Dietary supplementation with black elderberry has been reported to augment recovery against upper respiratory tract infection and to mediate neuropathic pain.

The effects of black elderberry are likely linked to its high polyphenol and anthocyanin content and its potential to mitigate oxidative stress and/or enhance nitric oxide (NO) production. However, the effects of black elderberry supplementation on NO biomarkers, blood pressure, physiological responses during/post exercise and exercise capacity have yet to be investigated. Therefore, this research evaluated first, the effects of acute supplementation of black elderberry on plasma [nitrite], cardiorespiratory markers during and post exercise, resting and post-exercise blood pressure and exercise capacity and second, the efficacy of black elderberry administered as a water-based solution compared to capsules.

Based on a repeated measures and counterbalanced design, seven healthy and recreationally active individuals (six males, one female) (age, 21±2 years; body mass, 75±8 kg; height, 173±7 cm) completed this study. Pre-exercise dietary ingestion was standardised 48 hours prior to trials, and stimulants, alcohol and foods high in nitrate and polyphenols were avoided or limited during this period. The first two visits were familiarisation trials followed by three experimental trials.

Initially, participants performed a motorised treadmill-based graded exercise test to ascertain peak oxygen uptake (VO2PEAK) and the running speed associated with it. After 15 minutes, seated rest systolic and diastolic blood pressure measurements were recorded. A venous blood sample was then collected and participants subsequently ingested either 10 placebo capsules or 10 black elderberry capsules, both of which were colour and weight matched, with 300 ml water. Another group ingested the contents of 10 black elderberry capsules dissolved in 300 ml water. The capsules were administered double-blind. The 3,000 mg dosage of black elderberry (Haschberg variety sourced from the standardised range of BerryPharma® extracts by Iprona AG) contained a total of 489 mg anthoycyanins (measured as cyanidin-3-o-glucoside [C3G]) and 777 mg polyphenols.

After 30 minutes, seated rest blood pressure readings were repeated and a further venous blood sample was taken.

With a 1 percent incline, participants then performed three sets of five minutes of sub-maximal treadmill running (50 percent, 65 percent and 80 percent of peak running speed) before running until volitional exhaustion at 90 percent of their peak running speed.

Plasma nitrite concentration (NO2) was greatest 30 minutes post-ingestion in those who'd taken the elderberry capsules dissolved in water (255 percent greater than baseline). Overall, NO2 was 126 percent and 103 percent greater for capsule ingestion and when dissolved in water, respectively, when compared to the placebo group during running at 50, 65 and 80 percent peak running speed. Post-isotime exercise seated rest systolic blood pressure was lower in whose who'd taken black elderberry in capsule form (138 ± 15 mmHg) and when dissolved in water (138 ± 14 mmHg), compared with those who'd taken the placebo (145 ± 13 mmHg) although no difference was observed at 90 percent peak running speed.

In summary, black elderberry supplementation substantially increased plasma NO2 and markedly reduced seated rest systolic blood pressure post-isotime submaximal exercise. The elderberry solution appeared to outperform the elderberry capsules, although further research to replicate the findings in a larger population is warranted.

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Note: Akbar Shabir and Mariasole Da Boit, Ph.D. (both Derby University), and Stephen Bailey, Ph.D. (Loughborough University), contributed to this research.