



Table S1. Effects of fruit-derived anthocyanins on cycling-induced responses and cycling performance. Captions: ACN, anthocyanins; ALT, altitude; ATi, anaerobic threshold intensity; CK, creatine kinase; CM, cardiometabolic markers; CO, cardiac output; CRP, C-reactive protein; DNA, deoxyribonucleic acid; DBP, diastolic blood pressure; F, females; FATMAX, intensity eliciting maximal fat oxidation rate, conveyed as percentage of maximal oxygen uptake (%VO_{2max}); GSH, reduced glutathione; Hct, hematocrit; HDL, high density lipoprotein; HIIE, high-intensity intermittent exercise; HIIT, high-intensity interval training; HR, heart rate; hsCRP, high-sensitivity C-reactive protein; I, inflammation biomarkers; IL-1-β, interleukin-1-beta; IL-6, interleukin-6; IL-8, interleukin-8; [La-]b, blood lactate concentration; LDL, low density lipoprotein; LOOH, lipid hydroperoxides; M, males; MAP, mean arterial pressure; MD, multiple daily; MDA, malondialdehyde; MO, muscle oxygenation; MVIC, maximum voluntary isometric contraction; NEFA, non-esterified fatty acids; NO, nitric oxide biomarkers; NO₂⁻, nitrite; NO₃⁻, nitrate; OS, oxidative stress biomarkers; OSI, oxidative stress index; O₂, oxygen; P, performance; RER, respiratory exchange ratio; RPE, ratings of perceived exertion; rPPOspint, relative peak power output sprint; SBP, systolic blood pressure; SD, single daily; SEA, sea level; SV, stroke volume; SO, substrate oxidation; TAS, total antioxidant status; TEAC, trolox equivalent antioxidant capacity; TNF-α, tumor necrosis factor-alpha; TOI, tissue oxygenation index; TPR, total peripheral resistance; TTE, trial to exhaustion; VCO₂, carbon dioxide produced; VE, minute ventilation; VF, vascular function; VO₂, oxygen uptake; VO_{2max}, maximal oxygen consumption; VT2, ventilatory threshold 2; ↑ increase; ↓ decrease; → maintenance/no significant differences when compared to the control group.

References	Sample	Supplementation Protocol/Duration	Fruit and Processing Method	Intervention Strategy/Total Daily Anthocyanin Amount	Cycling Protocol/Duration	Blood Collection Time Points	Key Findings
Bell et al. (2014) [8]—United Kingdom	16 M, trained VO _{2max} = 61.6 ± 10.4 mL.kg. min	7 days	Cherry, juice concentrate	MD: 2x – 30 mL + 100 mL of water 547 mg ACN	High-intensity cycling intervals, 109 min	Baseline (prior to 4-day loading phase), pre- and post-trial 1, pre- and post-trial 2, and pre- and post-trial 3	OS: ↓ LOOH I: ↓ IL-6 and hsCRP → IL-8, IL-1-β, and TNF-α Muscle Damage: → CK
Bell et al. (2015) [17]—United Kingdom	16 M, trained VO _{2max} = 61.6 ± 10.4 mL.kg. min	8 days	Cherry, juice concentrate	MD: 2x – 30 mL + 100 mL of water 552 mg ACN	High-intensity cycling intervals, 109 min	Baseline (prior to 4 the day loading phase), immediately pre-trial, immediately post-trial, and 1, 3, 5, 24, 48, and 72 h post-trial	OS: → LOOH I: ↓ IL-6 and hsCRP, → IL-8 and TNF-α Muscle Damage: → CK P: MVIC decline attenuation and ↓ VO ₂
Cliford; Mitchell; Scott (2013) [40]—United Kingdom	9 M, recreationally trained VO _{2max} = 52.4 ± 8.7 mL.kg. min	3 days	Cherry, powdered freeze-dried	SD: 1 capsule Not reported	Four 5 min stages with maximum power output of 40%, 50%, 60%, and 70% (W max), followed by a 20 km time trial, ~53 min	Before the end of each stage	P: → Lactate and time trial
Cook et al. (2015) [23]—United Kingdom	14 M, recreationally trained VO _{2max} = 53.0 ± 6.0 mL.kg.min	7 days	Blackcurrant, extract	SD: 1 capsule 105 mg ACN	30 min of cycling (3 × 10 min at 45, 55 and 65% of VO _{2max}), followed by a 16.1 km time trial, ~ 58 min	Between each exercise stage of incremental cycling test, 4 min after the end of the of incremental cycling test, 5 min into each stage (i.e., at 5, 15, 25 min of submaximal cycling intensities), and every minute for the first 5 min, and then taken every 5 min for	P: ↑ Lactate ↓ Total time to complete the 16.1 km time trial SO: ↑ Fat oxidation → Carbohydrate oxidation

							a total of 15 min after the 16.1 km cycling time trial
Cook et al. (2017) [24]—United Kingdom	15 M, trained VO _{2max} = 56.7 ± 7.9 mL.kg.min	7 days	Blackcurrant, extract	SD: 1–3 capsules 105–315 mg ACN	Four separate 120 min cycling bouts at 65% VO _{2max} , 120 min		At the beginning of the rest stage of the incremental cycling test, 4 min after the end of the incremental cycling test and every 15 min (i.e., at 15, 30, 45, 60, 75, 90, 105, and 120 min) of the 120 cycling protocol
							P: → VO ₂ , VCO ₂ , and lactate SO: ↑ Fat oxidation → Carbohydrate oxidation
Copetti et al. (2020) [11]—Brazil	15 M, recreationally trained ** VO _{2max} = 49.1 ± 7.2 mL.kg.min	1 day—Prior to the test	Juçara fruit, juice concentrate	SD: 250 mL 185 mg ACN	HIIT: 7 series of high-intensity cycling lasting 60 s and a workload corresponding to 100% of the peak power obtained in the maximum incremental test with a 75 s active recovery interval (30 W), 17 min	1 h prior to exercise, immediately post-exercise, and 1 h post-exercise	OS: ↑ GSH ↓ OSI ↑ Total phenols and uric acid (over time) Fatigue: ↓ Fatigue index
Crum et al. (2017) [39]—United Kingdom	7 M, 1 F, professional VO _{2max} = 74.4 ± 6.2 mL.kg.min	1 day—Prior to the test	Pomegranate, extract	SD: 1 capsule 18 mg ACN	Cycling TTE at 100% VO _{2max} at sea level (SEA) and at 1657 m of altitude (ALT) ~10 min	Before the test	NO: ↑ NO ₃ [−] → NO ₂ [−] VF: → SBP and DPB P: ↑ Hct and VO ₂ at 1657 m of ALT ↓ Hct at SEA → TTE 100%, VCO ₂ and [La [−]]b
Desai et al. (2018) [12]—United Kingdom	7 M, 4 F, untrained VO _{2max} = 35.9 ± 4.8 mL.kg.min	20 days	Cherry, juice concentrate	MD: 2x – 30 mL + 100 mL of water 540 mg ACN	1 h of FATMAX exercise that consist in cycling on cycle ergometer at 70 rev.min ^{−1} at an initial intensity of 30 W with increments of 10 W every 3 min. The test was terminated once RER exceeded 1 for a continuous period of 30 s	Before and after exercise	OS: ↓ Pre-exercise TAS CM: ↓ HDL, → serum glucose, triglycerides, LDL, and HR SO: → mean fat and carbohydrate oxidation rates
Keane et al. (2018) [28]—United Kingdom	10 M, trained VO _{2max} = 59.0 ± 7.0 mL.kg.min	1 day—Prior to the test	Cherry, juice concentrate	SD: 60 mL + 100 mL of water 73 mg ACN	6 min of cycles of moderate and severe intensity. The severe intensity test was continued until exhaustion on one occasion and immediately	Baseline, over the 20 s preceding the step transition in work rate, the 20 s preceding the completion of 360 s of moderate- and severe-intensity cycling exercise, immediately following	P: ↑ Peak power in the first 20 s and the total work completed during the total 60 s sprint ↑ Test peak power by 9.5% and the total work completed during the 60 s sprint by 10% between → TTE, VO ₂ and lactate

					followed by a to- tal sprint of 60 s	the 60 s all-out sprint and immediately af- ter exhaustion dur- ing the severe-inten- sity constant-work- rate trial	MO: → TOI NO: → NO ₂ ⁻ and NO ₃ ⁻ VF: ↓ SBP
Mendes et al. (2021) [18]—Brazil	15 M, recre- ationally trained ** VO _{2max} = 49.1 ± 7.2 mL. kg. min	1 day— Prior to the test	Juçara fruit, juice concen- trate	SD: 250 mL 186 mg ACN	HIIE: 7 series of high-intensity cy- cling lasting 60 s and a workload corresponding to 100% of the peak power obtained in the maximum incremental test with a 75 s active recovery interval (30 W), 17 min	Before and at 0, 30, and 60 min post- HIIE	I: ↑ IL-10 and cortisol ↓ TNF-α → IL-1-β, IL-6, and IL-8 P: ↑ rPPO _{spint}
Montanari et al. (2020) [43]—United Kingdom	13 M, trained VO _{2max} = 55.3 ± 6.7 mL. kg. min	7 days	Blackcurrant, extract	SD: 1–2 cap- sules 105–210 mg ACN	Incremental in- tensity cycling test followed by 10 min cycling at 65% VO _{2max} end- ing with the 16.1 km time trial ~28 min	During the last mi- nute of every stage in incremental cy- cling test and after completion of 16.1 km	P: → Lactate, VO ₂ , VCO ₂ , V _E , and RER A time difference was observed between day 1 (1701 ± 163 s) and day 4 (1682 ± 162 s) for 210 mg ACN, with an incre- ment in average speed and time to complete the 16.1 km time trial. However, there was no difference between the other days and between conditions SO: → Carbohydrate and fat oxidation rates CM: → HR
Montanari et al. (2021) [44]—United Kingdom	13 M, trained VO _{2max} = 55.3 ± 6.7 mL. kg. min	7 days	Blackcurrant, extract	SD: 1–2 cap- sules 105–210 mg ACN	Incremental in- tensity cycling test followed by 10 min cycling at 65% VO _{2max} end- ing with the 16.1 km time trial ~28 min	At the end of each stage	CM: → SBP, DBP, MAP, HR, SV, CO, and TPR at rest A significant effect for time was observed for CO, SV, and TPR during submaximal exercise on day 7. However, these changes were trivial and fell within the coeffi- cient of variation of the study design
Morgan; Bar- ton; Bowtell (2019) [29]—United King- dom	8 M, trained VO _{2max} = 62.3 ± 10.1 mL. kg. min	7 days	Cherry, pow- dered freeze- dried	MD: 6 cap- sules 257 mg ACN	10 min of steady state cycling at ~65% VO _{2peak} fol- lowed by a 15 km time trial, ~36 min	Baseline, post steady-state exercise, and post time trial	MO: ↑ TOI P: ↓ Total time to com- plete the 15 km time trial ↑ Lactate → VO ₂ and RER
Murphy, Cook; Wil- lems (2017)	10 M, trained	7 days	Blackcurrant, extract	SD: 1 capsule 105 mg ACN	2 × 4 km time tri- als separated by 10 min of active recovery at the	Immediately after each trial and 8 min into recovery be- tween the trials	P: ↓ The total time of the two 4 km cycling trials by 0.82% → Lactate

[30]—United Kingdom	VO _{2max} = 55.0 ± 7.0 mL. kg. min				selected auto cycling intensity, ~6 min		
Strauss et al. (2018) [25]—United Kingdom	16 F, untrained VO _{2max} = 43.7 ± 1.1 mL. kg. min	7 days	Blackcurrant, extract	SD: 2 capsules 210 mg ACN	120 min cycling at 65% VO _{2max}	Baseline and at 15 min intervals throughout the exercise	SO: ↑ Fat oxidation over time during the cycling bout ↑ NEFA and glycerol pre-exercise the cycling bout Tendency to ↓ carbohydrate oxidation
Terrazas et al. (2019) [15]—Brazil	10 M, recreationally trained ** VO _{2max} = 45.5 ± 3.5 mL. kg. min	15 days	Açaí, pulp	SD: 400 g 284.4 mg ACN	Incremental test started at 150 W, with increments of 25 W every 2 min until voluntary exhaustion, protocol duration not reported	At the beginning and end of each trial, before performing the incremental test	OS: ↓ MDA ↑ TEAC → DNA damage P: ↓ Lactate ↑ ATi
Torregrosa-García et al. (2019) [38]—Spain	26 M, recreationally trained VO _{2max} = 54.4 ± 9.0 mL. kg. min	15 days	Pomegranate, extract	SD: 2 capsules Not reported	Square-wave endurance test followed by an incremental stress test until exhaustion and a subsequent eccentric exercise ~105 min	At the end of the test (lactate) and 10 min before the first isokinetic test and subsequently upon each strength assessment completion (2, 24, 48, and 72 h later) for muscular damage and inflammation biomarkers	I: ↓ CRP Muscle damage: ↓ CK Fatigue: ↓ % work fatigue P: ↑ TTE and the time to reach VT2 → VO _{2max} , VO ₂ at VT2, lactate RPE, and peak torque
Willems et al. (2015) [42]—United Kingdom	8 M, 5 F, recreationally trained VO _{2max} = 49.1 ± 6.2 mL. kg. min	7 days	Blackcurrant, powder	SD: 6 g 138.6 mg ACN	2 incremental cycling protocols with the recording of physiological and cardiovascular responses, protocol duration not reported	Immediately after each stage and 3 min after voluntary exhaustion during the maximum oxygen uptake test	P: ↓ Lactate → Power and maximum values of oxygen uptake. However, maximum oxygen uptake with blackcurrant powder was obtained with lactate values 14% lower
Willems et al. (2019) [41]—United Kingdom	11 M, recreationally trained VO _{2max} = 47.0 ± 7.0 mL. kg. min	7 days	Blackcurrant, extract	SD: 2 capsules 210 mg ACN	Steady state cycling test (3 × 10 min at 45%, 55%, and 65% VO _{2max}) followed by a 16.1 km time trial at a simulated altitude of ~2500 m (~15% O ₂), ~58 min	In the last 30 s of each stage of incremental cycling test for oxygen–cycling power relationship and 3 min after the end of the incremental cycling test for maximum oxygen uptake	P: → 16.1 km cycling time trial, lactate, and RER SO: → substrate oxidation during steady state cycling at 45%, 55%, and 65% VO _{2max} CM: → Blood glucose and HR

* Classification of training status according to De Pauw et al. (2013) [36]. ** Estimated VO_{2max} according to Santilla et al. (2013) [37].