

Carotenoid content of raw tomato and processed tomato-based products

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Numerous studies have reported on the carotenoid content of various vegetables in their natural raw state⁽¹⁾. However, many foods are subjected to various processing procedures before consumption. Tomatoes are a commonly-consumed fruit vegetable that are available in many different forms such as raw and canned, as well as tomato-based sauces and juices. Thus, the objective of the present study was to compare the carotenoid content of tomato-based sauces and juices with that of raw tomatoes. The carotenoids analysed were lycopene and β -carotene, which are the predominant carotenoids present in tomatoes.

The food products were purchased from a local supermarket chain. All work was performed under amber light to minimise photo-decomposition of the carotenoids. Each food was weighed (approximately 2 g) and homogenised. The samples were then extracted twice using a solvent mixture of hexane–acetone–ethanol (2: 1:1, by vol.)⁽²⁾. The carotenoid content of the samples was quantified by HPLC⁽³⁾.

	Lycopene ($\mu\text{g}/100\text{ g}$)		β -Carotene ($\mu\text{g}/100\text{ g}$)	
	Mean	SE	Mean	SE
Raw tomatoes	1716	181	538	47.0
Canned Tomatoes	3740*	436	651	88.5
Ketchup	3397*	246	772	105
Relish	2989*	174	400	59.3
Tomato juice	2530	182	554	30.2
Bolognese sauce	2115	185	935*	14.4
Mixed vegetable juice	1366	106	3311*	135

Values are means for four independent experiments. Mean values were significantly different from those for raw tomatoes (one-way ANOVA, followed by Dunnett's test): * $P < 0.05$.

The lycopene and β -carotene content of the raw tomatoes tested is in agreement with values reported in the literature⁽¹⁾. Canned tomatoes, ketchup, and relish had significantly greater amounts ($P < 0.05$) of lycopene compared with the raw tomatoes. The mixed vegetable juice had lower levels of lycopene compared with the raw tomatoes; however, it is important to bear in mind that the mixed vegetable juice was produced using several vegetables and not just tomato. In relation to β -carotene content, only the Bolognese sauce and mixed vegetable juice contained significantly greater amounts ($P < 0.05$) compared with the raw tomatoes. This result may be explained by the presence of carrots in these food products. In conclusion, processing did not have a significant effect on β -carotene content whereas lycopene content was enhanced in the tomato-based processed food products.

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