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Effects of ingestion of tomatoes, tomato juice and tomato purée on contents of lycopene isomers, tocopherols and ascorbic acid in human plasma as well as on lycopene isomer pattern.

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### **Abstract**

Tomatoes are an important part of the diet. Lycopene, the predominant carotenoid in tomatoes, is hypothesised to mainly mediate the health benefits of tomato products. Anticancer activity of tomato products and lycopene has been suggested by numerous studies. The aim of the presented study was to investigate the effect of ingestion of three different tomato-based foodstuffs on plasma contents of lycopene, tocopherols and ascorbic acid. Because isomers of lycopene may have different biological activities, a special interest was to look how the lycopene isomer pattern is changed depending on the matrix of tomato products. Following a 2 week depletion phase volunteers ingested 12.5 mg lycopene/d for 4 weeks comprising tomatoes, tomato juice or tomato purée. The basal levels of lycopene in plasma were comparable for all groups and decreased significantly during the 2 weeks of depletion to approximately half of the basal values. Following intervention, plasma lycopene concentration increased significantly. Conversely, supplementation did not significantly affect levels of tocopherols and ascorbic acid in plasma. Regarding isomers of lycopene, the (*Z*)-lycopene:(*all-E*)-lycopene plasma isomer ratio was significantly changed during the study for all groups. A remarkable enrichment of the relative contents of (*5Z*)-lycopene was observed during the depletion period, which supports the hypothesis that lycopene (*Z*)-isomers are formed within the human body after ingestion of (*all-E*)-lycopene. After dietary intervention with lycopene-rich products the isomer ratios returned to those observed at the start of the study. Further investigations will clarify the process of isomerisation more in detail.