

Nutrition
Centre
By TATE & LYLE

Sports Nutrition



Sports Nutrition - the nutrition you need for your active lifestyle

Leading an active lifestyle requires the right nutritional balance. What that looks like for you will depend on how active you are. For many, leading a healthy lifestyle has always been a priority, and since the COVID-19 pandemic an increasing number of us are choosing to be more active.

As a result, sports nutrition products are no longer the sole domain of performance athletes. They can be useful in supporting every day exercise, no matter the intensity level.

Here, we'll be exploring some of the key components to sports nutrition, namely carbohydrates, fibre, protein and hydration, and how they can help you achieve your fitness goals.



How active are you?

Take a look at the table below to ascertain your activity level, based on intensity and duration, to get a better idea of the nutrients you need for optimum sports nutrition.

Low

Less than 45 minutes per day low intensity or skill-based activities

Examples:

Yoga, Pilates, walks and short hikes



Moderate

Around 1 hour per day moderate exercise programme

Examples:

Jogging, brisk walking, gym workouts, swimming and cycling



High

Around 1-3 hours per day moderate to high-intensity exercise

Examples:

Running, cross-fit, HIIT and mountain biking



Very High

4-5 hours per day moderate to high-intensity exercise

Examples:

Training for ultra-endurance events



Carbohydrates

Carbohydrates are the body's main source of energy(1). When we exercise, this is the source of fuel that our body will use first (2,3). If the carbohydrates in our diet are restricted, we run the risk of getting tired quickly, and our performance will be impaired (4).

Take a look at the below table showing the amount you'll need, depending on the amount and intensity of exercise you do, based on an adult with an average body weight of 70kg:



Guidelines for daily carbohydrate intake (1)

Low	Moderate	High	Very High
3-5g of carbohydrate per kg of body weight	5-7g of carbohydrate per kg of body weight	6 - 10g of carbohydrate per kg of body weight	8- 12g of carbohydrate per kg of body weight
Daily	Daily	Daily	Daily
210-350g of carbohydrate per day	350-490g of carbohydrate per day	420 - 700g of carbohydrate per day	560 - 840g of carbohydrate per day

Carbohydrates during exercise

If you're exercising for more than 1 hour, taking on carbohydrates during exercise can help your muscles receive adequate amounts of energy. It's also been found to improve performance (5). Sports drinks and gels are an easy way to get the extra carbohydrate boost you need during your workout, as it's much easier to reach for a drink that you can keep on hand, rather than to stop for a sandwich.

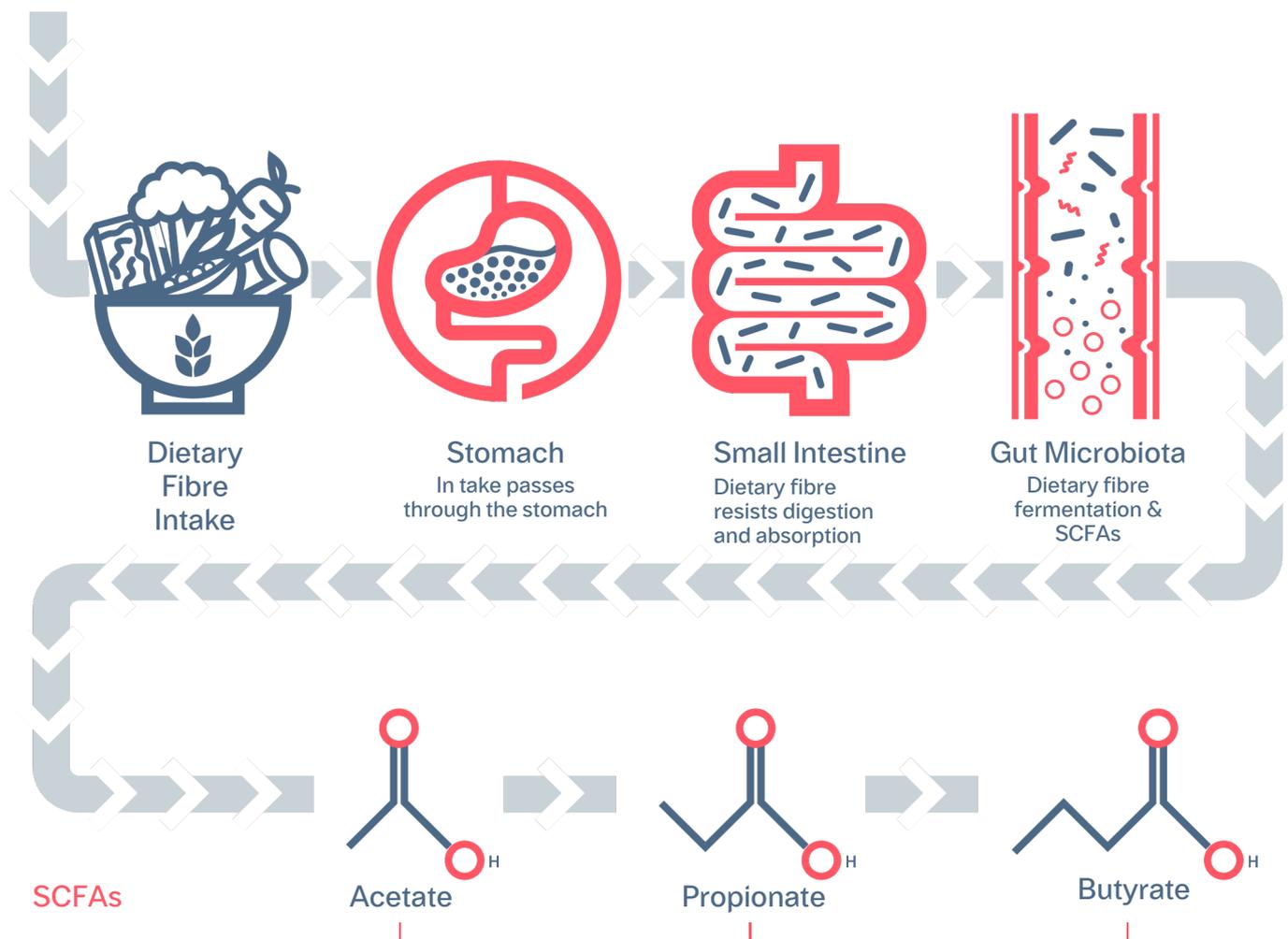


Fibre

Fibre is a type of carbohydrate that is not digested in the stomach or small intestine and passes intact to the large intestine (also called the colon) (6). Once there, the fibres may be partially or completely fermented by gut bacteria to produce short-chain fatty acids (SCFAs), which help to keep your digestive system healthy.



The journey of fibre through the human body



Fibre has lots of benefits, including helping to reduce the risk of certain diseases such as diabetes, some cancers and heart disease (7-9). However, even though they may know a lot about nutrition, many athletes struggle to eat enough fibre (10, 11). The body has to work hard to break down the fibre you eat, which isn't ideal when you're trying to exercise and

perform the best you can. Because of this, fibre intake isn't always something athletes prioritise, as they aim to avoid digestive upset - a common feature of strenuous exercise (12). However, fibre is very important for our long-term health, and finding the right balance is key.

The benefits of soluble fibre for an active lifestyle

Emerging evidence suggests that a particular type of fibre, known as soluble fibre has a number of potential health benefits. Soluble fibre can be found in fruits such as ripe bananas, apples and pears, vegetables including root vegetables, broccoli and peas, as well as oats.

Whilst further research is needed into how fibre can benefit athletes and their performance, it's certainly an exciting area for the future. **Take a look below.**



Bone Health

Healthy bones are important for an active lifestyle, as low bone density and stress fractures (1) can seriously impair your ability to stay active. Studies have shown that certain types of soluble fibre can increase calcium absorption and in turn, help to keep bones healthy (13).



Gut Health

A healthy and diverse gut microbiota may support energy levels and increase performance and health (14). Some soluble fibres have been shown to promote the growth of certain bacteria and production of short-chain fatty acids, helping to support a healthy gut (15, 16). With around 70% of the body's immune cells in the gastrointestinal tract (17), it is increasingly recognised that gut health is an important area that can benefit athletes.



Immunity

Illness can limit an active lifestyle. Some studies suggest that soluble fibre encourages the growth and activity of certain bacteria, resulting in the production of short-chain fatty acids (165). These prebiotic qualities may help support a healthy gut and potentially play a role in immune health (16,18-20). Further research is needed to understand better the effect of fibres on specific aspects of the immune system and to explore the effect on clinical outcomes across the lifespan.

Protein

It's widely accepted that those who are more active need more protein than those who live sedentary lifestyles. This is because protein has a number of different functions. It helps to repair damaged muscle tissue (21), maintains muscle mass, and helps with new muscle growth.

Take a look at the recommendations for protein intake below, across the range of exercise intensity and duration, based on an adult with an average body weight of 70kg:



Guidelines for daily protein intake (5)

Low-Moderate	High Endurance	High Strength and Power	Female Athletes
0.8 - 1.2g/kg of body weight	1.2 - 2g/kg of body weight	1.6 - 2.2g/kg of body weight	20% less than males
Daily	Daily	Daily	Daily
56 - 84g of protein per day	84 - 140g of protein per day	112 - 154g of protein per day	20% less than males

Protein is most effective when consumed at regular intervals throughout the day, with the recommended amount being around 20g every 3-5 hours, and again immediately after an exercise session (1).

High-biological value protein to help you reach your daily goals include dairy proteins, eggs and soy. Dairy proteins are particularly good for muscle protein synthesis due to their high digestion (5, 23).

Plant-based protein

For dietary or ethical reasons many people are now choosing to go plant-based. Although plant and animal proteins differ in composition (22), research shows that they both contribute towards muscle growth and building strength (23).



Hydration

You'll need to make sure that you're getting enough fluids before, during and after exercise. This is to ensure you're fully hydrated, don't excessively dehydrate, and properly replace any fluids you lose, for example through sweat (24).

Hydration isn't an exact science, and what you'll require can fluctuate due to a number of factors, from the intensity of the exercise to the weather conditions.

Keep an eye on your thirst and energy levels, as well as checking the colour of your urine - the darker it is, the more likely it is that you need to drink more fluids – and remember that you are likely to be slightly dehydrated even before you start to feel thirsty.

A rough guide as to the amount of hydration you need (5)



Before exercise

500ml the night before training/competition and 400 - 600 ml 20-30 mins before

(For an adult with an average weight of 70kg).



During exercise

500ml to 2L of fluid per hour to offset weight loss



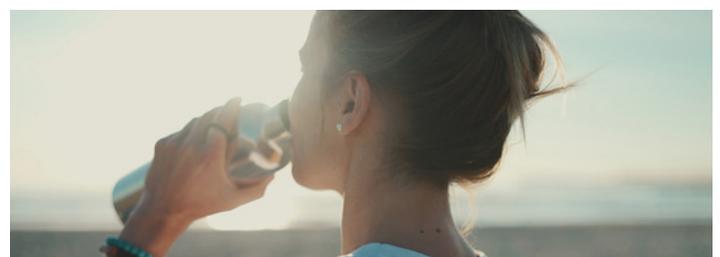
After exercise

500 - 700ml for every 0.5 kg of weight lost during exercise

Choosing the right hydration

Optimal hydration replaces water and electrolytes (25, 26)

Every time we sweat, or go to the toilet, we lose electrolytes, so it's important that we're replacing these (25, 26). Sports drinks can be a good option as they already contain the right balance of electrolytes for the body.



What are electrolytes?

Electrolytes are essential minerals like sodium, potassium, calcium and chloride (27). They play important roles in nerve transmission and muscle contraction, and a lack of them can impair athletic performance (25).

Conclusion

An active lifestyle and good nutrition go hand in hand. Whatever your level of activity, it's important to get the nutritional balance you need. Following healthy eating guidelines, staying hydrated, and using specialist sports nutrition products where needed to support your goals are a firm foundation for success.

At Tate & Lyle, our portfolio of innovative ingredients is leading the way for products that you can incorporate seamlessly into your chosen exercise routine.





References

1. Thomas DT, et al. 2016. Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *J Acad Nutr Diet.* 116(3):501-28.
2. Casey A, et al. 2000. Effect of carbohydrate ingestion on glycogen resynthesis in human liver and skeletal muscle, measured by $(13)C$ MRS. *Am J Physiol Endocrinol Metab.* 278(1):E65-75.
3. Bergstrom J, et al. 1967. Diet, muscle glycogen and physical performance. *Acta Physiol Scand.* 71(2):140-50.
4. Kanter M. 2018. High-Quality Carbohydrates and Physical Performance: Expert Panel Report. *Nutr Today.* Jan;53(1):35-39.
5. Kerksick CM. 2018. ISSN exercise & sports nutrition review update: research & recommendations. *J Int Soc Sports Nutr.* Aug 1;15(1):38.
6. Williams B, et al. 2017. Gut Fermentation of Dietary Fibres: Physico-Chemistry of Plant Cell Walls and Implications for Health. *Int. J. Mol. Sci.* 18:2203.
7. Dietary Guidelines Advisory Committee. 2015. Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans.
8. Institute of Medicine, Food and Nutrition Board. 2002/2005. Dietary Reference Intakes: Energy, Carbohydrates, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington, DC: National Academies Press.
9. Stephen AM, et al. 2017. Dietary fibre in Europe: current state of knowledge on definitions, sources, recommendations, intakes and relationships to health. *Nutrition Research Reviews.*
10. Bronkowska M, et al. 2018. Assessment of the frequency of intake of selected sources of dietary fibre among persons competing in marathons. *Rocz Panstw Zakl Hig.* 69(4):347.
11. Naughton RJ, et al. 2017. Free-sugar, total-sugar, fibre, and micronutrient intake within elite youth British soccer players: a nutritional transition from schoolboy to fulltime soccer player. *Appl Physiol Nutr Metab.* 42(5):517-22.
12. Costa RJS, et al. 2017. Systematic review: exercise-induced gastrointestinal syndrome-implications for health and intestinal disease. *Aliment Pharmacol Ther.* 46(3):246-65.
13. Whisner CM and Castillo LF. 2018. Prebiotics, Bone and Mineral Metabolism. *Calcif Tissue Int.* 102(4):443-79. 14. Mohr AE, et al. 2020. The athletic gut microbiota. *J Int Soc Sports Nutr* 17(24).
15. Vester Boler BM, et al. 2011. Digestive physiological outcomes related to polydextrose and soluble maize fibre consumption by healthy adult men. *Br J Nutr.* 106:1864-71.
16. Whisner CM, et al. 2014. Soluble maize fibre affects short-term calcium absorption in adolescent boys and girls: a randomised controlled trial using dual stable isotopic tracers. *Br J Nutr.* 112:446-56.
17. Wiertsema SP, et al. 2021. The Interplay between the Gut Microbiome and the Immune System in the Context of Infectious Diseases throughout Life and the Role of Nutrition in Optimizing Treatment Strategies. *Nutrients.* 2021; 13(3):886.
18. Arroyo MC, et al. 2023. Age-Dependent Prebiotic Effects of Soluble Corn Fiber in M-SHIME® Gut Microbial Ecosystems. *Plant Foods Hum Nutr.* 2023 Mar;78(1):213-220. 1
9. Costabile A, et al. 2016. Prebiotic Potential of a Maize-Based Soluble Fibre and Impact of Dose on the Human Gut Microbiota. *PLoS One.* 5;11(1).
20. Maathuis A, et al. 2009. The effect of the undigested fraction of maize products on the activity and composition of the microbiota determined in a dynamic in vitro model of the human proximal large intestine. *J Am Coll Nutr.* 28(6):657-66.
21. Churchward-Venne TA, et al. 2020. Dose-response effects of dietary protein on muscle protein synthesis during recovery from endurance exercise in young men: a double-blind randomized trial. *Am J Clin Nutr.* 1;112(2):303-317.
22. Gorissen SHM, et al. 2018. Protein content and amino acid composition of commercially available plant-based protein isolates. *Amino Acids.* 50(12):1685-95.
23. Hevia-Larrazin V, et al. 2021. High-Protein Plant-Based Diet Versus a Protein-Matched Omnivorous Diet to Support Resistance Training Adaptations: A Comparison Between Habitual Vegans and Omnivores. *Sports Med.* 51(6):1317-1330.
24. Belval LN, et al. 2019. Practical Hydration Solutions for Sports. *Nutrients.* 11(7).
25. Williams MH. 2005 Dietary Supplements and Sports Performance: Minerals. *J Int Soc Sports Nutr.* 2,43.
26. Ziegenhagen R, et al. 2020. Position of the working group sports nutrition of the German Nutrition Society (DGE): safety aspects of dietary supplements in sports. *Dtsch Z Sportmed.* 71: 216-224.
27. Shirreffs SM and Sawka MN. 2011. Fluid and electrolyte needs for training, competition, and recovery. *J Sports Sci.* 29 Suppl 1:S39-46.

To learn more about Tate & Lyle ingredients and innovations as well as health benefits and relevant research, please visit www.tateandlyle.com/nutrition-centre

This leaflet is provided for general circulation to the nutrition science and health professional community and professional participants in the food industry, including prospective customers for Tate & Lyle food ingredients. It is not designed for consumer use. The applicability of label claims, health claims and the regulatory and intellectual property status of our ingredients varies by jurisdiction. You should obtain your own advice regarding all legal and regulatory aspects of our ingredients and their usage in your own products to determine suitability for their particular purposes, claims, freedom to operate, labeling or specific applications in any particular jurisdiction. This product information is published for your consideration and independent verification. Tate & Lyle accepts no liability for its accuracy or completeness.
