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Studies on Physico-chemical characteristics and processing quality of some tomato cultivars

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Abstract

The present investigation was undertaken on Tomato fruits of nine cultivars namely VLT-34, Maini Thaiba, IIVR Selection 2, CO- 3, Arka Vikas, NDT-1, NDT-2, NDT-3 & NDT-4 were procured from Vegetable Experiments Farm, A.N.D.U.A. &T., Kumarganj, Ayodhya region of Uttar Pradesh. The various parameters physico-chemical characteristics, total soluble solids (TSS), ascorbic acid, titrable acidity and lycopene content were studied. The physical and chemical composition of these varieties of tomatoes were analysed by using suitable methods and techniques. The physical and chemical composition of among the nine varieties, and it may be concluded that VLT-34, NDT-3, Co-3 and NDT-3, Varieties of tomato were best suitable for making processed products Viz; juice, ketchup, puree and chutney respectively.

Keywords: *Solanum lycopersicum*, Physico-chemical, total soluble solids, lycopene, juice, ketchup and chutney

Introduction

Tomato (*Lycopersicon esculentum* Mill) is one of the most important vegetable and fruit crop grown in different parts of the country. It is very refreshing and important in nutritional and medicinal aspects and also considered in integrated part of healthy daily diet. Tomato is grown in our country in abundance; both in summer and winter seasons, but those grown in winter are superior in quality because they contain more total solids. They are good source of vitamin "C" fresh tomatoes are very refreshing and appetizing but cannot be stored for a longer period. But owing to its perishable nature and due to lack of cold chain storage and processing units nearly 25-40% of the produce worth Rs 25- 30 thousand crores is gutted, which is a great national loss (Shriwastav, 2004) [9]. Lycopene, a major carotenoid without provitamin activity, present in red tomatoes, is considered responsible for their beneficial effects (Shi & Maguer 2000; Rao *et al.* 1998) [8, 7]. Each vegetable group contains a unique combination and amount of these phyto chemicals which distinguishes them from other vegetables. Vegetables have been strongly associated with improvement of gastro intestinal health, good vision and reduced risk of heart disease stroke, chronic diseases such as diabetes and cancer. The promotion of healthy vegetables products has coincided with a surging consumer interested in the healthy functionality of food Rao *et al.* (1998) [7]. Post harvest losses and transportation losses are high in tomato as tomatoes start deteriorating immediately after harvest, due to enzymatic action leading to spoilage. These post harvest losses can be reduced by processing of tomato quickly into more stable products like juice, puree, ketchup, sauce and chutney etc. The present investigation was undertaken to evaluate the processing qualities of some tomato cultivars grown under in Ayodhya region of Uttar Pradesh.

Methodology

Study area

The study was conducted on Tomato fruits of 9 cultivars namely VLT-34, Maini Thaiba, IIVR Selection 2, CO- 3, Arka Vikas, NDT-1, NDT-2, NDT-3 & NDT-4 were procured from Vegetable Experiments Farm, N.D.U.A. & T., Kumarganj, Faizabad.

Physico-Chemical Analysis: Ten fruits in triplicate were recorded for weight, length and diameter and their average values were calculated. Tomato juice was obtained by crushing tomato in pieces with Pestle and Mortar, pulp was strained through muslin cloth. Juice content was calculated in per cent. While T.S.S., acidity and ascorbic acid was estimated by method of (Rangana, 1986) [6].

The method of Adsule *et al.* (1976) [1] was adopted to estimate lycopene in different varieties. The results were statistically analyzed using method proposed by (Snedecor & Cochran 1989) [10]. The results are presented in Table-1.

Product Preparation: The method for preparing juice purees ketchup and chutney and presented in Fig-1, 2, 3 & 4 respectively. The products prepared from different varieties were subjected to organoleptic evaluation by Hedonic Rating Scale Ameriene *et al.*, (1965) [2] and results are presented in Table-2.

Extraction of tomato pulp

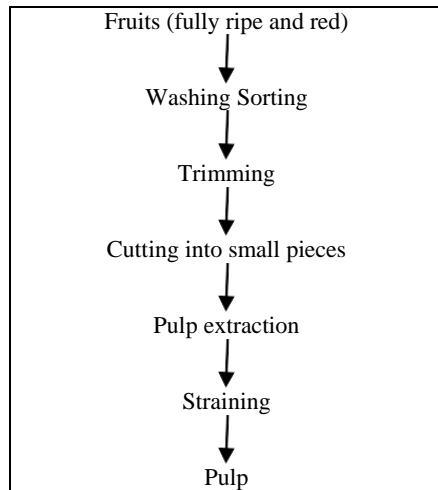


Fig 1: Flow sheet for extraction of tomato pulp.

Preparation of tomato Ketchup

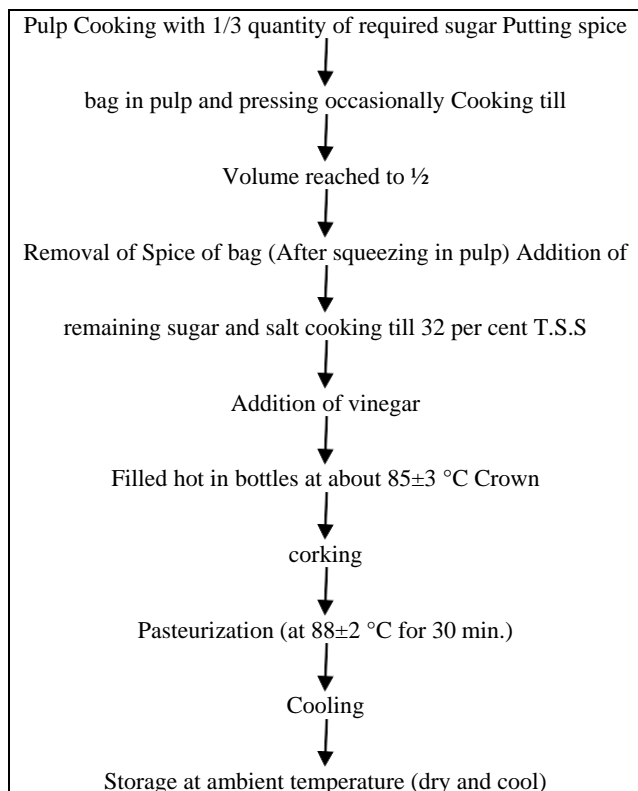


Fig 2: Flow sheet for preparation of tomato Ketchup.

Preparation of tomato Puree

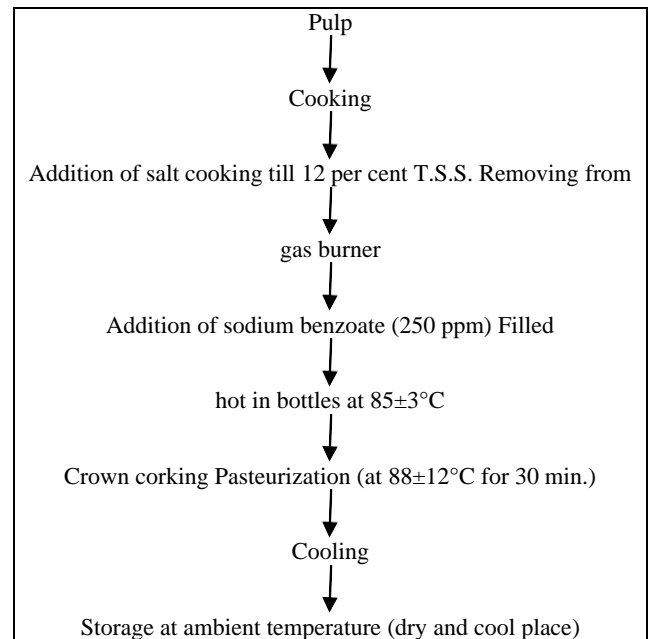


Fig 3: Flow sheet for preparation of tomato puree.

Preparation of tomato Chutney

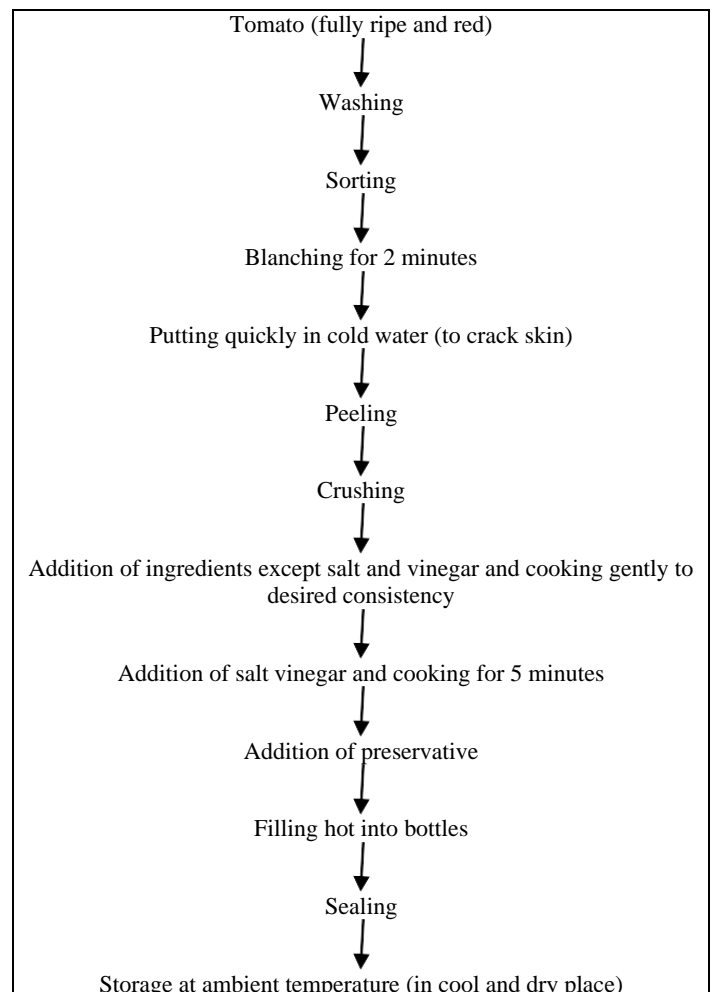


Fig 4: Flow sheet for preparation of tomato Chutney

Results and Discussion

The data depicted in Table-1 physico-chemical character of different varieties of tomato varied up to greater extent. The physical characteristics and chemical composition of tomatoes are influenced by the variety, the age of the fruit and certain external and internal factors (Kalloo, 1985) [5]. The present study revealed that tomato had a wide variation in fruit weight among the different varieties. The mean weight of the fruit ranged from 28.61 g to 32.08 g and the maximum being in Arka Vikas, whereas the minimum was found in NDT-3 variety. Gowda *et al.* (1994) [4] reported that weights of fruits varied significantly in different varieties. Juice yield of the varieties ranged from 86.98 to 92.40 percent. Among the varieties, VLT-34 registered highest juice yield (92.40%) followed by NDT-3 (92.00%) and Co-3 (91.00%) where as lowest juice yield (86.98%) was observed in IIVR sel-2 variety respectively. This may be due to the influence of

genetic and agronomical factors. Higher Titrable acidity of the fruit, higher the flavour and lower its pH has been the pattern shown by (Balasubramanian, 1984) [3]. The Highest T.A. was shown in Maini-thaiba, whereas lowest was found in NDT-3. In the present study highest ascorbic acid was observed in VLT-34 and NDT-1 had lower values. The lycopene content of raw tomatoes were analyzed in all cultivars. The lycopene content ranged from 4.68-1.74 (mg/100 g) on fresh weight basis (Table 2). lycopene was maximum in NDT-3 (4.70%, 22.41 mg/100g, respectively) followed by V.L.T.-34. The variation in the lycopene content of tomatoes is probably due to the differences in the genetic nature. Results for juice VLT-34 had got maximum score for juice, NDT-3 for ketchup and puree; however Co-3 had highest score for chutney respectively, for processed tomato product.

Table 1: Physico-chemical characteristics of tomato of different varieties

S. No.	Variety	Average weight	Length (cm)	Diameter (cm)	Juice Content (%)	T.S.S(%)	Acidity (%)	Ascorbic acid (mg/100g)	Lycopene (mg/100g)
1.	VLT-34	92.66	4.35	5.82	92.40	4.50	0.30	21.64	4.29
2.	Maini Thaiba	80.50	5.63	4.90	88.40	3.60	0.37	20.35	3.12
3.	IIVR Sel-2	79.85	4.65	5.38	86.98	3.60	0.34	21.23	2.93
4.	Co-3	94.45	4.59	5.70	91.00	4.10	0.30	21.09	3.90
5.	Arka Vikas	165.50	5.41	7.05	90.80	3.50	0.32	18.83	2.73
6.	NDT-1	147.50	5.69	6.53	90.40	3.60	0.33	16.41	1.74
7.	NDT-2	144.05	6.41	6.22	90.34	4.00	0.36	20.40	3.57
8.	NDT-3	52.50	3.32	4.75	92.00	4.70	0.27	22.41	4.68
9.	NDT-4	139.79	5.54	6.61	88.90	3.70	0.35	20.12	3.32
	C.D. at 5%	36.79	0.42	0.60	1.80	0.53	0.05	1.96	0.79

Table 2: Organoleptic quality of tomato products prepared from different varieties

S. No.	Variety	Juice		Puree		Ketchup		Chutney	
		Score	Rating	Score	Rating	Score	Rating	Score	Rating
1.	VLT-34	8.42	LVM	7.90	LVM	7.43	LM	8.01	LVM
2.	Maini Thaiba	7.14	LM	6.13	LS	6.64	LM	7.32	LM
3.	IIVR Sel-2	7.63	LVM	5.63	LS	5.45	NLND	7.05	LM
4.	Co-3	7.34	LM	7.40	LM	7.18	LM	8.50	LVM
5.	Arka Vikas	7.01	LM	6.68	LM	7.05	LM	6.67	LS
6.	NDT-1	7.37	LM	6.13	Ls	6.59	LM	7.09	LM
7.	NDT-2	6.62	LS	6.81	LM	7.07	LM	6.34	LS
8.	NDT-3	8.09	LVM	8.11	LVM	8.25	LVM	7.61	LVM
9.	NDT-4	7.32	LM	6.44	LS	6.91	LM	7.01	LM
	C.D. @ 5%	1.11	-	0.73	-	1.08	-	1.12	-

LVM-Liked very much

LM- Liked moderately

LS-Liked slightly

NLND-Neither like nor dislike

Conclusion

On the basis of present study it may be concluded that VLT-34, NDT-3, Co-3 and NDT-3, Varieties of tomato were best suitable for preparation of tomato products juice, ketchup, puree and chutney respectively. Without using preservative trace amount in organic method. All these varieties overall contains more or less similar amount of nutritional fact and all can be used to make further processed products.

Conflict of interests

The authors declare that there is no competing interest.

References

1. Adsule PG, Dan, Amaba, Tikoo SK. Inherent study of some tomato varieties in relation to their shape. Indian Food Science Technology. 1976;76:262-263.
2. Ameriene MA, Singh Bhupinder, Sodhi JS. Studies on physico-chemical characteristics of some newly evolved tomato cultivars for making juice and concentrates. Indian Food Packer 1965;40:45-53.
3. Balasubramanian T. Studies on quality and nutritional aspects of tomato. Journal of Food Science and Technology. 1984;21:419-421.
4. Gowda IN, Ramanjaneya KH, Anand N, Sadashiva AT, Tikoo SK. Studies on physico-chemical characteristics and processing quality of two IIHR tomato varieties in relation to commercial cultivars. Journal of Food Science and Technology. 1994;31:126-129.
5. Kalloo G. Chemical composition. In: Tomato published by R.N. Sachdev, Allid Publishers Pvt. Ltd., New Delhi,

- 1985, 25-42.
6. Ranganna S. Handbook of analysis and quality control of fruit and vegetable products (2nd edition). Tata McGraw Hill Publications. Co, New Delhi, India, 2003, 497-528
 7. Rao AV, Waseem Z, Agarwal S. Lycopene Contents of Tomatoes and Tomato Products and Their Contribution to Dietary Lycopene," Food Research International. 1998;30:737-741.
 8. Shi J, Le Maguer M. Lycopene in tomatoes: chemical and physical properties affected by food processing. Critical Reviews in Food Science and Nutrition. 2000;40:1-42
 9. Shrivastav SS. 'Fal Parirakhan Dipika'. Published by Central Book House, Sadar Bazar, Raipur (M.P.), 2004, 01-93
 10. Snedecor G, Cochran W, Cox D. Statistical Methods (8th edition). The Iowa State University Press, 1989.