



Physio and Organoleptic Characteristics of Tomatoes and Ketchup Prepared from Different Varieties of Tomato

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ABSTRACT

Tomatoes are a boots of nutrient enriched with antioxidants and essential mineral that are vital for growth, fighting cancer, increasing immunity, improved vision and fighting against infections etc. Moreover, tomatoes ranked top among the canning and value addition food industries for making culinary products for storage. During the glut season, food preservation is a sound approach to store the product for further use to meet the domestic and commercial demands at reasonable price by storing them in off-season. In the present research work, three varieties of tomato namely TH1, TH1251 and TH SHIVA were evaluated in terms of physical parameters *i.e.* shape, size, colour and firmness etc. Tomatoes were processed and further evaluated organoleptically in terms of colour, flavor, taste, texture and over all acceptability on a nine point hedonic scale for ketchup making so that the best variety should be utilized for making tomatoes ketchup for food preservation. The results concluded that there was statistically significant difference found among the three different varieties of tomato and TH 1 had overall high acceptability (1.25 ± 0.37) in terms of colour (1.14 ± 0.37), flavour (1.14 ± 0.37), texture (1.42 ± 0.37) and taste (1.25 ± 0.37) as well.

Key Words: Flavour, Ketchup, Taste, Texture, Tomato.

INTRODUCTION

Tomato belongs to Solanaceae family and considered as culinary vegetable due to its significant contribution in cooking and nutritional aspects. Tomatoes are used in variety of products for making salads, dressings, curries, purees, ketchups, paste, soup etc. Apart from this, tomatoes are a real boost of nutrients like dietary fibre, antioxidants, minerals and vitamins etc. Tomatoes helps in protecting various kind of metabolic disorders like cardio vascular diseases, osteoporosis and different types of cancers *i.e.* lung, prostate, stomach, cervical, breast, oral, colorectal, esophageal, pancreatic etc (Vallverdu-Queralt *et al*, 2011). Tomatoes also help in improving vision, increasing immunity and normalize blood glucose and cholesterol levels (Bhowmik *et al*, 2012).

In India, the major state cultivating tomatoes are Andhra Pradesh, Madhya Pradesh and Karnataka contributing to 25.01, 12.30 and 9.01 per cent share, while Punjab is contributing only 1 per

cent share due to commercial crops (Anon, 2018). Tomatoes are highly perishable commodity as it has moisture content more than 90 percent (Arah *et al*, 2016; Derje *et al*, 2019). Due to high moisture content, it has shelf life less than three days in the tropical regions. So, post harvest losses of tomatoes are great challenge in the developing countries where cold chain facilities are limited (Arah *et al*, 2015; Muhammad *et al*, 2011). It is therefore, extremely important to process the tomatoes into value added products like paste, puree, juice and ketchup etc. to utilize for further consumption. Processing of tomatoes helps to protect these losses that occur in between the harvest to final consumption stage (Kader 2005; Pila *et al*, 2010). Thus, food preservation is a sound approach to utilize the tomatoes during off season by storing them in form of some product for future use. There is also a great scope in the food processing sector through value addition of tomatoes in the form of puree, paste, juice and ketchup to generate income

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as well. Currently, there are few companies those are commercializing value added products from tomatoes at large scale so this can be an opportunity for the farmers to sell their produce in the form of processed product to generate more profit with good nutritional significance. The present work was undertaken with the objective to assess the physio and sensory properties of different varieties of tomato and ketchup prepared so that the best variety can be assessed for value addition.

MATERIALS AND METHODS

Three different varieties of tomato *i.e.* Shiva Ji, TH 1214, TH 1 were procured from the KVK farm of Langroya. Fresh fruits of tomatoes were collected from the farm and further passed into grading for processing purpose.

Grading of tomatoes

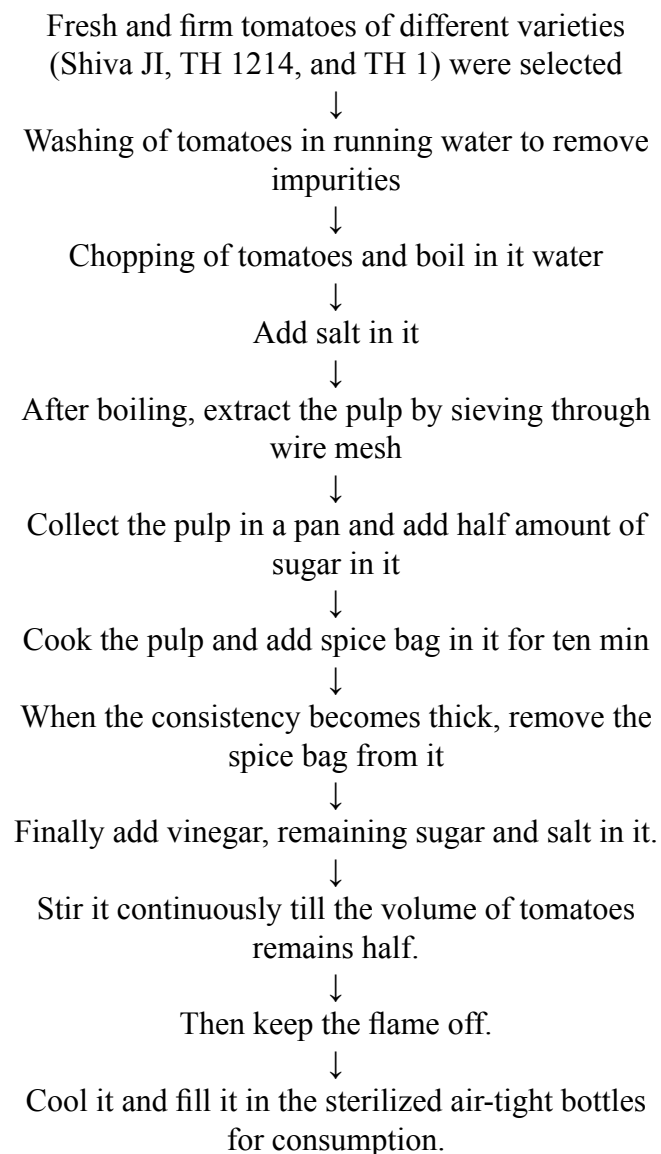
Tomatoes were graded on the basis of physical parameters like weight (g), shape, skin colour and firmness. The physical parameters were evaluated on the basis of standard classification as discussed below:

Table 1. Classification for grading of tomatoes.

Sr. No.	Parameter	Grading
1	Weight (g)	
	70-80	Most Preferred
	50-70	Moderate Preferred
	<50 & >80	Least Preferred
2	Shape	
	Round	Most Preferred
	Oval	Moderate Preferred
	Flat/Peared	Least Preferred
3	Skin Colour	
	Deep Red	Most Preferred
	Red	Moderate Preferred
	Light Red	Least Preferred
4	Firmness	
	Firm	Most Preferred
	Semi Soft	Moderate Preferred
	Soft	Least Preferred

Processing of Tomatoes

Tomatoes ketchup was prepared by using the ingredients such as : tomatoes puree (1kg), salt (20g), sugar (225g), vinegar (60ml), red chilli powder (2g) and whole spices (cardamom, cloves, cinnamom, black pepper,cumin-1g each) and discussed the procedure in flow chart:



Sensory Evaluation

The prepared ketchup from three different varieties of tomatoes was further evaluated organoleptically in terms of colour, flavor, taste, texture and over all acceptability on a nine-point hedonic scale (i.e. 9=Dislike extremely, 8=Dislike very much, 7= Dislike moderately, 6= Dislike

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Slightly, 5= Neither like or dislike, 4=Like Slightly, 3=Like Moderately, 2=Like Very Much, 1=Like Extremely) by a panel of ten judges.

Statistical analysis

Computation of some descriptive statistical measures such as percentage distribution, mean and standard deviation for different variables was performed to analysis the data.

RESULTS AND DISCUSSION

Physical Parameters

The grading of commodities into weight, size, shape and firmness is a very crucial phenomenon to determine the quality parameter of tomatoes. The standardized product can be obtained after grading and further used for processing purpose. Grading also helps in minimizing the post harvest losses and increase the market value of standardized product as reported by Londhe *et al* (2013). The data (Fig 1) revealed that the average weight of varieties *i.e.* Shiva Ji, TH 1214, TH 1 was 50.02±10.7g, 68.12±11.8g and 65.98±21.7g, respectively. All the varieties falls under the category of most preferred due to standard weight. The shape of tomatoes was round for variety Shiva Ji and TH 1214 while TH 1 had a combination of both round and oval. All the varieties were having light red colour in skin peel and also well firmed texture. The results further showed that the different varieties of tomatoes were physically acceptable for further processing into tomato ketchup.

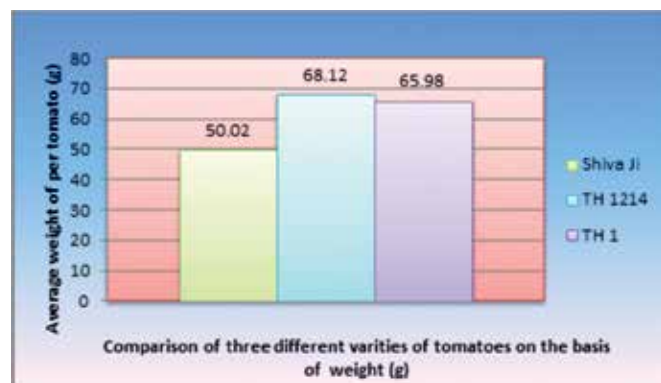


Fig 1. Grading of tomato varieties on the basis of mean fruit weight (g)

Sensory Parameters

Colour is an important attribute for assessing the quality of tomato. Tomatoes contain red colour due to the presence of carotenoids that are also known as polyene compounds ranging from yellow to red. Similarly, flavour is also essential characteristics of tomato product that is affected by agricultural practice, harvesting time and package of practice followed etc. The sensory parameters of tomato ketchup like colour, flavor, texture, taste and overall acceptability was highly observed for TH 1 as compared to Shiva Ji and TH 1214. But the appearance scores were estimated more for tomatoes variety TH 1214 as shown in Table 2. The flavor of tomatoes ketchup was due to the hydrolysis of glycosides compound present in the tomato fruit. The results further elucidated that TH 1 was the best variety for making tomato puree and ketchup due to high organoleptic scores.

CONCLUSION

The results revealed that three different varieties of tomato *i.e.* Shiva Ji, TH 1214, TH1 were light red, firm texture, round or oval shape and having average fruit weight falls between 50-70g. The tomatoes selected for ketchup preparation were fit to meet the physical standard of grading except in terms of colour due to maturity stage. After sensory evaluation, the TH1 had higher overall acceptability for colour, flavor, texture and taste. So this variety can be used for tomato processing for value addition so that it can be used for future consumption at domestic and commercial scale.

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Table 2. Organoleptic scores of tomatoes ketchup.

Variety	Colour	Appearance	Flavour/Smell	Texture	Taste	Overall Acceptability
SHIVA JI	1.28±0.48	1.85±0.69	2.0±1.52	2.71±0.48	3.28±1.25	2.22±0.53
TH 1214	1.71±0.75	1.28±0.48	1.42±0.53	2.57±0.78	2.85±1.46	1.97±0.62
TH 1	1.14±0.37	1.57±0.78	1.14±0.37	1.42±0.53	1.00±0.0	1.25±0.37

Values were expressed as Mean±SD

(Key to scores: 9=Dislike extremely, 8=Dislike very much, 7= Dislike moderately, 6= Dislike Slightly, 5= Neither like or dislike, 4=Like Slightly, 3=Like Moderately, 2=Like Very Much, 1=Like Extremely)

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