AIS SPORTS SUPPLEMENT FRAMEWORK
ABCD CLASSIFICATION SYSTEM

VITAMIN E

SUMMARY REPORT: CONSIDERATION FOR CLASSIFICATION OF A SUPPLEMENT INGREDIENT

The ABCD Classification system ranks sports foods and supplement ingredients into four groups according to scientific evidence and other practical considerations that determine whether a product is safe, permitted, and effective in improving sports performance. The classification of supplements and sports foods is made via the consideration of the AIS Sports Supplement Framework Committee and evolves according to new knowledge plus the informed direction of our key stakeholders. This report summarises decisions made regarding the addition or reclassification of a substance within the System, based on evidence provided by the applicant and assessed (and potentially augmented) by the Framework Committee.

SUMMARY REPORT FOLLOWING CONSIDERATION OF ADDITION/ALTERATION OF SUPPLEMENT INGREDIENT	
Name/ Formulation & description	Vitamin E refers to lipid soluble compounds including four tocopherols and four tocotrienols, with α-tocopherol being the most biologically available and most well-known form. It is found in lipid rich structures such as the sarcoplasmic reticulum, where it scavenges free radicals produced by the mitochondria, thereby reducing lipid peroxidation and membrane damage. Given Vitamin E is a fat-soluble vitamin, it is primarily found in higher fat, plant derived foods, including nuts and oils, and to a lesser extent in the fats of meat, poultry and fish. Both natural and synthetic forms of vitamin E can be found in vitamin E supplements, with the "d" prefix denoting natural forms, particularly d-alpha tocopherol; and the "dl" prefix denoting synthetic forms, particularly dl-alpha tocopheryl acetate. Vitamin E supplements are available in the form of tablets, capsules, powders or drops.
Current AIS Supplement Framework Classification	Group B
Agreed AIS Supplement Framework Classification	Group C
Proposed benefit[s]	1. Reduction in oxidative stress and free radical damage induced by intense exercise 2. Enhanced recovery following fatiguing exercise
Proposed mechanism of action[s]	Vitamin E appears to have a role in immune function, including increasing lymphocyte proliferation in response to mitogenic stimulation, increasing interleukin-2 production, decreasing interleukin-6 production and enhanced delayed type hypersensitivity response.[1] Vitamin E has anti-oxidant properties, and is capable of scavenging lipid-derived peroxyl radicals and terminating oxidation of polyunsaturated fatty acids.[2,3]
Summary of supporting evidence	Overall, there is limited evidence to support the use of vitamin E for athletes. > Studies are not supportive of any benefit of vitamin E supplementation on rate of recovery of muscle contraction force following fatiguing exercise in humans[4-6] > Despite evidence for improvements in oxidative stress with vitamin E supplementation in athletes/exercisers, its effects on exercise performance outcomes are not convincing[7] > Two studies found improvements in cycling anaerobic threshold power during incremental tests at altitude following vitamin E supplementation, however both studies were small in size[8-9] Some studies have shown improvements in non-fatal myocardial infarction risk in patients with existing heart disease following vitamin E supplementation, however RCTs are generally not supportive of any benefits of vitamin E supplements in the primary or secondary prevention of cardiovascular disease.[10]

Limitations to current science	Some investigations have shown a potential blunting of skeletal muscle adaptations to endurance training with combined vitamin E and vitamin C supplementation.[11-13] There is currently no convincing evidence that vitamin E supplements alone impair exercise-related adaptations in humans. While vitamin E is generally considered 'safe' even with intake well above RDI[14], a meta-analysis of clinical trials of vitamin E supplementation across a range of different clinical conditions reported that adults who consume ≥400 IU/day were 6% more likely to die of any cause compared to no supplementation.[15] Other meta-analyses of human RCTs have found that there is no risk of increased CVD mortality or all-cause mortality at doses of up to 800 IU/day.[16-17]
Final consensus	Chronic supplementation with vitamin E amongst athletic populations can not currently be supported. However, it is recognised that further research in this area is warranted. This includes research into the potential acute benefits of supplementation when immediate performance retention is desired, and adaptation is less important, such as during competition. If moderating oxidative stress and inflammation are a priority, adapting a meal plan that focuses on unprocessed, conventional foods to include additional serves of mixed fruit and vegetables, plus nuts and extra virgin plant based oils should be a priority.

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The Australian Institute of Sport (AIS) Supplement Framework is an initiative of the Australian High Performance Sport System. The AIS acknowledges the support of members of the National Institute Network (NIN) and National Sporting Organisations (NSO) and their staff in delivering content expertise. This information is intended to help athletes, coaches and scientists make evidence-based decisions about the use of supplements and sports foods. Before engaging in supplement use, we recommend that each individual refer to the specific supplement policies of their sporting organisation, sports institute or parent body, and seek appropriate professional advice from an accredited sports dietitian (**www.sportsdietitians.com.au**).

Athletes should be aware that the use of supplements may have doping implications. Athletes are reminded that they are responsible for all substances that enter their body under the 'strict liability' rules of the World Anti-Doping Code. Some supplements are riskier than others. The Sport Integrity Australia (SIA) app is a useful resource to help mitigate the risk of inadvertent doping by helping to identify supplements that have been batch-tested. The SIA App provides a list of more than 11,000 batch-tested products. We recommend that all athletes consult the educational resources of SIA regarding the risks associated with supplements and sports foods.. While batch-tested products have the lowest risk of a product containing prohibited substances, they cannot offer you a guarantee that they are not contaminated (**www.sportintegrity.gov.au/what-we-do/supplements-sport**).

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