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Antioxidant effects of a polyphenol-rich dietary supplement containing *Pinus massoniana* bark extract in healthy older adults: a two-arm, parallel group, randomized placebo-controlled trial

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Australia has an increasing ageing population, with over 27% (6.8 million) of the total population aged 55 and over in 2019[(1)] and an average life expectancy now exceeding 80 years, one of the highest in the world.[(2)] Oxidative stress is a key physiological phenomenon underpinning the ageing process and plays a major role in the development of age-associated chronic diseases.[(3)] This study investigated the antioxidant effects of a polyphenol-rich dietary supplement containing *Pinus massoniana* bark extract (PMBE) in healthy older Australians aged 55–75 years. In a double-blinded, placebo-controlled clinical trial, 62 participants were randomized to receive a 50 mL/day dietary supplement containing placebo (0 mg PMBE providing 32 mg total polyphenols) or PMBE (1322 mg PMBE providing 432 mg total polyphenols) for 12 weeks with breakfast as part of their habitual diet/lifestyle. The primary outcome was fasting plasma malondialdehyde (MDA) concentration and secondary outcomes were plasma inflammatory markers. A mixed effect regression model was used to evaluate the mean change in MDA concentrations. The model included fixed categorical effects for elapsed time, treatment assignment and their interaction as well as random subject-level intercept to account for within-subject correlations resulting from repeated measurements on the same participants at baseline, 6 weeks and 12 weeks. If models were found to be significant for change in response variables across groups, variables such as sex, age, BMI and body fat mass were included in the model to examine the potential effect of confounding. The intervention was well tolerated by participants with excellent compliance of 98.7 ± 2.3% study product consumed, which was comparable across groups. MDA concentrations significantly reduced following PMBE for 6 weeks (−1.19 nmol/mL, 95% CI [−1.62, −0.75], $p < 0.001$) and 12 weeks (−1.35 nmol/mL, 95% CI [−1.74, −0.96], $p < 0.001$) compared to baseline. MDA levels remained unchanged after placebo. MDA levels at 6 and 12 weeks were significantly lower following PMBE compared to placebo ($p < 0.001$). At 12 weeks in the PMBE group, fibrinogen concentrations significantly reduced −0.25 g/L, 95% CI [−0.39, −0.11], $p < 0.0001$) and interleukin-6 significantly increased compared to placebo (0.30 pg/mL, 95% CI [0.02, 0.59], $p < 0.05$). Nutrient intake and physical activity did not significantly change within groups nor across groups for the duration of the study. For the first time, we report a reduction in oxidative stress following dietary supplementation with polyphenols derived from PMBE in humans. Findings from this study could provide an effective therapeutic strategy for supporting the ageing process and potentially mitigating age-associated metabolic dysfunction that is underpinned by heightened oxidative stress and raised systemic inflammation. Further studies are warranted to investigate the antioxidant capacity of PMBE in conditions with heightened oxidative stress such as osteoarthritis, hypertension, type 2 diabetes, or other lifestyle related diseases.

References

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