



Fuelling the Sports Nutrition Sector

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Caffeine has been well marketed as a sports performance ingredient, but caffeine can also have many undesirable side effects. **Prof Jose Calbet** explains there is strong interest in finding natural alternatives to replace caffeine, and details one study into mango leaf extract as an example.

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As researchers following the supplement industry closely, **John Travis** and his team learnt about a new ingredient making waves on the sports nutrition scene: 2-aminoisoheptane. When they purchased products containing this ingredient to find out what it was, they discovered only one contained the labelled ingredient. Travis details the investigative process and highlights the importance of product testing and certification.

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Sports nutrition product manufacturers and retailers making claims about the features and benefits of products in the European Union need to be aware of the legal requirements of the marketing claims made on packaging or in advertising. **Claire Baseley** explains the rules and regulations of sports nutrition marketing, and the opportunities and challenges presented.

19 Takeaways



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Staying Ahead of the Game

In 2016, the global sports nutrition market was worth approximately €11.13 billion, with Europe seeing growth of more than 12 percent. We all know sports nutrition has long become mainstream and consumers increasingly understand the benefits of properly fuelling their workouts—this health movement sees brands push boundaries to meet ever-changing consumer demands. And that's great! The sports nutrition and active lifestyle sector continues to be a hotspot of innovation and new product development.

Humans have made good use of botanical ingredients to boost physical performance for centuries, and one of the most common of these is caffeine. Caffeine has been well marketed as a sports performance ingredient and many studies have reported a positive impact on performance following consumption, but it is an established fact caffeine can have many undesirable side effects—like that jittery feeling you get after one coffee too many. As a result, there is strong interest in finding natural alternatives to replace caffeine, as Prof Jose Calbet explores in his piece on [page 5](#).

Sometimes, manufacturers opt to include other stimulants in their products. As John Travis explains on [page 9](#), in 2016, his research team found the unapproved pharmaceutical stimulant oxilofrine in 14 products sold as dietary supplements. Travis details how his team approaches investigating hidden ingredients in products, and calls for industry-wide certification to protect consumers and reputable manufacturers.

Once a product is ready for market, considerable attention must be paid to the marketing claims made on packaging or in advertising: the European Nutrition and Health Claims Regulation governs all claims related to nutrients present within food products and the health benefits those nutrients may convey. Starting on [page 15](#), Clare Baseley covers how to word a health claim and shares best practice advice for marketing sports nutrition products.

Sports nutrition has come a long way from on-shelf products targeted only to bodybuilders and professional athletes; with today's consumers seeking protein in more diverse products and increasing numbers of the casually active 'weekend warriors', growth in this sector shows no sign of slowing down. Consumers globally are more interested in healthy diets and exercise, expanding the consumer base and ensuring continued market potential.

And hey, if all this talk of innovation in sport has you feeling pumped, why not sign up to take part in the [Vitafoods Europe 2018 5K run](#)?



J. Sterling

Jade Sterling

Associate Editor, Vitafoods Insights

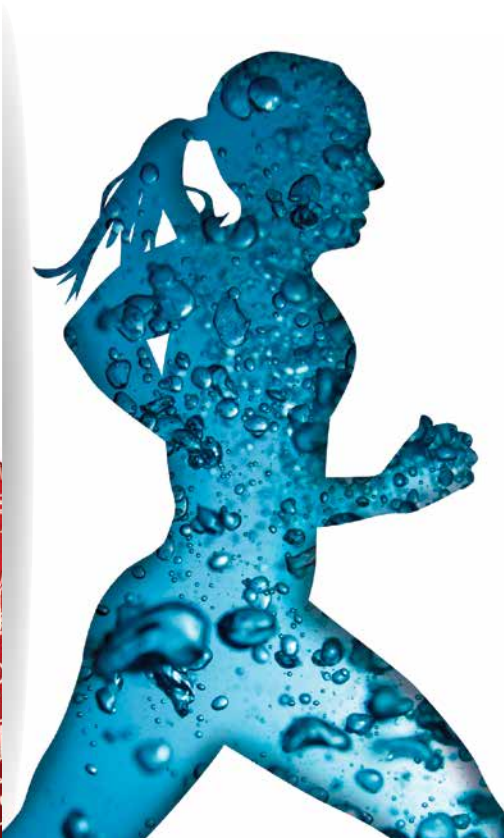
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Investigating Natural Alternatives to Caffeine in Sports Nutrition

by Prof Jose Calbet

Humans have made good use of botanical ingredients to boost intellectual and physical performance for centuries. However, not all botanical ingredients are supported by formal controlled clinical studies providing scientific evidence that the ingredients work as well as claimed. To enhance intellectual performance—cognitive and executive functions—bioactive compounds from botanical ingredients need to be absorbed and then cross the blood-brain barrier to be bioavailable within the brain. Once in the brain, they should enhance the state of alertness by modulating brain neurotransmitter levels to facilitate the noradrenergic and dopaminergic circuits while depressing serotonergic pathways, and selectively blocking adenosine receptors, for example.

Substances may enhance performance by increasing energy availability, enhancing efficiency in the use of energy, or by blocking the action of metabolites (including reactive oxygen and nitrogen species), which could reduce the contractile capacity of muscle. Botanical ingredients with a central action may also enhance performance by reducing the perception of effort by either limiting nociceptive and metabotropic afferent feedback or by improving the brain function during exercise.

One of the most common natural ingredients used to boost intellectual and physical performance is caffeine. Several sports drinks enriched with caffeine have been marketed and even though some studies have reported a positive influence on physical performance, particularly during prolonged exercise, it is also an established fact caffeine has many undesirable side effects—including increased arterial blood pressure, risk of arrhythmias during exercise, reduction of coronary blood flow in some people, and hypokalaemia.

There is strong interest in finding natural alternatives to replace caffeine—ingredients that could offer the positive effects of caffeine without its negative side effects. One such ingredient could be mango leaf extract. Seventeen healthy and physically active male and 13 female athletes agreed to participate in a study. After a familiarisation and pre-test phase lasting four weeks, the main experiment was performed to test the effects of two different caffeine-free sports formulations including the mango leaf extract.




There is strong interest in finding natural alternatives to replace caffeine—ingredients which could offer the positive effects of caffeine without its negative side effects.

One such ingredient could be mango leaf extract.



Pre-tests included assessment of body composition by dual-energy x-ray absorptiometry (Lunar iDXA, GE Healthcare, Wisconsin; USA), maximal oxygen uptake (VO₂max), and sprint performance and the assessment of the maximal oxygen deficit (the capacity to produce energy through the anaerobic metabolic pathways). This was followed by the main experiment involving repeated all-out sprints on an isokinetic ergometer.

The volunteers were randomly assigned to three treatments, following a double-blind design.



Treatment A was a **placebo** (500mg/d of maltodextrin);

Treatment B was a combination of **140mg of mango leaf extract** and **50mg luteolin per day**;

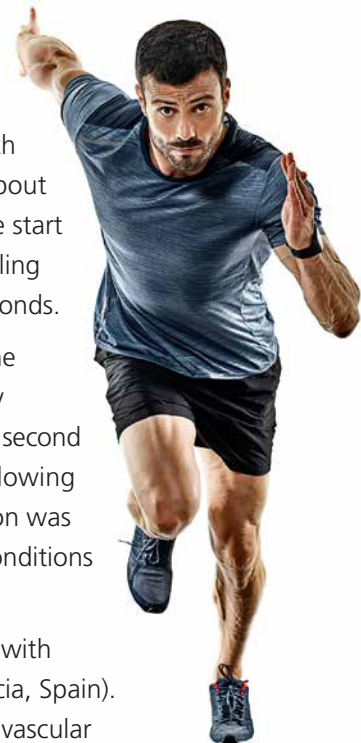
Treatment C was a combination of **140mg mango leaf extract, 600mg quercetin** and **350 mg *Cyperus esculentus*** extract per day.

The three treatments were divided into three daily doses administered every eight hours in identical capsules. On the experimental day, each subject reported to the laboratory in fasting conditions and 60 minutes before the start of the experiment they ingested an additional dose of the supplement. During the following 60 minutes, 10 ml of arterialised blood was taken before an assessment of the cognitive and executive function and cerebral vascular reactivity to determine the vasoconstrictor response of the middle cerebral artery. Then, with the subject seated on the cycle ergometer, they performed a standardised warm-up followed by two all-out 30 second sprints—also known as the Wingate test—separated by a four-minute resting period and four minutes later, another sprint test lasting 60 seconds.

Subjects were strongly encouraged to try their best and at the end of the 60 second sprint, two cuffs around their thighs, close to the inguinal crease, were instantaneously inflated at 300 mmHg to completely occlude the circulation of both lower extremities for 20 seconds. During the occlusion, the subjects were asked about the level of pain and asked to refrain from moving their legs. Ten seconds after the start of the occlusion they were given a reverse countdown and prompted to start pedalling again as fast and hard as possible with the ergometer in isokinetic mode for 15 seconds.

At the start of the sprint, the cuff was deflated to allow full reestablishment of the circulation during the subsequent exercise. At the end of the 15 second sprint, they pedalled slowly for another 5 seconds and then stopped to get ready for the final 15 second sprint announced with a 5 second reverse countdown. During the 10 seconds following the 15 second post-ischemia sprint, and during the final 15 second sprint, circulation was open. This allowed the efficiency of the mango leaf extract to be assessed under conditions of extreme fatigue.

A capillary blood sample was drawn from the earlobe, previously hyperhaemised with Finalgon cream, to measure the concentration of lactate (lactate-Pro, Arkray, Valencia, Spain). At the end of the test, the cognitive and executive function, as well as the cerebral vascular reactivity were measured again. Cerebral and muscle oxygenation (vastus lateralis) was assessed using near-infrared spectroscopy (NIRS, NIRO-200, Hamamatsu, Japan) employing spatially resolved spectroscopy. In all instances, exhaustion was defined by the incapacity of the subject to



Consumer Trends



maintain a pedalling rate above 50 rpm during 5 seconds, despite strong verbal encouragement or by the sudden stop of pedalling. Data was analysed using one-way repeated-measures ANOVA with one within-subjects factor: exercise bout (with five levels) and occlusion (with two levels: free or occlude recovery) and with gender as a between-subjects factor.

The results showed the mango leaf extract combinations provided an interesting alternative to caffeine. Both compounds containing mango leaf extract significantly enhanced performance during the last two sprints, i.e., those carried out with a high level of fatigue. Compared with placebo, when all sprints were averaged, compounds B and C increased peak power output by 5.4 and 7.5 percent, respectively. In the sprint performed after ischemia, formulation C increased peak power output by 19.4 percent compared to placebo ($P < 0.001$) and by 10.2 percent compared to compound B ($P < 0.05$). During the 15 second sprint performed after ischaemia and the last 15 second sprint, the vastus lateralis oxygenation index was slightly lower after the administration of formulation C than placebo ($P = 0.08$ and $P = 0.09$, respectively).

There was a trend for an interaction between the sprint and treatment for O₂ deficit ($P = 0.105$). In fact, when the analysis was circumscribed to the sprints performed immediately after ischemia, the O₂ deficit incurred was 59 percent greater after the ingestion of ingredient C compared with placebo ($P = 0.04$).

The mechanisms of action responsible for the ergogenic effect is a subject of ongoing research; however, our findings provide indirect evidence for an enhancement of performance without additional consumption of oxygen, suggesting either better muscle energy efficiency or enhanced capacity to recruit the exhausted muscle fibres by the central nervous system. Moreover, a trend for better muscular extraction of O₂ was also observed in the sprints performed after ischemia/reperfusion, which could be explained by better preservation of mitochondrial functioning or better distribution of blood flow after the ingestion of mango leaf extract. ●

Prof Jose Calbet is Professor of Exercise Physiology, University of Las Palmas de Gran Canaria.



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Uncovering Potentially Harmful Stimulants in Dietary Supplements

Researchers Take a Closer Look at Supplements Labeled '2-aminoisoheptane' or *Aconitum kusnezoffii*

By John Travis

As researchers following the supplement industry closely, my colleagues and I vigilantly watch bodybuilding and workout blogs. In 2016, we learned a new ingredient had arrived on the scene: 2-aminoisoheptane. None of us were familiar with this compound and we could find no evidence that 2-aminoisoheptane could be considered a legitimate dietary ingredient derived from plants. Based on its name, we suspected this substance was an alkylamine, possibly related to DMAA (1,3-dimethylamylamine) and DMBA (1,3-dimethylbutylamine). 2-aminoisoheptane also had another interesting connection to DMAA and DMBA; all these compounds were discussed in studies of pressor amines originally published by Lilly Research Laboratories in the late 1940s.

We purchased products listing 2-aminoisoheptane, DMHA, 2-amino-6-methylheptane or *Aconitum kusnezoffii* as ingredients and tested them to determine what those products actually contained. Of the six products tested, only one contained the labelled ingredient. So what was actually in these products? A little more investigative analysis uncovered DMBA in one product, DMAA in two other products and another substance, 1,4-DMAA—related to both DMBA and DMAA—in three products. However, three of the stimulants (DMBA, DMAA and 1,4-DMAA) were not disclosed on the product labels. These findings were published in the peer-reviewed journal [Clinical Toxicology](#) in November 2017.

This isn't the first time our team has found hidden stimulants in products labeled and marketed as supplements. Over the last few years, I've worked closely with researchers at Harvard Medical School, the National Center for Natural Products Research (NCNPR) at the University of Mississippi, and the National Institute for Public Health and the Environment in the Netherlands (RIVM) and we've found many examples of untested and potentially harmful compounds in products labeled as supplements. These hidden stimulants include DEPEA, DMAA, DMBA and oxilofrine, which were alleged constituents of orchid, geranium, tea and citrus fruit respectively, although there isn't credible evidence to support those claims.

Our test methods

Usually, I 'target' what I am searching for, purchase a reference standard, and then go find it. In this case, I had to deviate from that process. In targeted analysis, I use ultra-high performance chromatography (UHPLC) coupled with tandem mass spectrometry to detect and measure compounds. The investigative analysis was interesting in that I used a different technique to capture much



information and then sifted out the interesting features. I still used UHPLC, but coupled that to a high resolution/accurate mass, mass spectrometer (HRAM-MS). This instrumentation can measure a compound's mass with a high degree of accuracy and discriminate it from others close in mass. An example will help explain: testosterone has a molecular formula of $C_{19}H_{28}O_2$, which corresponds to an exact mass of 288.2089. Desoxymethyltestosterone has a molecular formula of $C_{20}H_{32}O$ and a corresponding exact mass of 288.2453. The HRAM-MS has the selectivity to distinguish between those two, and provide an accurate mass measurement for each.

I analysed all the products using the UHPLC-HRAM-MS instrument and sifted out their interesting features. First, I eliminated the features that corresponded to the labelled ingredients. Then I worked on identifying the most intense features in a descending fashion. In this way, I uncovered the presence of the unlabelled ingredients but I still had to use the targeted method with a reference standard to confirm their presence and quantity. This last step is very important, and often omitted in published research.

A disturbing trend

Our latest research related to 2-aminoisoheptane is the most recent 'hidden stimulant' incident we've found. In 2016, my research colleagues and I found the unapproved pharmaceutical stimulant oxilofrine in 14 products sold as dietary supplements. Our research was published in the peer-reviewed journal *Drug Testing and Analysis*. Oxilofrine is easily disguised or unlisted on labels—posing serious health risks to consumers.

The US Food and Drug Administration (FDA) took action on 4 April 2016 to remove oxilofrine from the marketplace, issuing warning letters to seven companies that listed the compound on their product labels. According to FDA, oxilofrine is an illegal dietary ingredient, which means products containing oxilofrine are considered misbranded under US law. Considered a performance enhancing drug, oxilofrine is on the World Anti-Doping Agency's list of banned substances and is not widely used in Europe, where it is only available on prescription.

Oxilofrine has been studied in animals and humans and found to cause effects on the heart similar to ephedrine. According to our research, 26 adverse events have been reported in the Netherlands linked to supplements containing oxilofrine. These products led to nausea and vomiting, tachycardia, chest pain and cardiac arrest. Additionally, oxilofrine is often disguised on labels as 'methysynephrine' or 'extract of *Acacia rigidula*.' The use of methysynephrine as a synonym is particularly troublesome. Synephrine is a compound in the phenylethylamine class and present in many citrus fruits—using the name methysynephrine implies that it is also present in citrus fruits, which is simply untrue and misleading.



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Another example is DMAA. In 2013, it was determined that 1,3 dimethylamylamine—commonly known as DMAA—is not ‘natural’ in origin and should not be used as an ingredient in dietary supplements. The research findings support research conducted by academic research laboratories around the world.

Several sports supplements have tried to market DMAA as a natural constituent of geranium or its extract, but there is no credible scientific evidence to support that claim. Under the US Dietary Supplement Health and Education Act (DSHEA), any dietary ingredient that was marketed and sold prior to the signing of the act can be used in a dietary supplement. Products containing DMAA have been linked to health problems and at least five deaths. As a result, FDA issued several warning letters to manufacturers formulating their products with DMAA and have urged people to avoid these products. Several professional and Olympic athletes have lost their eligibility to compete due to DMAA. Stores and online retailers still sell products that contain DMAA, despite FDA’s position that it is not a legitimate dietary ingredient.

Commitment to quality and safety

All this research highlights the importance of Good Manufacturing Practices (GMPs), ingredient and finished product testing, and independent certification of supplements. While the vast majority of manufacturers are committed to quality and safety, a small number of manufacturers continue to develop and market products that contain potentially harmful ingredients. This presents a great opportunity for reputable companies that want to showcase their products’ quality and safety.

Independent third-party certification of dietary and sports supplements helps supplement makers differentiate their products in the marketplace. When consumers see the NSF International certification mark on a package, they can be sure those vitamins and supplements have been independently tested for harmful levels of specific contaminants like lead and arsenic. NSF certification also means the product has been tested and label claims verified so consumers can be sure the ingredients listed on the package are actually in the product.



Independent third-party certification of dietary and sports supplements

helps supplement makers differentiate their products in the marketplace, and means consumers can be sure those manufacturers are committed to quality and safety.

An additional level of certification is available for sports supplement products. Products earning NSF’s Certified for Sport® certification are tested for over 270 athletic banned substances. In addition, these products must be produced in a manufacturing facility that is inspected twice a year to comply with FDA’s GMP requirements. Label claims are verified and products are tested to verify formulation. The product is also tested for harmful levels of contaminants or fraudulent ingredients.

Harmful Stimulants in Dietary Supplements



How does this happen?

None of us know how synthetic stimulants like DMAA, DMBA, 1-4 DMAA and Octodrine found their way into supplements. Poor manufacturing practices may be to blame. Perhaps a supplier shipped the wrong ingredient; or maybe it was intentional. It would not be the first time a synthetic stimulant was hidden under the guise of a botanical. Ever since ephedrine was banned by FDA in 2004, many supplement manufacturers have been searching for new ingredients to replace it. Today, it seems, many supplement makers remain on the hunt for an ingredient that will provide that same 'ephedrine-like' stimulant kick in their products.

Regardless of how it happened, brand owners are ultimately responsible for the quality and safety of their finished products. While most supplement brands and manufacturers are committed to ensuring quality and safety, there are some bad players in global supplement supply chain. And the actions of these companies continue to put consumers at risk. ●

John Travis is senior research scientist, Dietary Supplements at NSF International.

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Marketing an Active Nutrition Product to Consumers: Opportunities and Challenges

By Clare Baseley

Sports nutrition product manufacturers and retailers making claims about the features and benefits of products in the European Union (EU) need to be aware of the legal requirements of the marketing claims made on packaging or in advertising.

The Nutrition and Health Claims legislation

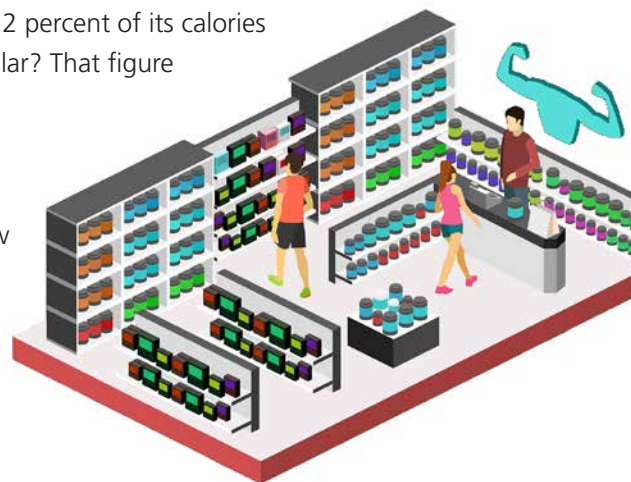
The European Nutrition and Health Claims Regulation has been in force since December 2006 and governs all claims related to nutrients present within food products and the health benefits those nutrients may convey. It applies to the product packaging and also to all marketing materials including product websites; retailer websites selling the product; above and below the line media (broadcast and print media adverts, posters etc.); any social media communications on the brand's channels or on influencer's channels, if they have been paid to promote the product; and all B2B communications such as trade brochures and catalogues.

Note that even the product name can constitute a claim: for example, '*Fruit and Fibre*' or '*Slim Fast*'. If that brand name existed or was trademarked before 1 January 2005 and it does not meet the requirements of the Nutrition and Health Claims legislation, it may continue to be used until 19 January 2022, after which it will need to meet the necessary conditions of use or be amended. Any brand names used after this date will need to meet the conditions of use for the relevant claim, if they could be construed as a health claim.

Nutrition claims

Let's say you want to add a 'Source of protein' claim to your product. You need to demonstrate there is a significant amount of protein present, or the claim would be misleading. In this case, the product should provide at least 12 percent of its calories from protein. Want to say 'high in protein' or something similar? That figure must be 20 percent or more.

There is an [approved list of nutrition claims](#) detailing the approved claim wording (which you must stick to and not exaggerate) and the conditions of use in each case—i.e., how much of the nutrient should be present to permit the claim. These range from 'low or reduced fat' to 'source of omega-3'. If the claim you wish to make is not on the list, it is not authorised and you could therefore be challenged



for using it—examples include ‘no added refined sugar’ (though ‘no added sugar’ alone is acceptable) and ‘90 percent fat free’.

In addition, under the [EU Food Information to Consumers legislation](#), you must—among other particulars—label the energy content per 100g of your product, along with the levels of fat, saturates, carbohydrates, sugars, protein, fibre and salt. If you have made a claim about a nutrient not included in this list, you must also detail the amount of that nutrient present in the product, along with the proportion of the reference intake that the product provides per 100g.

Health claims

What if you wish to link the presence of a nutrient in your product with a health effect such as ‘protein contributes to a growth in muscle mass’? Again, you must comply with the conditions of use of this claim, which is to supply an adequate source of protein (again, 12 percent energy from protein). This protein claim is on the European Food Safety Authority (EFSA) approved list. Out of thousands of claims submitted, with their supporting evidence, the EFSA scientists considered the quality of the evidence for a health effect of each nutrient and approved just 261 claims. You can find these claims in the searchable [EFSA database](#). Select only authorised claims and search via keyword, such as ‘calcium’ or ‘protein’.

As with nutrition claims, you must meet the conditions of use in the case of each claim, supplying the requisite amount of the nutrient in a portion that a consumer might reasonably consume—it’s misleading to make a cholesterol reduction claim on a spread that would require you to eat the entire tub to consume adequate amounts of the active ingredient. You must also label the eight nutrients detailed above, plus the amounts of any claimed nutrient if not included in the standard nutrition panel and the proportion of the reference intake the product delivers, along with a recommendation to consume a varied and balanced diet.

When it comes to claim wording, you might be tempted to embellish the approved wording to make it more consumer friendly—for example, you may replace ‘vitamin C contributes to the protection of cells from oxidative stress’ with ‘vitamin C is an antioxidant’ as this is more meaningful to the consumer. However, this is not permitted because it is changing the meaning. You may wish to substitute ‘healthy’ for ‘normal’—such as ‘calcium helps contribute to normal/healthy bone growth’ but again, this is misleading as it is an exaggeration of the permitted claim. Unfortunately for marketers, you must stick as closely as possible to the approved claim wording to avoid misleading the consumer.

Also, bear in mind saying that a product is ‘good for you’, ‘healthy’, ‘nutritious’ or similar is what’s known as a non-specific health claim. It must therefore be accompanied by an approved, specific health claim such as ‘contains a source of calcium to support normal bones’.

Finally, be aware that any health claim must be clearly attributed to the nutrient the product delivers and not the product itself. A protein shake does not support the growth of muscle mass; the protein it contains does this.

The best way to learn about best practice is to visit the [Advertising Standards Authority \(ASA\) rulings](#) page. Every Wednesday, adjudications are published, providing a wealth of information on how the legislation is enforced and why complaints against non-compliant products are upheld (or not).





Weight management

There are two EFSA-approved claims for meal replacement products, aimed either at weight loss or maintenance. As with all such health claims, your product must meet all the conditions of use if you are to make a weight reduction claim. This means meeting strict nutritional criteria and avoiding making claims about the rate of weight loss—like using before and after pictures with a specific time scale or using claims like ‘drop a dress size in a month’.

Many products in the sports nutrition market claim to be meal replacements but not all of them meet these nutritional criteria, and many use before and after pictures referencing the rate of weight loss. In addition, many make unauthorised health claims about boosting metabolism, ‘toning’, fat burning and appetite management. There are no authorised health claims for fat-burning that relate to weight reduction.

Muscle recovery

While many individuals use protein supplements after weight training to aid muscle recovery, there are only two approved claims linking protein with muscle function (muscle maintenance and growth). Therefore, referring to either muscle recovery or overall performance in marketing claims for protein supplements is not permitted.

It is permitted to reference muscle recovery following intense or endurance exercise for products supplying a source of carbohydrate, as long as the relevant conditions of use are fulfilled.

Energy and endurance performance

Numerous claims are made on sports nutrition products about energy provision or release. There are only three approved nutrition claims relating to the energy content of foods and these are all aimed at low calorie products and not sports nutrition products. Therefore, take care when using the word ‘energy’ or ‘fuel’ in communications.

Moreover, making comparative claims is fraught with pitfalls. It’s not permitted to make comparative nutrition claims across different food categories, such as ‘Brand X Protein drink provides more protein than beef’. It’s also not permitted to claim a product fuels exercise better than water or it releases its energy quicker than other products. There are currently only two claims related to endurance performance, both intended for use on carbohydrate-electrolyte drinks meeting strict compositional criteria. Neither of these specifically reference energy, fuel or the speed of energy or carbohydrate release. Both [Lucozade](#) and [Science in Sport](#) had ASA Rulings upheld that are of great use as case studies for brands wishing to make claims about endurance products.

If you are creating packaging or marketing copy, make sure you are using only approved nutrition or health claims, even if you are speaking with other businesses or to the trade. Make prodigious use of the ASA’s website for invaluable case studies and, above all, make sure you do not mislead the consumer! ●

[Claire Baseley](#) is a registered nutritionist who helps companies create consumer-friendly, legally compliant communications to market their products.



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Takeaways for Your Business

The sports nutrition industry is booming in Europe, with figures from Euromonitor showing Finland, Sweden and the United Kingdom are the biggest sports nutrition markets in terms of per capita consumption. Mintel data indicates women are a key target group as female sports nutrition users grow in number and finished products still cater mostly to men. Manufacturers are moving away from weight management products in favour of sports nutrition products for women, and this trend is likely to continue.

Protein is the top performing ingredient, popular thanks to its sustained media support, with brands in every sector aiming to capitalise on the protein boom. This is leading to a blurring of the lines between traditional sports nutrition products and trendy high protein food; as Mintel data shows 45 percent of consumers believe it is important to increase protein intake when exercising regularly, users are no longer relying solely on sports nutrition products for their protein intake. Manufacturers and retailers making protein claims need to demonstrate there is a significant amount of protein present, or the claim would be misleading. To say 'high in protein', the product should provide at least 20 percent of its calories from protein. There is an approved list of nutrition claims detailing the approved claim wording and the conditions of use in each case. As consumers are offered a greater choice of protein products from sports nutrition products and food items, it is likely consumers will cease differentiating between the two, particularly as the clean label trend develops and consumers view protein itself as a food ingredient.

Mintel data also shows 72 percent of sports nutrition consumers would like to see an industry-wide certification to ensure the quality of the ingredients. There is a high level of scrutiny among consumers, highlighting the need for transparency in this sector. Research highlights the importance of good manufacturing practices (GMPs), ingredient and finished product testing, and independent certification of supplements. While the vast majority of manufacturers are committed to quality and safety, a small number of outliers continue to develop and market products containing potentially harmful ingredients; this presents a great opportunity for reputable companies to showcase their products' quality and safety through certification.

Personalised nutrition is a mega-trend for the wider industry, and has a natural focus on sports nutrition as athletic individuals select the best products for their personal performance. In the long-term, developments in nutrigenomics and nutrigenetics give rise to the possibility of highly personalised ingredient recommendations, with the industry looking to tailor products to individual requirements. This can be seen in the substantial variation between individuals following caffeine ingestion in sport—although some studies have reported a positive influence of physical performance, it is also an established fact caffeine has many undesirable side effects. There is strong interest in finding natural alternatives to replace caffeine—ingredients which could offer the positive performance boosts of caffeine without its negative side effects. ●



Vitafoods is the leading brand in Europe and Asia connecting companies across the food, beverage, supplement and personal care markets with ingredient suppliers, contract manufacturers and service providers. Vitafoods Insights (vitafoodsinsights.com) is a premium content destination that delivers the best content from Vitafoods to a global audience.

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