

Research Paper :

Enzymatic extraction of lycopene from tomato skin

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ABSTRACT

Lycopene is a natural carotenoid pigment and a high value nutraceutical having wide use. The objective of the present work was to obtain a good yield of lycopene from tomato tissues pectinase enzyme derived from *Aspergillus niger*. Various parameters such as concentration of enzymes and by varying the degree of incubation temperature were optimized for incubation time of 20 min, to improve the yield of lycopene from blanched and unblanched tomato skin. Enzymatic extraction of lycopene from tomato skin under optimized conditions showed a remarkable increase in the yield of lycopene by 56.92 mg/100g and 42.32 mg/100g for unblanched and blanched tomato skin, respectively at 2.0% w/w of pectinase enzyme (*Aspergillus niger*) at 50°C for 20 minutes incubation time.

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Key words : Lycopene, Blanched, Enzyme, Extraction, Tomato, *Aspergillus niger*

Lycopene, the pigment principally responsible for the characteristic deep-red colour of ripe tomato fruits and tomato products, has received much attention in recent years because of its beneficial effect in the treatment of diseases. Tomatoes and tomato products are considered as one of the best sources of lycopene. As determined by Gross (1987), the total lycopene content in tomatoes varies between 90 and 190 lg/g fresh weight (Baysal *et al.*, 2000). The occurrence of lycopene in different fractions of tomato fruit such as tomato skin, the water insoluble fraction, and the fibrous fraction including the fibre and soluble solids. Their results indicated that 72–92% lycopene was associated with the water-insoluble fraction of the skin. Tomato extracts and especially skin extracts contain high amounts of lycopene (Sharma and Le Maguer, 1996). The amount of lycopene in fresh tomato fruits depends on the variety, maturity, and environmental conditions under which the fruit matured. More than 80% of processed tomatoes are consumed in the form of tomato juice, paste, puree, ketchup, sauce, and salsa (Shi and Le Maguer, 2000).

METHODOLOGY

Tomatoes (Bangalore variety) were procured from local market and were maintained at 2 - 8°C for 24 hrs. The whole tomatoes were divided into two batches. In

the first batch the tomato skin was obtained manually from whole tomatoes. Whereas, in the second batch tomatoes were blanched at 88-90°C for 2min to obtain skin. Pectinase was obtained from Fluka (Denmark), produced from a selected strain of *Aspergillus niger*. Sodium acetate and acetone (AR) were purchased from Universal laboratories private limited, Mumbai. Sodium sulphate was purchased from Merck private limited, Mumbai. Sodium Sulphate anhydrous and glacial acetic acid were purchased from Loba Chemie limited, Mumbai. Petroleum ether (AR) grade was obtained from S.D. Fine chemicals limited, Mumbai.

Sample preparation:

The whole tomatoes were washed and then thoroughly sorted and trimmed to remove any visible defects. A batch of 100g of each unblanched and blanched tomato skin excluding pulp, seeds and juice was taken and ground in the mixer for two min. A 60g of tomato skin paste of each unblanched and blanched was placed in the flask containing 100 ml of 0.2M acetate buffer (pH 5.0). One gram sample of each unblanched and blanched was distributed in the beaker and were covered with aluminium foil. The samples were stored in the refrigerator (2 - 6°C) and these samples were used within 24 hours.