed ingredients that won't put them at risk for dangerous side effects. With reports of adverse events linked to energy drinks in the news, lawmakers requesting increased scrutiny on caffeine and the health consciousness that usually accompanies an athlete, consumers are becoming more wary of products that promise too much too soon without research backing.

Regulatory bodies are also demanding safety assurances from sports nutrition product manufacturers. It's not just FDA that's keeping a close watch on products aimed as improving athletic performance. Health Canada recently released several warnings to the public concerning adulterated sports nutrition products, particularly those that promote weight loss and muscle definition.

Despite these warnings, consumers are still interested in sports nutrition functional foods and supplements, but they must meet label claims, be convenient to take, market to a wide audience and stay on the right side of the law. It's not as easy task, but this **INSIDER** Digital issue is here to help.

This Digital Issue takes a look at the research behind key dietary ingredients that help improve athletic performance from several angles—from muscles to joints and recovery. We close the issue with a look at Canadian regulations aimed at sports nutrition products.

Be sure to check out **naturalproductsinsider.com** for more information on sports nutrition products. There, you can view articles in our **Sports Nutrition Content Library**, and in August 2013, we're launching a Sports Nutrition Immersion Center that will offer in-depth market Reports, Digital Briefs on key ingredients, slide shows and more.

Sandy Almendarez
Editor in Chief, Natural Products **INSIDER**
(480) 281-6745
salmendarez@vpico.com
@SandyAlmendarez

NATURAL PRODUCTS INSIDER

Faster, Stronger, Harder

CONTENTS

A SPECIAL ALL-DIGITAL ISSUE *VOLUME 3 ISSUE 4* *June 2013*

4

17

26

36

Features

Living on the Edge

Sports nutrition for improved performance

by Steve Myers

Some athletes train for one golden moment in one landmark competition. Others workout regularly to stay in shape for ongoing good health and preparation for weekend events. The common thread is they all seek improved performance from their sports nutrition products. They want to see improvements to their bodies and experience improvements in their a fitness after taking the products, which means the products must perform as promised.

Sports nutrition consumers strive to improve performance in four key areas: body composition, energy, strength and recovery.

INSIDER's TAKE

- Sports consumers look for a performance edge by targeting body cmposition, energy, strength and recovery.
- Traditional sports supplement delivery includes powders, capsules and tablets, but on-the-go forms such as gels and shots are increasingly in demand from active consumers.
- Science, quality and efficacy are primary long-term drivers in the sports nutrition market and are often highlighted by certifications.

Body Composition

The goal here is less fat, more muscle or lean body mass. Improving body composition not only helps people look good, but also makes them feel and perform better.

Conjugated linoleic acid (CLA) inhibits a lipase enzyme responsible for the breakdown of dietary fat, which limits fat storage in the body. However, in addition to reducing fat deposits, it also promotes development of lean muscle mass. "We are noticing the sports nutrition market opening up to wider age groups and a larger consumer type specific to our Clarinol CLA ingredient, which had not typically been marketed to for that segment," said Emile Henein, global business manager, Stepan Lipid Nutrition. "Instead of your late teens and 20s age group, or regular body builder or sports athlete, we now easily see the consumer for Clarinol CLA as a weight management/sports nutrition combined product option, appealing to a wider age group, of which may only exercise moderately to occasional days such as weekends."

Products that increase the metabolic rate and burn more energy by creating heat are called thermogenics. Among these are **bitter orange**, **7-oxo-DHEA**, **green tea** and **fucoxanthin**.

Sports nutrition consumers strive to improve performance in four key areas:

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3

ViNitrox™

Time to power up !

IFT13
ANNUAL MEETING + FOOD EXPO®
VISIT US AT
BOOTH 4338

NEW CLINICAL STUDY

- Ignite muscle performance
- Break through the fatigue barrier
- Amp up Nitric Oxide level
- Apple & grape polyphenols

ViNitrox™ is a unique and proprietary synergistic combination of apple and grape polyphenols. It has been specifically developed to answer the demands of athletes in search of natural dietary supplements.

ViNitrox™ offers a number of exceptional sports nutrition properties including enhanced and lasting performance. Nexira's latest clinical study on 50 athletes, 25-45 years old, demonstrated that under intensive effort 500 mg/day of **ViNitrox**™ improves physical capabilities.

nexira
HEALTH
info-usa@nexira.com
www.nexira.com

Scott Steil, Nutrabridge, noted 7-Keto offers multiple clinical studies to support claims focused on thermogenesis and increasing metabolic rate. “The fact that our ingredient is a non-stimulant, also offers solid consumers unparalleled safety,” he said. “Finally, we are seeing very positive feedback on positioning the product as one of the few ingredients that actually replaces something produced by our bodies—we all have 7-Keto in our bodies, but lose more than 50 percent of natural levels by the age of 40 (which in part explains why it’s tougher to burn fat as we get older).”

Energy

A lean, mean machine burns more energy and thus requires more energy from the body and diet. Energy is created on a cellular level, with various reactions and energy released in the mitochondria membranes.

Acetyl-L-carnitine, small amounts of which are synthesized in the body, helps transport fatty acids into the mitochondria to be broken down and used as an energy source. “Without L-carnitine, this transfer of fatty acids does not occur, and fats are not able to be converted into energy,” said Kevin Owen, Ph.D., head of technical and scientific affairs, Lonza, adding decades of science support its use in energy production as well as fat metabolism, cardiovascular function, blood flow and providing normal blood supply to the tissues.

A lean, mean machine burns more energy and thus requires more energy from the body and diet.

Within the mitochondria, adosine triphosphate (ATP) is considered the currency of energy. It contains three phosphate groups, the bonds between which contain a wealth of potential energy. Unstable due to high negative charges, these groups are broken up easily, which releases energy. As the phosphate is released, such as during exercise, ATP becomes adosine diphosphate (ADP), which is similar to a depleted battery. A component of adosine in ATP, **ribose** is a crucial component in restoring ADP to the fully charged ATP to continue the energy production cycle. The body can manufacture ribose from glucose, but the process is slow in the heart and muscles, according to Tom VonderBrink, president, Bioenergy Ribose, which is why supplementation can help, especially in athletes.

The body oxidizes fat to provide energy in longer activities, say 30 or 40 minutes and longer. Before fats are burned for energy, the body uses glycolysis (turning glucose into ATP), which is a quicker process and supplies energy needs from about five to 30 minutes of exercise duration. Before either of these energy systems kicks in, the body uses the phosophagen system. **Creatine** stored in the muscles is converted to phosphocreatine; this compound is used to regenerate ATP from ADP in a process that is even quicker than with glucose.

While creatine is stored in the body, especially the skeletal muscles, half of these levels come from the diet—the body makes creatine from three amino acids: L-arginine, L-methionine and glycine. Supplemental creatine is favored by athletes for short, intense exercise to increase muscle contraction time and delay muscle failure time.

These three supplements—carnitine, ribose and creatine—can be used to address energy needs at different levels of training.

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3

Nutrition for her, trusted by you.

High-protein dietary formulas have become an even more popular way to lose and balance weight. Due to their high nutritional quality, dairy proteins are key ingredients in numerous weight balance and meal replacement products. The weight management industry can trust us for our high quality proteins, supply reliability and nutritional know-how. Our intensified focus on weight management nutrition makes DMV your trusted partner to build success. To find out more please visit: www.dmv.nl

FrieslandCampina

DMV
Simply trusted

Strength

Increasing energy and workout intensity/time can help build muscle, but there also must be the building blocks for new muscle development. The key to muscle development is to have more muscle **protein** synthesis than muscle protein breakdown. Proteins are comprised of amino acid chains and perform structural and/or functional duties in the muscles. **Branched-chain amino acids** (BCAAs), including leucine, isoleucine and valine, are precursors for proteins. As essential amino acids, BCAAs are not made in the body and need to be supplemented by the diet, usually in the form of protein foods.

Mineral All-Stars

Albion's Max Motyka, director of sales and marketing, detailed four minerals that play crucial roles in sports nutrition.

Magnesium is the mineral that is most tightly linked to exercise and sports performance. All energy for muscle contraction is derived from the hydrolysis of ATP, and metabolic rates can be 20-times higher during intense anaerobic activity. Magnesium is intimately connected to the metabolic cycle of ATP production and hydrolysis. Magnesium is also a key catalyst in the cycling of ADP to ATP (i.e., recharging the energy system's battery) and the subsequent hydrolysis of ATP to cleave the high-energy phosphate bond of ATP, providing the energy needed for muscle contraction.

Research has shown exercise and sports performance cause increased loss of magnesium proportional to the length and intensity level of that exercise being performed. Magnesium helps support muscle and nerve function, a strong and healthy heart rate, immune function and bone strength. It also helps regulate blood sugar levels and blood pressure, in addition to being involved in protein synthesis.

Strenuous exercise can result in a marked change in zinc metabolism; the intensity of exercise can result in variations in plasma **zinc** levels. If severe, zinc deficiency can affect muscle function since the mineral is required for the activity of several enzymes in muscle energy metabolism. Adding insult to injury: low muscle zinc will also result in a reduction of endurance capacity.

Vanadium is used by athletes and weightlifters to build muscle for improved performance. Some studies suggest vanadium may be linked to the proper regulation of sugar levels in the blood and possibly to maintaining healthy cholesterol levels. This is critical, as athletes consuming large amounts of carbohydrates can cause fluctuations in their correct metabolism, thus altering blood sugar levels.

Potassium is an important mineral in sports activity as a key electrolyte (used in electrical activity of muscle cells). Heavy loss of electrolytes, like potassium in sweat, during strenuous exercise can cause muscle cramping, weakness and fatigue, resulting in poor athletic performance. In addition, potassium helps maintain a strong and healthy heart rate.

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3

PURENERGY™

The next-gen caffeine alternative that is a patent-protected cocrystal of ~43% caffeine and ~57% pTeroPure® pterostilbene.

- Crystalline structure has superior benefits as compared to the components individually*
- 6-8x longer half-life than caffeine alone (animal studies)*
- May reduce caffeine quantities needed to produce results*
- Sustained energy boost and alertness*

Pioneering your next-gen performance ingredient technologies

NIAGEN™

*The first and only commercially available and patent-protected nicotinamide riboside (NR) shown to boost NAD+ levels.**

- NAD+ is a critial compound that enables cells to convert fuel to energy and improve mitochondrial function*
- NAD+ optimizes sirtuin activity which affects many regulatory processes within the body*
- Next-gen vitamin B3 with a more efficient pathway to deliver B3 for use by the body*
- Encourages production of energy within the body at the cellular level to increase metabolism*

*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.

ChromaDex® ingredients

ChromaDex®'s core competency is the ability to discover, assess, develop and commercialize ingredients for the dietary supplement, food & beverage, animal health, cosmetic and pharmaceutical industries.

For more information on our expanding ingredient line, please contact us at:

+1.949.600.9733
ingredients@chromadex.com
www.chromadex.com

Athletes have long turned to protein and BCAAs to help build and hone muscles, some for strength and others for quickness. **Whey protein** is quickly digested and leads to a faster release of amino acids for uptake into muscles.

"Consumer awareness of the benefits of whey protein has increased, and whey-enriched products have expanded beyond the shelves of specialist sports nutrition outlets," said Shanna Smidt, business development manager, Glanbia. "The popularity of protein-enhanced food and beverages with sports or performance nutrition benefits now reaches beyond elite athletes and professional bodybuilders to mainstream athletes and everyday gym-goers."

The long-held popularity of whey has not dampened the upward trend of products with a combination of protein sources. "With casein and soy proteins having a slower digestion rate than whey and amino acids, the benefits on post-workout muscle protein synthesis and recovery can be prolonged further than by drinking a single protein source," Smidt explained. "Consumers also benefit from the varied amino acids composition from the different protein sources."

Another approach to improving strength and performance is to improve blood flow to the muscles, delivering more nutrients. The focus in this market has been on nitric oxide (NO), a potent vasodilator that helps widen blood vessels. The amino acid **arginine** is a precursor to NO and is the predominate NO supplement on the sports market. It also promotes faster healing of both bone and tissue.

"The popularity of protein-enhanced food and beverages with sports or performance nutrition benefits now reaches beyond elite athletes and professional body builders to mainstream athletes and everyday gym-goers."

- Shanna Smidt, business development manager, Glanbia

Apple and grape polyphenols are known to promote NO production and increase blood flow. Mathieu Dondain, director of communication and marketing for Nexira, said whey protein, L-arginine or isotonic formulas, while important parts of the sports market, act more like muscular mass boosters, while grape and apple polyphenols act as performance enhancers. He noted these polyphenols, which are featured in Nexira's Vinitrox® ingredient, can decrease oxidative stress while other ingredients can generate harmful free radicals when NO production is not controlled. "More athletes and persons regularly exercising are becoming aware of the potential toxicity of the chemical substances used in some of the products used to boost their performances."

Taking yet another approach to muscle development, **alpha glyceryl phosphoryl choline (A-GPC)** targets the mind-to-muscle connection. Chase Hagerman, business development and marketing manager for Chemi Nutra, explained AlphaSize® A-GPC optimizes muscular power output, sharpens agility and delays mental fatigue. "This is due to its action-involving motor unit activation of muscle fibers and its mental

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3

Get the invisible edge.

Wellmune WGP® boosts the body's immune system, to help athletes sustain energy levels, sharpen mental clarity, and maintain overall health. This natural ingredient is a competitive edge that helps keep you healthy after intense workouts, so you can train harder, train longer.

Wellmune is a natural beta 1,3/1,6 glucan derived from a proprietary strain of baker's yeast. It's clinically proven to safely boost immune strength before and after exercise.

Wellmune WGP® has regulatory approval worldwide, including FDA GRAS notification and Novel Foods status in the EU and China.

Get the edge on your competition. Visit us at **www.wellmune.com/sportsperformance** to obtain a sample of Wellmune and additional information about this award-winning ingredient.

wellmune wgp®

BIOTHERA
the immune health company

sharpness benefits," he said. A metabolically active form of choline, A-GPC is drawn to synaptic nerve endings and promotes the synthesis and release of the neurotransmitter acetylcholine (AC). "AC plays a critical role in almost every cognitive function, and while in the muscle, it is the major neurotransmitter involved in contraction," Hagerman said, noting it also has been shown to potentiate the secretion of human growth hormone (HGH), a master hormone that in part regulates basal metabolism and body composition.

Recovery

No pain, no gain, right? Well, exercise certainly can leave the body worn out and in pain. As the science and implementation of fitness and performance boosting have skyrocketed, many active consumers have sought natural products to support and improve recovery. Exercise and sports can deplete nutrients, trigger inflammation and cause wear and tear of joints and bones. Many sports nutrition products can help with recovery.

As seen in the case of energy and ATP, recovery can often be promoted by a component in an original building block. For muscles, the amino acid **L-glutamine** can help replenish glutamine stores depleted during prolonged exercise and can also help balance nitrogen, which is a key element in muscle repair. Glutamine is the most abundant naturally occurring amino acid in the body—in as much as 60 percent of skeletal muscle—making it non-essential. It also plays a role in immune function, so restoring glutamine levels helps address some of the immune suppression seen after intense, prolonged exercise.

Glutamine
is the most abundant naturally occurring amino acid in the body—in as much as
60%
of skeletal muscle—making it non-essential.

While glutamine may help with muscle soreness, many athletes also turn to other natural products that help tame inflammation. There are many natural anti-inflammatory products, but **omega-3 fatty acids'** popularity in the mainstream market has carried over into sports nutrition. Like essential amino acids, omega-3s are not produced by the body and must come from the diet. The omgea-3s EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) are active deep into the inflammation cascade and help control and limit chronic inflammation. They are commonly consumed as fish oil supplements, although new plant sources such as algae are increasingly available.

Omega-3s have been shown to improve inflammation and recovery (e.g., blood flow) in muscles and joints. **Methylsulfonylmethane (MSM)** is also touted for its boost to recovery from both muscle soreness and joint stress. "Beyond delivering less muscle soreness from exercise, MSM may also protect cartilage from damage," said Rodney Benjamin, director of technical development, Bergstrom Nutrition. "These are real world benefits that appeal to anyone that is active—from the hard-core competitive athlete, the industrial athlete such as construction workers, to the farmer or the office worker who hits the gym a couple of times a week."

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3

Just add Prinova™

Your singular source for Sports & Lifestyle Nutrition.

Proteins | Amino Acids | Flavors | Sweeteners

Prinova
Your secret ingredient.®

From Whey Protein to Vegetarian Alternatives (Pea and Rice), Prinova carries a full line of functional proteins. Boost your products with Amino Acids, including Glutamine, Arginine, & BCAA Instants. Prinova supports you in all stages of nutritional product formulation with services such as Micronization and expert Flavor development.

Learn more at prinovagroup.com

Tim Hammond, director of sales and strategic relations, Bergstrom Nutrition, noted MSM helps minimize soreness resulting from exercise while boosting antioxidant activity and limiting the amount of oxidative stress. “These attributes point to MSM being beneficial to a wide range of active consumers, from those initiating a new fitness routine or increasing their exercise level to trained athletes that must maintain their level of fitness and performance,” he concluded.

After intense phsyical activity, the body releases the hormone cortisol, increased amounts of which can negatively affect physical and mental performance. “These stress levels are elevated for several hours after the physical activity and are so destructive they can catabolically break down the body’s muscle protein into amino acids, which are converted to glucose in the liver,” Hagerman said, adding SerinAid® **Phosphatidylserine** (PS) acts as a cortisol blocker. “A number of research studies have found PS effective in controlling cortisol, aiding in recovery, reducing muscle damage, and providing physiological machinery for faster muscle repair.” ❑

On the Go

Athletes, especially bodybuilders, are no strangers to sports nutrition in supplement and powder form. However, as training regimens become more hectic and companies develop new ways to deliver healthy natural products, the sports market welcomes more convenient delivery forms.

“Consumers are not only looking for the performance benefits of sports nutrition, they are also seeking a range of food and beverage formulation options,” said Shanna Smidt, business development manager of sports nutrition, Glanbia Nutritionals. “Demand from everyday consumers is now driving the sports nutrition category towards convenient formats, a greater emphasis on general fitness and health positioning, and greater accessibility in grocery stores. In addition, vegetarians and vegans are using sports nutrition products for protein supplementation.”

Tim Hammond, director of sales and strategic relations, Bergstrom Nutrition suggested the sporting activity dictates the product type. “However, the preference weighs on readily available and accessible products, with the strongest performer in shelf space being ready-to-mix powders and supplements for both pre- and post-workout formulations,” he said, noting gels and shots are primarily focused on more intra-workout activities. “Consumers may very well choose a pre-, intra- and post-workout product all from different manufacturers and in different forms based on their individual needs.”

Emile Henein, global business manager for Stepan Lipid Nutrition, reported an exceptional rise in interest for small beverage type applications from 3- to 4-oz. shots

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3

up to 10-oz. beverages. "These quick drink options seem to appeal to the sports nutrition users typically before or after exercise, or simply on-the-go."

Chase Hagerman, business development and marketing manager at Chemi Nutra, reasoned from a marketing standpoint, you can't ignore the appeal of customers holding your brand's ready-to-drink (RTD) protein drink, gulping down a pre-workout shot, or squeezing an endurance gel. "People forget how powerful product packaging can be, but it truly is one of the greatest methods of advertising," he said. "In this regard, encapsulated products and bulk products don't have the same level of environmental ubiquity that large format, single serve products have."

In the energy segment, energy drinks, bars and mints are resonating with sports consumers, according to Tom VonderBrink, president of Bioenergy. However, he noted delivery form is only part of the draw. "The [other] drivers are science, GRAS (generally recognized as safe status)—and FDA affirmation of the GRAS status—taste profile, quality and certifications."

Offering ingredients for use in both traditional and alternative delivery forms may be an ideal approach to shifting sports consumer demands. Ninety-five percent of the sports nutrition market manifests as powders, capsules and tablets, said Scott Steil, president of Nutra Bridge, as alternatives have not yet made real market penetration. However, with growing demand for alternative forms such as gels, shots and gums, Nutrabridge offers its sports ingredients for use in traditional forms as well as the growing alternative forms. "This offers maximum flexibility for both formulators of finished products as well as covering the specific needs of each individual consumer and their preferred product format."

"These quick drink options seem to appeal to the sports nutrition users typically before or after exercise, or simply on-the-go."

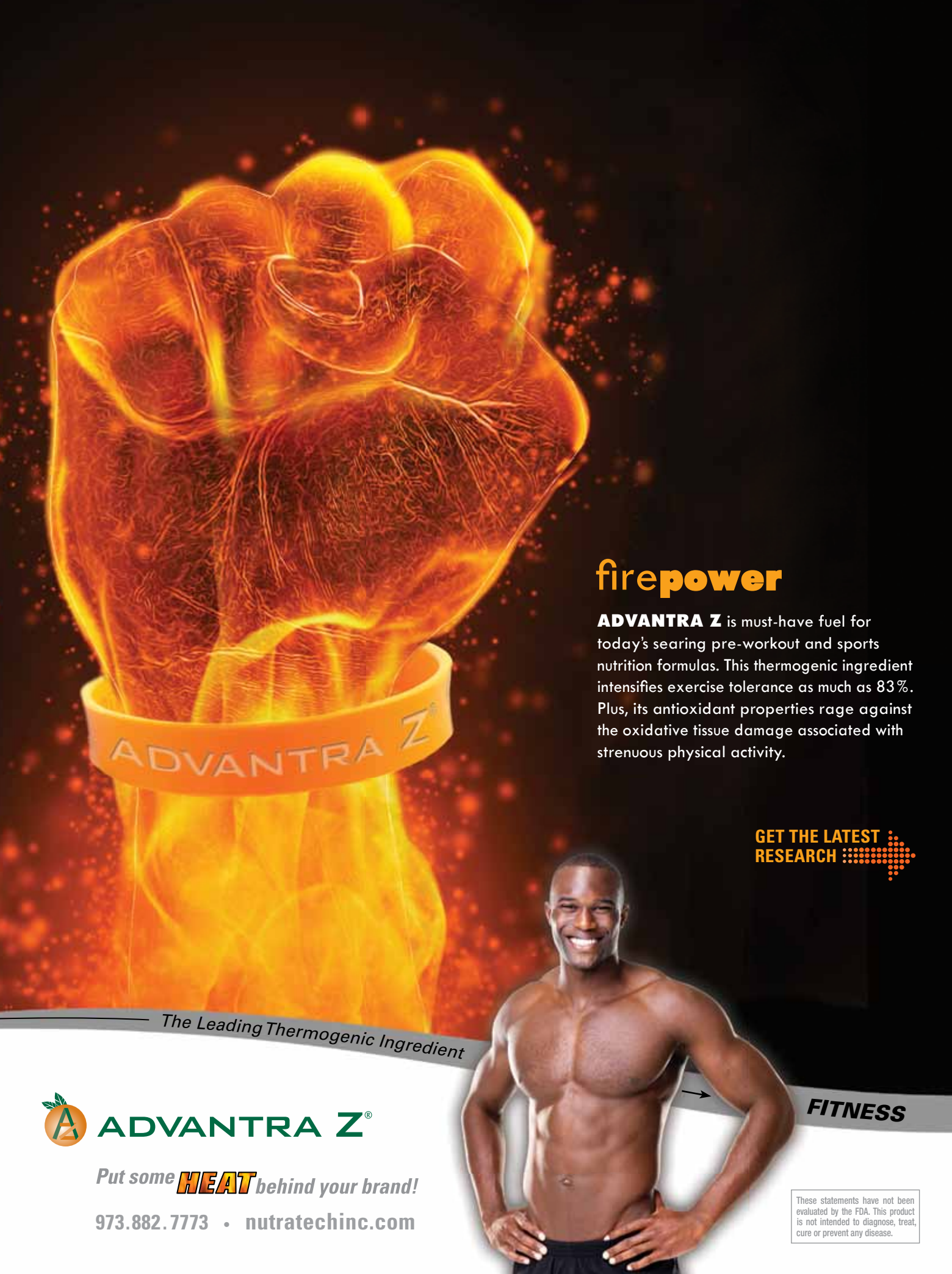
—Emile Henein, global business manager for Stepan Lipid Nutrition

But outside of delivery form, efficacy and science are the core drivers of long-term demand, according to Steil.

Joe Archer, vice president of sales and marketing for All American Pharmaceutical, agreed consumers want products that are based on science and research. "Product quality is also very important along with certifications—like Informed Sport and NSF Sport," he added. "If we don't deliver efficacious levels of contaminant-free products to consumers, the science and research behind them really has no value."

Just as they demands the best of themselves, sports nutrition consumers have high expectations of natural products, from science and quality to taste and convenience.

Viewpoint p. 2 ■ Joint Health p. 17 ■ Contents p. 3



firepower

ADVANTRA Z is must-have fuel for today's searing pre-workout and sports nutrition formulas. This thermogenic ingredient intensifies exercise tolerance as much as 83%. Plus, its antioxidant properties rage against the oxidative tissue damage associated with strenuous physical activity.

GET THE LATEST RESEARCH

The Leading Thermogenic Ingredient

FITNESS

ADVANTRA Z®

Put some HEAT behind your brand!

973.882.7773 • nutratechinc.com

These statements have not been evaluated by the FDA. This product is not intended to diagnose, treat, cure or prevent any disease.

A Joint Effort

by Celeste Sepessy

Your joints go the distance with every step you take and every move you make. Consider this: your knees support a force equal to four times your body weight (or more) with each step.[1] Running? That force—known as "joint load"—jumps to seven times your weight. A 140-pound marathoner may be slender and spry, but his joints might feel differently after withstanding 980 pounds of force for 26.2 miles.

Exercise does a body good. But exercisers need to do their bodies good, too.

INSIDER's TAKE

- Sports nutrition consumers are taking joint health supplements earlier as they feel the effects of both aging and athletic wear and tear.
- Ingredients for joint health generally target cartilage renewal and synovial fluid replenishment; some provide analgesic and anti-inflammatory benefits.
- By improving range of motion and decreasing pain, natural ingredients such as collagen, eggshell membrane and MSM allow athletes to exercise longer and better.

Humans owe their mobility to the skeletal system, which boasts more than 300 hinging, rotating, gliding and bending joints. Of these, synovial joints are the most common and offer the most movement. In addition to tendons, ligaments and bursae, cartilage and synovial fluid are keys to maintaining proper—and pain-free—mobility. Made of collagen and elastin, cartilage covers the bones in synovial joints to reduce friction and cushion impact. Synovial fluid absorbs shock, lubricates and nourishes joints, thanks to its viscous hyaluronic acid (HA).

Over time, both structures can become compromised, leaving a painful lasting impression on athletes. But whether seasoned Ironmen or Zumba enthusiasts, active adults can protect their joints' integrity with natural ingredients that deliver crucial nutrients such as collagen and HA, especially if they start supplementing early.

"Active individuals often begin joint support modalities earlier in life because of the stress that many physical activities have on joints and surrounding tissue," said Heather Thompson, global marketing communications, Stratum Nutrition.

And the consumer base is diversifying to include both die-hard athletes and casual exercisers, said Joosang Park, Ph.D., vice president of scientific affairs, BioCell Technology. "This new group of consumers wants to maintain their active lifestyle as the natural aging process takes a toll on the integrity of various connective tissues, making them susceptible to injury and leading to a longer time for recovery," he said.

➲ Check out the Joint Health Content Library

Joint disease affects more than 75 million Americans.

Learn more about key ingredients to control inflammation, manage pain and repair joint structure in **INSIDER**'s Joint Health Content Library.

Hot Ingredients p. 4 ■ Recovery p. 26 ■ Contents p. 3

For Athletes of All Types

Knee Function and Comfort Matter

UC-II®
FOR JOINT HEALTH

- 40 mg once-a-day of UC-II® improves knee extension in healthy exercising adults*
- UC-II® for Sports Nutrition Products

* 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.

Research-based ingredients. Uncompromised quality. Trusted.

800-783-4636 www.interhealthusa.com

InterHealth Nutraceuticals Incorporated

Sport-Specific Trends

The female athlete: "Sports nutrition in the past has favored men with their products," said Heather Thompson, global marketing communications, Stratum Nutrition. "But more and more events are catering to female athletes, which has changed the dynamic for products as well in recent years."

Convenient delivery: Athletes turn to supplements and functional foods on the go, literally. Sports nutrition products, including those for joint health, should offer easily ingested benefits, whether taken on the bike or before the gym.

Appropriate dosages: "Ease of dosing is popular in this category, particularly with the recent trend of mid-workout supplementation," explained Weiguo Zhang, president, Synutra Ingredients. Zhang suggested marketers provide high-purity and high-concentration products.

Flexible Ingredients for High Performance

Nearly every "flex" product on the market features **glucosamine**, a compound living in healthy cartilage and synovial fluid. A precursor to glycosaminoglycans (GAGs), glucosamine protects joints in two ways: first, its viscous nature helps lubricate joints; the chemical also provides strength to cartilage. The ingredient is most often paired with the GAG **chondroitin**, which is found naturally in cartilage and helps protect against its degeneration.[2]

Glucosamine and chondroitin work in tandem to promote cartilage renewal by increasing the quality and volume of the crucial fiber. But, as demonstrated in numerous trials, including the National Institutes of Health (NIH)-funded GAIT study, glucosamine's and chondroitin's effects are largely reaped by the osteoarthritis (OA) population.[3] Other analyses, including a meta-analysis of six studies, found glucosamine to improve joint space narrowing.[4] The effects took three years to realize, making the duo a possible addition to the athlete's long-term supplement regimen with more sport-specific ingredients.

However, the ubiquitous ingredient suffered a huge blow in the global market in May 2012, when the European Food and Safety Authority (EFSA) rejected supplement giant Merck's glucosamine joint health claim. The European regulatory body said the evidence was "weak" in healthy humans, though the manufacturer submitted 61 scientific references.

Collagen is critical to healthy connective tissue such as cartilage that wears down over repetitive steps, jumps and strokes. Through supplementation, athletes can help maintain collagen levels to promote joint health and avoid the joint degradation commonly associated with long-time activity.

"Research shows that hydrolyzed collagen type 2 stimulated the cartilage-forming chondrocytes to produce novel collagen type 2," Park said. "This observation has a profound implication that BioCell Collagen® may help regenerate worn down cartilage."

Hot Ingredients p. 4 ■ Recovery p. 26 ■ Contents p. 3

AIDP PLANT-BASED PROTEINS

Move Whey Ahead

PBteins
PLANT-BASED PROTEIN

Your protein product will break away from the competition with AIDP's plant-based proteins. Sprouted brown rice and our other plant proteins are fast becoming the preferred choice for athletes. They are allergen free, offer superior nutrition and are clinically supported. Get ahead of the protein peloton with AIDP's plant-based proteins for sports, energy, muscle recovery, weight management and satiety products.

AVAILABLE IN

- SBRP80 Sprouted Brown Rice Protein
- Pea protein
- New plant based proteins
- Organic Forms

AIDP
Your Trusted Source

vitamin angels

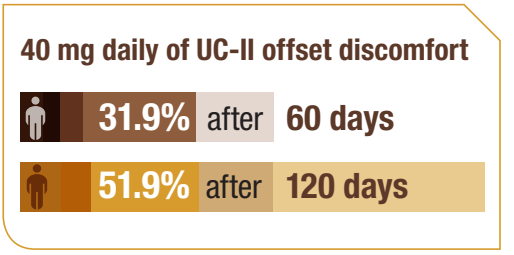
NSF
GMP Registered

www.aidp.com | T: 866.262.6699 | customercare@aidp.com

In a 2012 randomized control trial (RCT), 71 percent of subjects had a significant improvement in joint-mobility discomfort after 2 g/d of BioCell Collagen for 10 weeks.[5] Reports of physical activity ability also improved. BioCell Collagen also contains chondroitin and HA, which helps enhance the integrity of connective tissues by supporting proteoglycans essential for structure, Park explained.

Collagen intake is especially important for athletes popping nonsteroidal anti-inflammatory drugs (NSAIDs). A recent study in the *Journal of Applied Physiology* demonstrated NSAIDs' deleterious effects on collagen synthesis in runners.[6]

In a double blind, randomized Medicus Research study, 45 healthy men took 40 mg of UC-II , an undenatured type II collagen from InterHealth Nutraceuticals, or placebo daily for 120 days and were tested using stepmill and knee extension exercises.[7] After 120 days, the average knee extension was significantly greater than baseline compared to placebo; the supplemented group also exercised longer before experiencing joint pain by day 90. Similarly, men taking UC-II reported reduced maximum time to offset of discomfort by 31.9 percent after 60 days, and 51.9 percent by day 120.



Source: Medicus Research study

Juliana Erickson, senior marketing manager, InterHealth Nutraceuticals, emphasized the importance of knee function and comfort for athletes of all types. "Maintaining knee joint function supports mobility, increases flexibility and may support the ability to exercise longer and more regularly," she said.

Commonly found in joint recovery products, **methylsulfonylmethane** (MSM) targets reactive oxygen species (ROS) and free radicals caused by vigorous activity. This oxidative stress can accumulate, leading to tissue damage and eventually chronic joint pain. "Studies support that MSM decreases the amount of free radicals formed as a result of intense exercise and minimizes the muscle damage and soreness—which means less recovery time and a quicker return to daily activities," said Tim Hammond, director of sales and strategic relations, Bergstrom Nutrition.

Healthy men taking 3 g/d of MSM (as OptiMSM® from Bergstrom Nutrition) experienced reduced soreness after increased exercise stress from leg extensions.[8] Published in April 2013's *FASEB Journal*, the study found MSM supplementation resulted in reduced inflammation and significantly less pain and discomfort compared to placebo: 1.55 versus 3.75 on the 10-point Visual Analog Scale. The ingredient also supports healthy joints by preserving range of motion.[9,10]

One whole food ingredient—**eggshell membrane**—contains natural ratios of multiple joint health nutrients, including collagen, elastin and GAGs.

In an unpublished, open-label pilot study, 42 subjects taking 450 mg/d of egg membrane (as BiovaFlex™ from Biova) for six weeks experienced decreased pain symptoms and improved functionality of the knee. Pain symptoms reduced by 8 percent after one week, and by 21 percent by six weeks; relative knee functionality improved nearly 38 percent after six weeks.

Hot Ingredients p. 4 ■ Recovery p. 26 ■ Contents p. 3

impactI
MAKING HEALTHY TASTE GREAT

Making healthy taste great.

Wixon brings you Impact! all natural flavor modifiers – formulated to make your products healthier and great tasting.

- Suppress vitamin off-notes in fortified products
- Mask bitterness and off-notes in caffeinated and soy products
- Create delicious, low-glycemic products: drink mixes, bars
- Reduce sugar and sodium, improve mouthfeel

Challenge Wixon with your flavor issues. **Call today for an innovative solution that will improve the health and taste of your products.**

WIXON

Scan for **FREE HIGH IMPACT TREND ANALYSIS**

www.wixon.com | 1.800.841.5304 | service@wixon.com

Eggshell membrane may also protect against inflammation, which is a huge concern for active individuals. Published in the *Journal of Medicinal Food*, an in vitro study demonstrated eggshell membrane (as NEM® from Stratum Nutrition) significantly reduced pro-inflammatory cytokines.[11]

Joint health supplements often contain a cocktail of helpful compounds, including both traditional and fresh ingredients, such as **ergothioneine** (EGT). A newcomer in the segment, EGT holds special promise as a joint-specific antioxidant. Though a somewhat weak antioxidant overall, EGT is delivered directly into joint tissue, rather than across the whole body, giving it a sports nutrition edge.[12]

Though science is somewhat limited on this new ingredient, research published in a 2012 *Preventative Medicine* found EGT reduced joint pain after one week, and its analgesic effects lasted through the six-week study and six-week wash out period.[13] Supplementation also improved range of motion in the neck, thorax, lumbar, hip, knees and shoulders.

Whether reducing inflammation, promoting cartilage renewal or reducing pain, natural ingredients can keep joints working smoothly for athletes of all abilities. However, dietary supplement manufacturers must mind science to ensure their customers reach their goals with research-backed compounds and combinations. ❑

Check out Anti-Aging Digital Issue

Bone and Joint Health Ingredients Find Synergistic Strength

For decades, Americans have rallied behind ingredients such as calcium, vitamin D and glucosamine to build bone strength and grease joints. But despite the push for bone and joint health, Americans still have brittle, vulnerable skeletal systems.

Bone diseases such as osteoporosis and osteoarthritis (OA) typically strike the elderly; as a result, bone health usually flits off the radar for the young and even middle aged. But dietary supplement companies are tapping into new, youthful markets with their bone health products as consumers seek anti-aging solutions.

Together, the global bone and joint health market will reach USD$9 billion by 2017, according to Global Industry Analysts. Driven by an increase in bone- and joint-related diseases, product sales have been steady thanks to thanks to strong science for traditional ingredients such as calcium and vitamin D. But in order to increase demand across the wide spectrum of ingredients, companies must leverage recent science and market to different populations.

Learn more about ingredients that help keep consumers young by boosting bone and joint health in **INSIDER**'s Ageless Ingredients Digital Issue.

Hot Ingredients p. 4 ■ Recovery p. 26 ■ Contents p. 3

References

1. Kuster M et al. "Joint Load Considerations in Total Knee Replacement." *J Bone Joint Surg.* 1997;79-B:109-13.
2. Kubo M et al. "Chondroitin sulfate for the treatment of hip and knee osteoarthritis: current status and future trends. *Life Sci.* 2009 Sep 23;85(13-14):477-83.
3. Clegg D et al. "Glucosamine, Chondroitin Sulfate, and the Two in Combination for Painful Knee Osteoarthritis." *New Engl J Med.* 2006;354:795-808.
4. Lee YH et al. "Effect of glucosamine or chondroitin sulfate on the osteoarthritis progression: a meta-analysis." *Rheumatol Int.* 2010 Jan;30(3):357-63.
5. Schauss AG et al. "Effect of the novel low molecular weight hydrolyzed chicken sternal cartilage extract, BioCell Collagen, on improving osteoarthritis-related symptoms: a randomized, double-blind, placebo-controlled trial." *J Agric Food Chem.* 2012 Apr 25;60(16):4096-101.
6. Christensen B, et al. "Effect of anti-inflammatory medication on the running-induced rise in patella tendon collagen synthesis in humans." *J Appl Physiol.* 2011 Jan;110(1):137-41.
7. Udani J. "UC-II® for Joint Support: A randomized, double-blind, placebo-controlled study in healthy volunteers." Presented 2013 Feb.
8. Kalman D et al. "A Randomized Double Blind Placebo Controlled Evaluation of MSM for Exercise Induced Discomfort/Pain." *The FASEB Journal.* 2013;27:1076.7.
9. Usha PR et al. "Randomised, Double-Blind, Parallel, Placebo-Controlled Study of Oral Glucosamine, Methylsulfonylmethane and their Combination in Osteoarthritis." *Clin Drug Invest.* 2004;24(6):353-63.
10. Kim LS et al. Southwest College Research Institute, Southwest College of Naturopathic Medicine and Health Sciences, Tempe, AZ, March 2006.
11. Benson, K.F., Ruff, K.J., and Jensen, G.S. "Effects of Natural Eggshell Membrane (NEM) on Cytokine Production in Cultures of Peripheral Blood Mononuclear Cells: Increased Suppression of Tumor Necrosis Factor-a Levels After In Vitro Digestion." *Journal of Medicinal Food.* (2012) 15(4):360-368.
12. Gründemann D et al. " Discovery of the ergothioneine transporter." *Natl Acad Sci U S A.* 2005 Apr 5;102(14):5256-61. Epub 2005 Mar 28.
13. Benson KF et al. "Improvement of joint range of motion (ROM) and reduction of chronic pain after consumption of an ergothioneine-containing nutritional supplement." *Prev Med.* 2012 May;54 Suppl:S83-9. doi: 10.1016/j.ypmed.2012.02.001.

Hot Ingredients p. 4 ■ Recovery p. 26 ■ Contents p. 3

The perfect recipe for an active, healthy lifestyle starts here.

As top performers in the areas of **sports nutrition, weight management, clinical nutrition and infant health**, our family of branded ingredients delivers the nutritional benefits that today's consumers demand from their wellness products. **Naturally sourced, clinically proven and scientifically based, our ingredients support and enhance your functional foods, beverages or dietary supplements.**

Learn about the benefits of **Clarinol® CLA** for sports nutrition. ›

Stepan® Lipid Nutrition
The Natural Way to Better Health

VISIT OUR WEBSITE ›

Stepan Lipid Nutrition USA

100 West Hunter Avenue
Maywood, NJ 07607
Phone: +1 800-457-7673
+1 201-845-3030
Email: food.health@stepan.com

Visit us at **Clarinol.com**.
Like Clarinol® CLA on

Nutrients for Sports Recovery

by Marygrace Taylor

Increasingly, post-workout nutrition is getting attention as the critical component for optimizing exercise and sport performance results. While nutritional needs vary by goals, taking the right mix of supplements can help athletes and exercisers minimize the time needed to recover from physical exertion, allowing for more training and a better chance to reach higher performance levels.

INSIDER's TAKE

- Botanicals, amino acids, minerals, vitamins and more can help exercisers bounce back after strenuous activity.
- Sports nutrition recovery products should inform consumers on the best times to take to ensure optimal results.
- Marketers need to emphasize the bang-for-your-buck aspect of sports recovery supplements.

"While the advantages of physical activity are clear, strenuous activity also increases the risk of oxidative stress, which can lead to inflammation, as well as wear and tear on joints, tendons, ligaments, muscles and other connective tissue," said Tim Hammond, director of sales and strategic relations for Bergstrom Nutrition. From electrolytes to amino acids, green tea and MSM, research has shown standout nutrients are effective for helping exercise recovery. Supplement manufacturers that tie the science and growing consumer interest into their marketing efforts are setting themselves up for a home run.

Best Recovery Tools

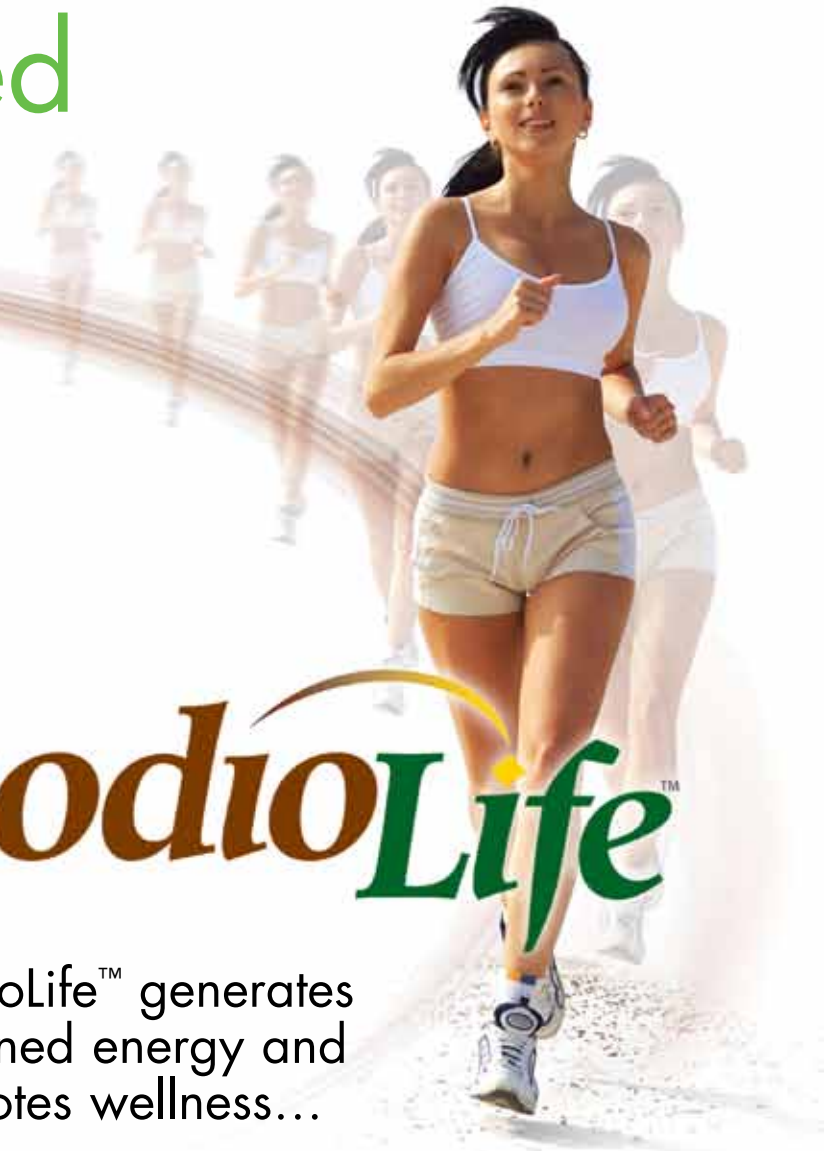
Electrolytes: The body loses more than water during a sweaty exercise session. It also loses electrolytes, or minerals in the blood such as magnesium, zinc, sodium and potassium. Electrolytes work to promote proper muscle function and balance acidity levels in the blood, and replacing them after a vigorous workout is essential. One of the most efficient ways to do that is simple: consume electrolyte-enhanced sports nutrition products, said Ed Wyszumiala, general manager of NSF International's Dietary Supplement and Certification Program.

From electrolytes to amino acids, green tea and MSM, research has shown standout nutrients are effective for helping exercise recovery.

Carbohydrates: They're digested faster than any other source of energy, making carbohydrates essential to helping the body recover post-workout. Short-chained sugars such as sucrose, glucose and fructose are the most quickly assimilated, making them an especially smart choice for sports drinks. What's more, consumers can get an additional boost by combining two different carbohydrate sources, which allows for greater water and micronutrient content, according to Jeremy Bartos, Ph.D., senior innovation scientist for Glanbia Nutritionals.

Joint Health p. 17 ■ Regulatory Insights p. 36 ■ Contents p. 3

For Sustained Energy and Faster Recovery



RhodioLife™

Standardized Extracts

Sourced from Altai Mountains of Siberia

Socially Responsible Harvesting

3 Published Studies

Self-Affirmed GRAS

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease. This document is provided for educational purposes only.

RhodioLife™ generates sustained energy and promotes wellness…

including psychological, emotional and physical conditioning. RhodioLife is a powerful adaptogen. Rhodiolife supports healthy biological responses necessary for healthy immune, cardio pulmonary and endocrine systems.

- Supports sustained energy, physical performance and an increased capacity to handle stress and support mood.*
- Has a fast onset and long lasting action in comparison to known adaptogens.
- *Only* RhodioLife's unique "fingerprint" composition consistently provides the spectrum of nutrients found in the root of the plant which are responsible for its biological activity.

Visit us at IFT – Booth 924

Where Food, Health and Science Meet.

plt

973-984-0900 x214 • plt@plthomas.com • www.plthomas.com

Branched-Chain Amino Acids: BCAAs comprise up to 18 percent of total amino acid mass in muscle proteins, making them a critical component of post-workout recovery. The essential amino acid leucine dictates muscle fiber status. And since leucine levels decrease during physical activity, it's important to replenish them after exercising, Bartos said. But research also suggested leucine supplementation before a workout can increase lactate threshold and oxygen capacity, as well as delays muscle soreness and fatigue.[1,2] Other amino acids, such as isoleucine and valine, aid in muscle recovery, maintenance and growth.[3,4,5] When paired with leucine, they can enhance muscle balance.[6] More to keep in mind: combining BCAAs with carbohydrates can further enhance the recovery process by improving insulin response, which in turn boosts protein synthesis, according to research published in the *European Journal of Applied Physiology*.[7]

BCAAs comprise up to **18%** of total amino acid mass in muscle proteins, making them a critical component of post-workout recovery.

Glutamine: Another amino acid, glutamine, promotes proper immune cell function. But since glutamine levels drop during exercise, the result is often a temporarily suppressed immune system, Bartos said. Thus, it makes sense that a study published in the journal *Current Opinion in Clinical Nutrition & Metabolic Care* found post-workout glutamine supplementation can assist in recovery by boosting the immune system after strenuous exercise.[8]

Creatine: The amino acid creatine allows the body to replenish ATP (adenosine triphosphate), an energy source important for muscle contraction. It's manufactured by the body, but supplementing can supply a fast energy boost when it's most needed, like after a workout, according to research from the *American Journal of Physiology*.[9] When used in conjunction with bovine whey protein or colostrum supplementation, creatine may help improve muscle strength;[10] it could also help improve high-intensity exercise performance, promoting greater gains in muscle strength and mass.[11]

L-carnitine: A substance that helps convert fat into energy, L-carnitine is produced naturally by the body. However, research suggests supplementing may have beneficial effects, most notably reducing inflammation and oxidative stress brought on by exercise.[12] It's also been shown to reduce fatigue, and improve energy and cognitive function. When taken in the form of L-carnitine L-tartrate, it could help lessen delayed-onset muscle soreness.[13]

L-carnitine helps convert fat into energy and may reduce inflammation.

Methylsulfonylmethane: There's a growing body of evidence suggesting methylsulfonylmethane (MSM) may support post-workout recovery. Several double-blind, placebo controlled studies in both animals and humans have found MSM can reduce oxidative stress, in turn helping to stave off tissue damage and muscle breakdown.[14,15] The ability to reduce muscle damage may also help lessen post-exercise muscle soreness, as demonstrated by research published in *The FASEB Journal*.[16]

Joint Health p. 17 ■ Regulatory Insights p. 36 ■ Contents p. 3

ENERGIZE & REHYDRATE. SOLUBLE COCONUT POWDER.

OUR INNOVATION IS YOUR ANSWER®
25 YEARS
SABINSA
Since 1988

Packing a punch, seems easier with Cococin™. Obtained from the tender green coconut water, which acts as a reservoir of nutrients that provide essential vitamins, minerals, amino acids and electrolytes. The unique Freeze Drying Technology at Sabinsa helps to preserve the goodness of Coconut in a free flowing powder form, enabling you to enjoy the goodness of Coconut water in a variety of nutritional applications and food applications. Cococin™ is free of cholesterol and sugar syrup making it a healthy choice for all ages. Energize and rehydrate yourself. Visit, www.sabinsa.com/cococin.

an ingredient of Sabinsa

Cococin®

NJ: 732.777.1111 | UT: 801.465.8400
www.sabinsa.com | info@sabinsa.com

Trace Elements and Minerals: In trace amounts, several minerals and elements are essential to the body, and supplementation can enhance the post-workout recovery process. “Manganese serves as a co-factor for enzymatic processes, which is important for metabolic function and for activating other enzymes,” Bartos said. “And molybdenum is important for oxidase function, which is key to catabolism.” Chromium, too, supports the exercise and recovery process: In a review published in the journal *Nutrition*, the mineral was shown to increase lean body mass;[17] and it could also play a role in macronutrient metabolism by regulating insulin.[18] Iodine is also important, Bartos said, since it’s needed to produce thyroxin, the thyroid hormone responsible for controlling basal metabolic rate, protein production, metabolism of macronutrients cell differentiation and neuronal function.

Green Tea and Quercetin: In research published in the journal *Molecular and Cellular Biochemistry*, the antioxidant and immune modulation properties of green tea were shown to help minimize cartilage and proteoglycan degeneration.[19] Quercetin, a potent antioxidant found in foods such as apples and onions, may help increase endurance and in animal studies, it’s been shown to increase the size and number of mitochondria in muscle cells.[20] What’s more, it’s important to note that antioxidants don’t just serve to manage inflammation immediately after exercising. The effects are also long term, by promoting overall joint health. “Maintaining knee joint function supports mobility, increases flexibility, and supports the ability to exercise longer and more regularly,” said Juliana Erickson, senior marketing manager for InterHealth Nutraceuticals.

Serious athletes who plan to complete another intense workout within six or eight hours should supplement immediately after training.

Beta carotene, and Vitamins C, D3 and K2: Vitamins can work in a few different ways to aid in sports recovery. Physical exertion results in greater oxygen intake, increasing the body’s exposure to damaging free radicals. Antioxidant vitamins such as beta carotene and vitamin C can reduce free radical damage to muscle and other tissues, as well as delay the onset of DNA, lipid or protein oxidation, Bartos said. Vitamin D3 may help suppress overactive immune cells, in turn decreasing inflammation; vitamin K2 removes calcium from the arteries to help increase blood flow and boost bone density.[21, 22, 23]

The Best Time for Sports Nutrition Recovery

Most experts agree that the best time to take many recovery supplements is post-workout, when glycogen stores have been depleted and muscles have experienced oxidative stress. Serious athletes who plan to complete another intense workout within six or eight hours should supplement immediately after training, Wyszumiala said. More casual exercisers don’t need to rush, and will benefit from recovery supplements taken within 30 minutes to an hour.

Joint Health p. 17 ■ Regulatory Insights p. 36 ■ Contents p. 3

Your Source for *NATURAL* Science-Based Specialty Ingredients

For further information
email dean@pnibrands.com
or visit pnibrands.com

PROPRIETARY NUTRITIONALS INC.

A Division of

PHARMACHEM LABORATORIES

Still, there are some exceptions: Some manufacturers, such as Bergstrom Nutrition, recommend taking oxidative-stress reducing supplements, like its OptiMSM, on a daily basis. Other nutrients, such as carbohydrates and certain BCAAs, can have a positive effect if taken before a workout. And for certain populations, taking recovery supplements before bed can also be beneficial. "Since sleep is such a vital element for recovery, it may make sense to most athletes to take some recovery products at night," Erickson said. In a study on InterHealth's joint support supplement, UC-II®, taking 40 mg before bed decreased recovery time when compared to baseline values.[24]

Marketing Advice

Sports nutrition products are continuing to permeate the mainstream market, which is great news for manufacturers and health-minded consumers. Since the products are starting to be seen as complements to regular exercise regimens, it's no longer necessary to market solely to die-hard athletes, Erickson said.

"Since sleep is such a vital element for recovery, it may make sense to most athletes to take some recovery products at night."

But in a world where time and energy always seem to be in short supply, it's more important than ever to promote that bang-for-your-buck mentality. "The emphasis should be on getting the most from what you consume," said Rich Mihalik, director of innovation and product development for the National Enzyme Company (NEC). Especially when it comes to products that aim to reduce muscle soreness. "The emphasis should be on using nutritional support to maximize training effort," he said.

Finally, place a premium on safety. With ever-growing numbers of supplements and brands available, it can become difficult for consumers to know what to look for in terms of quality products and ingredients. Wyszumalia recommended athletes and consumers use products that have been tested and certified by NSF International, which is easy to do with NSF's Certified for Sport App. If your product bears the NSF seal, or another certification equivalent, make it crystal clear to consumers.

As mainstream consumers become increasingly invested in health and fitness, the demographic interested in post-workout recovery will continue to expand. Coupled with the ever-growing body of research on the efficacy of nutrients and substances to help with recovery, there's never been a better time to develop and market new post-workout supplements. ❑

Joint Health p. 17 ■ Regulatory Insights p. 36 ■ Contents p. 3

References

1. Matsumoto, K. et al. “Branched-Chain Amino Acid Supplementation Increases the Lactate Threshold during an Incremental Exercise Test in Trained Individuals.” *J Nutr Sci Vitaminol.* 2009 Feb;55(1): 52-8.
2. Shimomura, Y. et al. “Nutraceutical Effects of Branched-Chain Amino Acids on Skeletal Muscle.” *The Journal of Nutrition.* 2006; 136(2): 529S-532. http://jn.nutrition.org/content/136/2/529S.short
3. Shimomura, Y. et al. “Nutraceutical Effects of Branched-Chain Amino Acids on Skeletal Muscle.” *The Journal of Nutrition.* 2006; 136(2): 529S-532. http://jn.nutrition.org/content/136/2/529S.short
4. She, P et al. “Disruption of BCAA metabolism in mice impairs exercise metabolism and endurance.” *Journal of Applied Physiology.* 2010 Apr;108(4):941-9. doi: 10.1152/japplphysiol.01248.2009.
5. Laviano, A et al. “Branched-chain amino acids: the best compromise to achieve anabolism?” *Current Opinion in Clinical Nutrition and Metabolic Care.* 2005 Jul;8(4):408-14. http://www.ncbi.nlm.nih.gov/pubmed/15930966
6. Bajotto, G et al. “Effect of branched-chain amino acid supplementation during unloading on regulatory components of protein synthesis in atrophied soleus muscles.” *European Journal of Applied Physiology.* 2011 Aug;111(8):1815-28. doi: 10.1007/s00421-010-1825-8.
7. Bird, S. et al. “Independent and combined effects of liquid carbohydrate/essential amino acid ingestion on hormonal and muscular adaptations following resistance training in untrained men.” *European Journal of Applied Physiology.* 2006 May; 97(2): 225-38. doi: 10.1007/s00421-005-0127-z
8. Agostini, F. “Effect of physical activity on glutamine metabolism.” *Current Opinion in Clinical Nutrition and Metabolic Care.* 2010 Jan; 13(1): 58-64. doi: 10.1097/MCO
9. Pan, J. W. “Cerebral energetic effects of creatine supplementation in humans.” *American Journal of Physiology.* 2007 Apr; 292(4): R1745-50. doi: 10.1152/ajpregu.00717.2006
10. Kerksick, C. M. et al. “Impact of differing protein sources and a creatine containing nutritional formula after 12 weeks of resistance training.” *Nutrition.* 2007 Sept; 23 (9): 647-656. doi: 10.1016/j.nut.2007.06.015
11. Brose, A. et al. “Creatine supplementation enhances isometric strength and body composition improvements following strength exercise training in older adults.” *The Journals of Gerontology.* 2003 Jan; 58 (1): 11-19. doi: 10.1093/gerona/58.1.B11
12. Calo, L. A. et al. “Antioxidant effect of L- carnitine and its short chain esters relevance for the protection from oxidative stress related cardiovascular damage.” *International Journal of Cardiology.* 2006 Feb 8; 107(1), 55-60. doi: 10.1016/j.ijcard.2005.02.053

Joint Health p. 17 ■ Regulatory Insights p. 36 ■ Contents p. 3

References

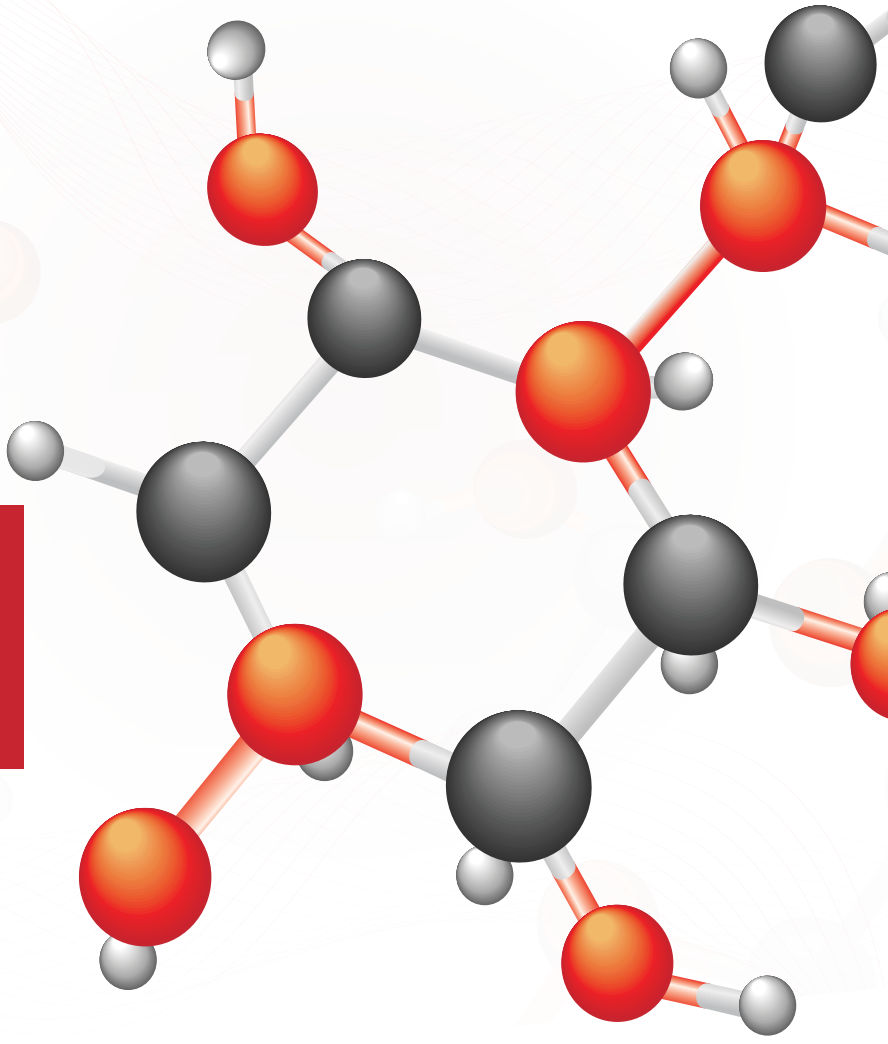
13. Spiering, B. A. et al. "Responses of criterion variables to different supplemental doses of L-carnitine L-tartrate." *Journal of Strength and Conditioning Research.* 2007, 21, (1), 259-64.
14. Nakhostin-Roohi, B. et al. "Effect of chronic supplementation with methylsulfonylmethane on oxidative stress following acute exercise in untrained healthy men." *Journal of Pharmacy and Pharmacology.* 2011; 63, 1290-1294. doi: 10.1111/j.2042-7158.2011.01314.x
15. Maranon, G. et al. "The effect of methyl sulphonyl methane supplementation on biomarkers of oxidative stress in sport horses following jumping exercise." *Acta Veterinaria Scandinavica.* 2008; 50(45). doi: 10.1186/1751-0147-50-45
16. Kalman, Douglas. "A Randomized Double Blind Placebo Controlled Evaluation of MSM for Exercised Induced Discomfort and Pain." *The FASEB Journal.* 2013; 27, 1076.7.
17. Lukaski, H. C. "Vitamin and mineral status: effects on physical performance." *Nutrition.* 2004; 20(7-8), 632-644. doi: 10.1016/j.nut.2004.04.001
18. Lukaski, H. C. "Chromium as a supplement." *Annual Review of Nutrition.* 1999, Jul; 19, 279-302. doi: 10.1146/annurev.nutr.19.1.279
19. Mandal, M. et al. "Clinical implications of matrix metalloproteinases." *Molecular and Cellular Biochemistry.* 2003; 252 (1-2), 305-29. doi: 10.1023/A:1025526424637
20. Davis, JM et al. "Quercetin increases brain and muscle mitochondrial biogenesis and exercise tolerance." *American Journal of Physiology.* 2009 Apr; 296(4):R1071-7. doi: 10.1152/ajpregu.90925.2008
21. Geleijnse, JM et al. "Dietary intake of menaquinone is associated with a reduced risk of coronary heart disease: the Rotterdam Study." *The Journal of Nutrition.* 2004 Nov;134(11):3100-5.
22. Bugel, S. "Vitamin K and Bone Health in Adult Humans." *Vitamins and Hormones.* 2008; 78:393-416. doi: 10.1016/S0083-6729(07)00016-7
23. Rees, K. "Is vitamin K consumption associated with cardio-metabolic disorders? A systematic review." *Maturitas.* 2010 Oct;67(2):121-8. doi: 10.1016/j.maturitas.2010.05.006.
24. Udani, J. "UC-II for Joint Support: A Randomized, Double-Blind, Placebo-Controlled Study in Healthy Volunteers." Medicus Research, LLC, Northridge, CA 91325.

Joint Health p. 17 ■ Regulatory Insights p. 36 ■ Contents p. 3

NATURAL PRODUCTS INSIDER

Enzyme Solution Center

A Targeted, Strategic Resource for Enzymes & Health



Sponsored by:

NATIONAL ENZYME COMPANY

Featured Content!

-Whitepaper: Food Enzymes…Where Did They Go?

-Whitepaper: Systemic Enzymes 101

-On-Demand Webinar: The Top 10 Things Your Medical Doctor Won't Tell YOU About Enzymes

Explore Today

New Measures to Regulate Sports Nutrition Products in Canada

by Steven F. Rosenhek

In recent years, there has been an explosive growth in the worldwide demand for sports nutrition supplements, foods and beverages. Gone are the days when these products were marketed only to athletes and bodybuilders; they are now "lifestyle" products widely used by the general public.

In 2009, Canadian retail sales of energy and nutrition bars exceeded CAD$85 million, a figure that is expected to reach $93 million by next year. In the same year, the market for sports nutrition supplements reached a value of $114 million.

INSIDER's TAKE

- Many sports nutrition products are subject to new labeling laws in Canada, and may need to be reformulated.
- Vitamin waters, sports drinks, energy bars and powders, and protein products face regulatory challenges as they transition from natural health products (NHPs) to a food and drug classification.
- Health Canada released several warnings to the public concerning adulterated sports nutrition products, particularly those that promote weight loss and muscle definition.

With increased popularity comes increased concern about regulation. Despite the fact that natural health products (NHPs) sold in Canada have been subject to the Natural Health Products Regulations (NHPRs) since 2004, the supplement industry is not heavily regulated. In an attempt to address this issue, Health Canada has begun to implement changes to the regulation of sports nutrition products.

Sports Nutrition Products as National Health Products

Historically, food and beverage products with added vitamins, minerals, caffeine or certain health claims were able to gain market access as NHPs. A number of these products were offered for sale without product licenses. In 2004, the introduction of the NHPRs meant unlicensed NHPs could no longer be sold in Canada. Since a large number of NHPs on the market did not meet the NHPRs, Health Canada became backlogged with licensing applications. Consequently, in 2010 the Natural Health Products Unprocessed Product License Applications Regulations (UPLARs) came into force to provide temporary authorization to NHPs awaiting market licenses. Exemption numbers were provided to allow for the legal sale of products awaiting review by Health Canada. The temporary system ended on

Gone are the days when these products were marketed only to athletes and bodybuilders; they are now "lifestyle" products widely used by the general public.

Recovery p. 26 ■ **INSIDER** Contacts p. 40 ■ Contents p. 3

NATURAL PRODUCTS INSIDER®

CONTENT LIBRARY

Sports Nutrition

Featured Content:

-Developing Products for Athletic Performance

-This Sporting Life

-Keen on Protein

-Sports Nutrition At A Glance

Visit Today

Feb. 4, 2013, coinciding with the repeal of the UPLARs. By Sept. 1, 2014, all NHPs sold in Canada must have a Natural Product Number or Homeopathic Medicine Number. However, these changes will have little impact on sports nutrition products, which are being removed from the NHP regime.

Transitioning Sports Nutrition Products from NHPR to the Food and Drugs Act

As of December 2012, many sports nutrition products, including vitamin waters, sports drinks, energy bars and powders, and protein products, lost their eligibility to receive NHP classification. In an effort to address safety concerns, in April 2012, Health Canada began to transition NHP food and beverage products to the food and drug regulatory framework. In order to facilitate the transition process, eligible products are receiving Temporary Market Authorization Letters (TMALs). A TMAL allows a product (excluding energy drinks, which have already transitioned) to be marketed for an initial time period of two years, subject to conditions, while additional data about the product is collected. Regulatory amendments will not be finalized until the necessary data is submitted, at which time market authorization can be extended. Products that do not initially qualify for TMALs due to health and safety risks have the option to be reformulated or re-labeled in order to become eligible. The issuance of a TMAL removes the product from the NHP licensing queue.

As of December 2012, many sports nutrition products, including vitamin waters, sports drinks, energy bars and powders, and protein products, lost their eligibility to receive NHP classification.

Transitioned products will also be subject to new labeling requirements. Since the products will be regulated as foods, they will now be subject to the Food and Drugs Act, Part B of the Food and Drug Regulations and the Consumer Packaging and Labeling Act and Regulations. Products that do not require any reformulation must meet these labeling requirements by March 2014.

Health Canada recently released several warnings about adulterated sports nutrition products.

Adulteration and Quality Assurance

In recent years, Health Canada released several warnings to the public concerning adulterated sports nutrition products, particularly those that promote weight loss and muscle definition. In particular, traces of sibutramine and phenolphthalein, which are not authorized for sale in Canada, have been found in various supplements.

Recovery p. 26 ■ **INSIDER** Contacts p. 40 ■ Contents p. 3

In March 2012, the Canadian Centre for Ethics in Sport released an advisory notice warning that various sports supplements, including protein powders, energy drinks and vitamins, contain substances that have not been approved by Health Canada. It specifically warned about methylhexaneamine, a banned substance that is often not listed on labels, either deliberately or due to contamination.

Currently, it is the responsibility of the product license holder to ensure the product is free from adulteration. Supplement manufacturers are required to provide documents supporting their compliance with GMPs (good manufacturing practices). Health Canada is now in the process of consulting on a new proposal that would create a two-prong quality assurance (QA) model. The proposed model would require an on-site inspection for companies demonstrating critical non-compliance with the regulations. The second prong would include an optional on-site inspection by a recognized third party to obtain a "seal of approval" for exportation and marketing purposes. Health Canada has said it will continue to focus on adulteration issues under the new approach.

It will be interesting to see what impact Health Canada's new initiatives will have on the growing market for sports nutrition products. While Canada has a long way to go before resolving the problem of adulterated products, these initial changes are a step in the right direction. ❑

Steven F. Rosenhek (srosenhek@fasken.com) is a partner in the Toronto office of Fasken Martineau DuMoulin LLP, a full-service, global law firm. The firm has significant expertise in the licensing and regulation of NHPs in Canada and the EU, as well as all aspects of bringing NHPs and supplements to market. *The assistance of Heather Michel, student-at-law, is gratefully acknowledged.*

Recovery p. 26 ■ **INSIDER** Contacts p. 40 ■ Contents p. 3

NATURAL PRODUCTS INSIDER

www.naturalproductsinsider.com

Natural Products INSIDER is the leading information source for marketers, manufacturers and formulators of dietary supplements, healthy foods and cosmeceuticals. Since 1997, **INSIDER** has been serving the needs of the global nutrition industry. **INSIDER** boasts the largest magazine and web audience in the industry delivering news, analysis and features to executives involved in the expanding market of global nutrition. The **Natural Products INSIDER** brand includes a print magazine, a website, e-newsletters, reports, webinars, whitepapers, digital issues and image galleries.

About VIRGO

Insight, Analysis, Action

VIRGO is a leading information distribution company that has delivered relevant content to key business markets since 1986. With 20 brands including leading magazines and websites, tradeshows/conferences, online communities, training and accreditation programs, and more, VIRGO continues to provide integrated media solutions to several industries, including self-storage, medical, health and nutrition and communications.

Publisher
Danica Cullins
dcullins@vpico.com
480.990.1101, ext. 1200

Global Account Director
Jim Wagner
jwagner@vpico.com
480.990.1101, ext. 1123

Account Director Amy Thorlin

Account Executives Ioana Neacsu
Anthony Arteca
Karen Salas

Editor in Chief Sandy Almendarez

Senior Editor Steve Myers

Associate Editor Celeste Sepessy

Vice President, Content, Health & Nutrition Heather Granato

Vice President, Health & Nutrition Network Jon Benninger

Senior Marketing Manager Judy Blanchard

Marketing Manager Melissa Black

Audience & Content Coordinator Lauren Kane

Vice President, Marketing Services
Danielle Dunlap

Creative Director Joseph DiPastena

Art Director, Health & Nutrition
Andrew Rosseau

Advertising Art Director Matt Courter

Program Manager
Kristin LaBarbera klabarbera@vpico.com
480.990.1101, ext. 2044

Reprint Manager Jennifer Thompson
jthompson@vpico.com
480.990.1101, ext. 1170

VIRGO Publishing, LLC

Chief Executive Officer John Siefert

Executive Vice President/CFO Kelly Ridley

Controller Jennifer Janos

Senior Vice President, Human Resources Heather Wood

Published by VIRGO Publishing, LLC
3300 N. Central Ave. #300,
Phoenix, AZ 85012

Phone 480.990.1101
Fax 480.990.0819
Website: www.vpico.com