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The effect of consuming red and orange cherry tomatoes on blood-borne circulating biomarkers in free-living normotensive males: a randomised cross-over trial

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Cardiovascular diseases are the leading cause of mortality accounting for 17.7million global deaths each year ⁽¹⁾. Previous systematic reviews of randomised controlled trials have shown that supplementing tomato or lycopene have positive effects on biomarkers such as low-density lipoprotein (LDL) and Interleukin-6 (IL-6) ⁽²⁾. These studies have focused on studying red tomato, red-tomato products, or lycopene supplementation. However, with new varieties of tomato available to the public, whether different tomato varieties improve markers of cardiovascular risk in a similar fashion remains to be evaluated. The present study investigated whether red cherry tomato (Piccolo) characterised by high content of trans-lycopene, and orange cherry tomato (Oranjstar) high in cis-lycopene, improve blood biomarkers to the same extent.

27 healthy males, aged 18–60 years, participated in a randomised, controlled, cross-over study investigating the effect of consuming 300 g of fresh Piccolo compared to Oranjstar for 4 weeks (with a 4-week wash-out period without tomato consumption). Participants were instructed to maintain their dietary and physical activity patterns during the study. Before and after each 4-week intervention or control period, blood samples were obtained for the assessment of blood lipids, inflammatory factors and adhesion molecules. The study was reviewed by the Northumbria University Ethics Committee (Project ref: PG02_Cheng_121216). This trial has been registered in ClinicalTrials.gov (identifier: NCT03209817). Analysis compared the effects of interventions on bloodborne biomarkers including. ... Results were evaluated separately for two age groups of adults (those aged <30 years and those aged 30 or older).

Between-interventions analysis showed that consuming Oranjstar significantly lowered IL-6 in the older group aged 30 years or older (by 0.82 pg/mL; $p = 0.027$) in comparison to Piccolo supplementation; however, no significant differences were observed between interventions on any other marker assessed either in the young or the older groups.

Analysis on changes from baseline showed that both types of tomato improved some of the markers assessed in both age groups. Supplementation of Piccolo reduced sICAM-1 by 49.56 ng/mL, while consumption of Oranjstar reduced sICAM-1, sVCAM-1 and E-selectin by 59.14 ng/mL, 67.35 ng/mL and 6.65 ng/mL respectively.

In conclusion, this study has shown that the consumption of and Oranjstar varieties of cherry tomato for four weeks has a significant impact on reducing adhesion molecules, such as sICAM-1 and sVCAM-1, and inflammatory factors such as IL-6, potentially contributing to lowering the risk of developing cardiovascular disease in healthy males.

1. World Health Organization. (2016) NCD mortality and morbidity [Available from: http://www.who.int/gho/ncd/mortality_morbidity/en/]
2. Cheng HM, Koutsidis G, Lodge JK *et al.* (2017) *Atherosclerosis* **257**, 100–8.