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DEVELOPMENT OF YOGURT ENRICHED WITH FREEZE DRIED TOMATO PEEL POWDER

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Abstract -**This study is to investigate the development of yogurt enriched with freeze dried Tomato peel powder (TPP) is examined. Tomato peel is a rich source of lycopene which can be used as a natural antioxidant and colorant in food products and also it contains large amounts of Vitamin C. The antioxidant properties of this vitamin derive from the fact that it is a very good electron donor which also explains that it acts as a reducing agent that directly neutralizes or mitigates the damage caused by electronically imbalanced and unstable reactive species i.e., free radicals. Tomato peels were freeze dried, pulverized and sieved to prepare as fine powder. Yogurt is a fermented dairy product produced by Streptococcus thermophilus and Lactobacillus delbrueckii subsp. bulgaricus. Freeze-dried Tomato Peel Powder were added to the yogurt at the ratios of 0.1% and 0.2%, after fermentation. Yogurt with addition of 0.1% (T_1) incorporation of Tomato Peel Powder gained high scores for overall acceptability by sensory evaluation. The result obtained for Vitamin C as 0.425 and 0.851 g/100g in developed yogurt for T_1 and T_2. The protein content of T_0, T_1 and T_2 was 3.11%, 5.25% and 7.23%. These results suggest the possibility of utilizing freeze dried tomato peel powder as a source of Vitamin C enriched ingredient in yogurt manufacture.**

Key words – **Vitamin C. Lycopene. Freeze dried Tomato Peel Powder. Yogurt.**

I. INTRODUCTION

Dairy products are likely to remain important dietary components because of their nutritional value, flavour and texture. Demand for yogurt has increased considerably in the last decade. Yogurt has been a staple food product for numerous cultures throughout the world dating back many thousands of years. In the Middle East, primitive herdsman began carrying milk in containers made from intestinal gut lining, which they discovered could help extend the life of milk products because contact with the intestinal fluids of the containerscaused the milk to curdle and sour, preserving it for an extended period. Other than drying, this was historically the only safe method of preserving milk.

Yogurt is made when heated milk is combined with bacteria, specifically Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus, and left to sit for several hours at a warm temperature (110 - 115°F). Additional types of lactobacilli and bifidobacteria may be added. The bacteria convert the sugar in milk, called lactose, to lactic acid, which thickens the milk and develop its distinctive tart flavour.

Yogurt should contain at least 3.25% of milk fat and 8.25% of Milk Solids Non-Fat (MSNF) with a titratable acidity of not less than 0.9%. The composition requirement for milk fat and Milk Solids Non-Fat (MSNF) is applied to the yogurt prior to the addition of bulky flavouring ingredients according to the United States Department of Agriculture (USDA) specifications for yogurt. Whole milk is used for full fat/regular yogurt, partially skimmed milk is used for low fat yogurt and skimmed milk is used for non-fat yogurt. The protein content of commercial yogurt is generally higher than that of milk because of the addition of non-fat dry milk solids during processing, which increases the protein content of the final product. In yogurt and fermented milks, proteins are partly degraded by the action of the bacterial proteolytic system that facilitates their digestion.

Yogurt is considered as healthy food due to its high digestibility and bioavailability of nutrients and also can be recommended to the people with lactose intolerance, gastrointestinal disorders such as inflammatory bowel disease and irritable bowel disease, and aids in immune function and weight control.

Yogurt is considered as a nutrient dense food that contains essential nutrients such as protein, vitamins and minerals necessary for growth. Consumption of dairy products such as yogurt helps to improve the overall quality of the diet while increasing the chances of achieving nutritional recommendations such as Recommended Dietary Allowances (RDA) of each nutrient in daily basis. For instance, milk products including yogurt is a rich source of calcium in bio-available form which is reported to provide

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41% of the recommended daily requirement of Calcium for a 5-year-old through a serving of 50 g of yogurt.

Natural antioxidant has gained immense prominence in recent era for their role in obviating the auto- oxidation of fats, bioactive molecules owing to its antioxidant activity, which must be extracted from its sources in high quantities. Lycopene is the principle carotenoid responsible for the red pigment of tomato found that the peel of tomato is a rich source of lycopene, as they contained about five sources of lycopene than the whole tomato pulp. Lycopene is a pigment principally responsible for the characteristic deep-red colour of ripe tomato fruits and products. For nutritional benefits tomato is used mostly. Because of its growing dietary value and tremendous production as well as it uses as a model plant for diverse research tomatoes are considered as most elevated vegetable in global. Tomatoes consumption in diet can protect and defend against cancer and reduce blood glucose in diabetics patient. The most efficient carotenoid antioxidant is lycopene. Lycopene is a natural pigment which protects the body by neutralizing the negative effects of oxidants and it is also considered as natural pigment that is highly accepted by food industry as a natural colorant. Lycopene is soluble in fat and synthesized by plants and microorganisms.

Lycopene extract from tomato is obtained by the ethyl acetate extraction of the pulp of ripe red tomatoes (Lycopersicon esculentum L.) with subsequent removal of the solvent. The product also contains oils, fats, waxes, and flavor components naturally occurring in tomatoes.

The skin of fruits and vegetables is commonly removed because they are thought to be indigestible and contain low levels of nutrients, furthermore, approximately one third of tomatoes total weight in the form of skin and seeds is discarded during processing of tomatoes into paste (Al-Wandawi et al., 1985). In general, there is a lack of information on the levels of antioxidants in the peel fraction of tomatoes, and this could be an important contributor to the antioxidant activity of tomatoes.

The antioxidant activities of lycopene are highlighted by their singlet oxygen quenching properties and their ability to trap peroxyl radicals. Antioxidant ability of lycopene to delocalize free radical species lies in the presence of conjugated carbon-carbon double bonds, which makes it quite beneficial for the human beings. Tomato and its products (pulp and paste) are regarded as one of the richest sources of lycopene.

Therefore, producing functional foods which contain natural health ingredients are gaining more popularity than regular food products among the health-conscious consumers. Direct addition of the lyophilized tomato peel powder into stirred yogurt could be more advantageous than adding of isolated lycopene is a challenging and expensive process.

Yogurt is one of the most popular dairy products which is well-known for its health benefits. Colour is the first characteristic the consumer perceives of a food, and it confers expectations of quality and flavor. This study was focused on development of functional stirred yoghurt with high antioxidant activity, incorporating tomato peel powder as a source of lycopene.

Objectives

- To standardize the preparation of low-fat yogurt incorporation of Freeze-dried Tomato peel powder.
- To study the physico-chemical analysis of developed dairy product-yogurt.
- To evaluate the sensory analysis of developed product.

II. MATERIALS AND METHODS

2. 1Methods

2.1.1 Tomato peel preparation

Fresh ripe tomatoes were purchased from local market and stored at 4 °C for a maximum of 2 days before use. The tomatoes were cleaned, immersed in boiling water for 2–3 minutes, cooled under tap water and hand peeled. The peels were frozen at –17℃ in a freezer for two days. The tomato peels are blended with distilled water to prepare the tomato peel slurry. The prepared slurry was kept in deep freezer at -20˚C for overnight. The slurry was dried using Freeze Drier (LARK Penguin Classic plus (4kg)) for 6 hours. The Freeze- dried sample was blended manually by using motor and pestle to get fine powder. Freeze dried powder is stored at (0-5°C) and utilized for the product preparation.

2.1.2 Yogurt Preparation

Pasteurized cow's milk (milk fat 3%, protein 3.5%, Solid Not Fat 8.5% and pH 6.6-6.7) was used for yogurt production. Milk was heated to 85ºC for 15 mins and then rapidly cooled to 42ºC. 2% (w/v) starter culture (containing Streptococcus thermophilus and Lactobacillus delbruckii subsp. bulgaricus) was added and incubated at 42-45ºC. Incubation was terminated at acidity 1(% lactic acid). Two group of yogurt samples were prepared by incorporation of freeze- dried tomato peel powder at 0.1% and 0.2% blend/stirred it properly by hand blender. The prepared yogurt samples were stored ina refrigerator (4ºC).

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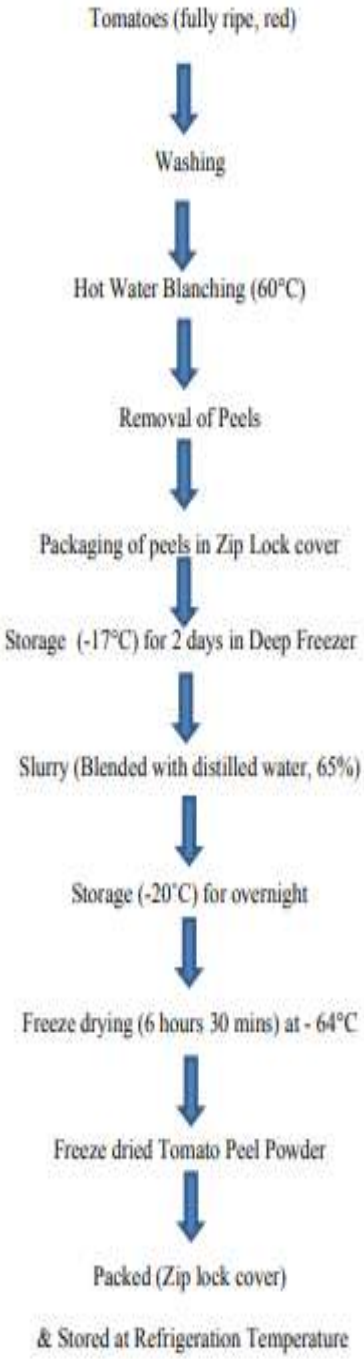
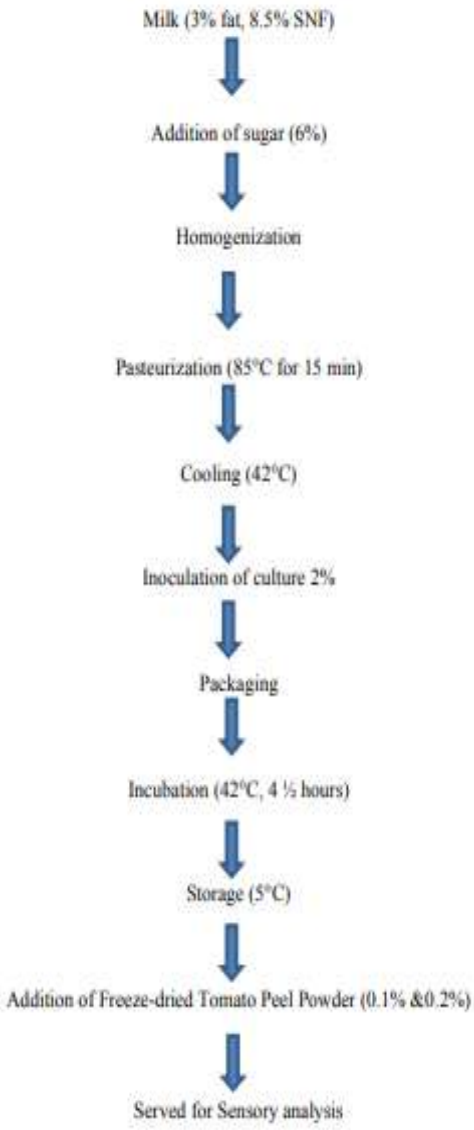


Flow chart 3.1 Preparation of Tomato Peel Powder



Flow chart 3.2 Preparation of Yogurt enriched with Freeze dried Tomato Peel Powder

2.2 Analysis methods

2.2.1 Moisture content

The oven drying method of AOAC was adapted. A clean suitable petri dish was dried in an oven for 30 minutes. The dish was transferred into desiccator to cool using a pair of tongs. The cooled empty dish was weighed and the weight was recorded as W1. Five grams (5g) of the test samples were weighed into the dish and the dish was reweighed and recorded as W_2. The sample was dried in an oven set at 100˚C until constant weight was recorded. The dish and its dried content were then weighed and the reading was recorded as W_3. The recorded weights i.e., W_1, W_2 and W_3 were used to calculate the moisture content of the food sample using the formula.

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$$\text{Moisture}(\%) = \frac{W_2 - W_3}{W_2 - W_1} \times 100 \qquad (1)$$

Where;

W_1 = weight of empty dish,
W_2 = weight of empty dish +sample before drying,
W_3 = weight of dish + sample after drying

2.2.2 Protein

Crude protein was determined by Kjeldahl method described by AOAC. The sample (1g) was weighed on a filter paper and transferred into Kjeldahl flask. Concentrated H_2SO_4 (25 ml) and half Kjeldahl flask (catalyst) was added into the Kjeldahl flask. The flask was placed in the Kjeldahl digestion compartment and theheater turned on. The mixture was heated till the solution turned colorless. The heater was turned off and allowed to cool to room temperature. Distilled water (100ml) was added to dilute the acidic medium. Also added was 75ml of 5% NaOH. A mixture comprising of 20ml of 4% boric acid and 3 drops of screened methyl red was made into a 250ml conical flask. The neutralized sample was transferred immediately to the Kjeldahl distillation compartment and the apparatus was set up, the heater was again turned on and the conical flask containing boric acid and the indicator was placed on the ammonia outlet. The ammonia was allowed to distil into the boric acid beaker until it reached the 250ml mark. The mixture above was titrated with 0.1N HCl to a light reddish colour. The titre value was recorded and used to calculate the percentage nitrogen content and the protein content using the expressions below;

$$Nitrogen(\%) = \frac{14.01 \times (\text{titre value of sample, ml} - \text{titre value of blank, ml}) \times N \times 100}{\text{Sample Weight} \times 1000} \quad \text{.....(2)}$$

$$protein(\%) = 6.25 \times Nitrogen(\%) \quad \text{.....(3)}$$

2.2.3 pH

The pH measurement was carried out using a digital pH-meter calibrated with pH 4 and 7 buffers. The
sample (25ml) was transferred to a 50 ml beaker. The pH probe was inserted into the sample, and the beaker was gently swirled until the pH reading stabilized before noting the value.

2.2.4 Titratable Acidity

The Titratable Acidity values of each yogurt sample was determined after mixing each yogurt sample with 25 ml distilled water and titrating with 0.1 N NaOH containing 0.5% phenolphthalein as an indicator to an end point of pale pink colour. The % lactic acid produced as a result of fermentation in the sample was calculated thus:

$$\text{Titratable acidity (Lactic acid\%)} = \frac{9 \times V \times N}{W} \times 100 \quad \text{.....(4)}$$

2.2.5 Ascorbic acid

The ascorbic acid content was determined by 2-6 dichlorophenol indophenol titration method described by (Ranganna, 2010). Oxalic Acid (4%), Dye Solution: Weigh 42mg sodium bicarbonate into a small volume of distilled water. Dissolve 52mg 2,6-dichlorophenol indophenol in it and make up to 200ml with distilled water. Stock Standard Solution: Dissolve 100mg ascorbic acid in 100ml of 4% oxalic acid solution in a standard flask (1mg/ml). Working Standard: Dilute 10ml of stock solution to 100ml with 4% oxalic acid. The concentration of working standard is 100µg/ml.

Ascorbic acid reduces the 2, 6-dichlorophenol indophenol dye to a colourless leuco-base. The ascorbic acid gets oxidized to dehydroascorbic acid. Though the dye is a blue coloured compound, the end point is the appearance of pink colour. The dye is pink colour in acidic medium. Oxalic acid is used as the titrating medium.

Pipette out 5ml of the working standard solution into a 100ml of conical flask. Addition of 10ml of 4% oxalic acid into the conical flask and titration against the dye (V_1 ml). End point is the appearance of pink colour which persists for a few minutes. The amount of dye consumed is equivalent to the amount of ascorbic acid. Extraction done for the sample (0.5 – 5 g depending on the sample) in 4% oxalic acid and make up to a known volume (100ml) and centrifuge. Pipette out 5ml of this supernatant, addition of 10ml of 4% oxalic acid and titrating against the dye (V_2 ml).

$$\text{Amount of ascorbic acid} \left(\frac{mg}{100ml}\right) = \frac{0.5mg}{V_1 ml} \times \frac{V_2 ml}{5ml} \times \frac{100ml \times 100}{Wt. of\ the\ sample} \quad \text{.....(5)}$$

2.2.6 Bacteriological analysis

2.2.6.1 Presumptive coliform test

The test sample mixing it thoroughly by shaking vigorously to get uniform consistency. Preparation of dilutions, 1:10 and 1:100 using sterile 1 ml pipettes and 9 ml blanks. Inoculation of 1 ml portions required dilutions into sterile petri plates (in duplicate). Addition to each plate 10-15 ml of MacConkey's agar previously melted and cooled to 45°C. Mixing it thoroughly and allowing the agar to solidify. Pour additional layer (3-4 ml) of the medium completely over the surface of the solidified medium. This is known as over laying. Invert and incubate the plates at

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37°C for 24 hours. After incubation for 24 hours remove the plates and examine for typical colonies of coliforms. Coliform colonies appear as dark red colonies measuring more than 0.5 mm in diameter with a pale periphery. Count such colonies only and express the results as coliform count per ml of milk.

2.2.6.2 Yeast and Mold Count
The sample (yogurt) mixing it thoroughly. Transfer 1ml of yogurt into 9 ml blanks and preparation1:10 and 1:100 dilutions. Adjust the pH of potato dextrose agar or broth to pH 3.5 by adding calculated amount of sterile 10% tartaric acid solution prior to pouring plates. Remelting of acidified medium may destroy its solidifying properties. Poured the melted cooled agar then mixing the contents well and the agar to cool and set. Invert and incubate the plates at 21°C or 25°C for 5 days. If mold grow fast and develop into large colonies, plates may be incubated for 3 days only. Count the number of colonies in the plates and compute the number of colonies per ml of yogurt**.**

2.2.7 Sensory evaluation
Organoleptic quality of developed product was determined with the help of a ten-member panel of judges using a 9-point hedonic scale. The aspects considered were colour and appearance, body and texture, taste, sourness, whey separation and overall acceptability. In between testing different samples, the panel members were served fresh water to rinse the mouth. The average scores of all the 10 panelists were computed for Colour and Appearance, Body and Texture, Taste, Sourness, Whey separation and Overall acceptability.

2.2.8 Statistical analysis
Summary statistics (mean and standard deviation), graphs and were obtained using Microsoft® excel
2010.

III. EXPERIMENT AND RESULT

The freeze-dried tomato peel powder incorporated yoghurt was subjected to proximate analysis, microbial analysis and organoleptic evaluation. The results are obtained are presented under the following sub headings.

Proximate AnalysisMoisture Content
The Mean ± Standard deviation of yogurt enriched with freeze dried tomato peel powder were analyzed and presented in Table 4.1 and Figure 4.1.

The moisture content was found to be 83.01 ± 0.05%, 75.80 ± 0.02% and 73.80±0.01% for T_0, T_1 and T_2 respectively. It is observed that the addition of tomato peel powder leads to decrease in moisture content rapidly. It is observed that the moisture content has been decreased due to presence of pectin in tomato peel powder.
By comparing the following article (Meegahawaththa et al., 2020), the moisture content ranges from
67.54 ± 0.00 to 75.54 ± 0.00 which shows increasing in moisture content whereas we observed that our samples indicate decrease in moisture content.

Table 4.1 Moisture content of Developed Yogurt

Parameter	**Treatment**		
	T0	**T1**	**T2**
Moisture content (%)	83.01 ± 0.05	75.80 ± 0.02	73.80 ± 0.01

@Average of six trails
T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

pH
The Mean ± Standard deviation for pH of yogurt enriched with freeze dried tomato peel powder were analyzed and presented in Table 4.2 and Figure 4.2.

The pH was determined after 24 hours of fermentation of the product. The results obtained for pH were
4.4 ± 0.02, 4.5 ± 0.02 and 4.5 ± 0.02 for T_0, T_1 and T_2 respectively. The addition of tomato peel powder significantly increased the pH value.

By comparing of the following article (Meegahawaththa et al., 2020), it is observed that the pH rangesfrom 4.12±0.01 to 4.50±0.02 which is similar to our sample values.

Table 4.2. pH of Developed Yogurt

Parameter	**Treatment**		
	T0	**T1**	**T2**
pH	4.4 ± 0.02	4.5 ± 0.02	4.5 ± 0.02

@Average of six trails
T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

Titratable Acidity
The Mean ± Standard deviation for Titratable acidity of yogurt enriched with freeze dried tomato peelpowder were analyzed and presented in Table 4.3 and Figure 4.3.
The results obtained for Titratable acidity were 0.63 ± 0.01,

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0.72 ± 0.01and 0.74 ± 0.01 % Lactic acid for T_0, T_1 and T_2 respectively. The values significantly showed that there increase in titratable acidity which is due to addition of tomato peel powder.
By comparing of the following article (Meegahawaththa et al., 2020), it is observed that the titratable acidity has been increased due to addition of tomato peel powder.

Table 4.3 Titratable Acidity of Developed Yogurt

Parameter	Treatment		
	T0	T1	T2
Acidity (%LA)	0.63 ± 0.01	0.72 ± 0.01	0.74 ± 0.01

T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

Protein
The Mean ± Standard deviation for Protein in yogurt enriched with freeze dried tomato peel powder were analyzed and presented in Table 4.5 and Figure 4.5.

The results obtained for Protein were 3.11 ± 0.01, 5.25 ± 0.02 and 7.23 ± 0.02 % for T_0, T_1 and T_2 respectively. The values significantly showed that there increase in Protein which is due to addition of tomato peel powder.

Table 4.4 Protein in Developed Yogurt

Parameter	Treatment		
	T0	T1	T2
Protein (%)	3.11 ± 0.01	5.25 ± 0.02	7.23 ± 0.02

@Average of six trails
T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

Vitamin C
The Mean ± Standard deviation for Vitamin C in yogurt enriched with freeze dried tomato peel powder were analyzed and presented in Table 4.4 and Figure 4.4.
The results obtained for Vitamin C were 42.55 ± 0.02 and 85.11 ± 0.01 mg/100g of Ascorbic acid for T_1 and T_2 respectively. The values significantly showed that there increase in Vitamin C which is due to addition of freeze-dried tomato peel powder.

Table 4.5 Vitamin C in Developed Yogurt

Parameter	Treatment		
	T0	T1	T2
Vitamin C (mg/100ml)	-	42.55 ± 0.02	85.11 ± 0.01

@Average of six trails
T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

Microbial Analysis
The Microbiological quality in terms of Yeast & Mould and Coliform count of treatments T_0, T_1, T_2 for 10^{-5} and 10^{-7} dilutions were presented in the Table 4.6 and the results were observed in Plate.

Table 4.6 Microbial analysis of Developed Yogurt

Sample	Coliform Count	Yeast and Mould Count
T_0	Nil	Nil
T_1	Nil	Nil
T_2	Nil	Nil

T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

Sensory analysis
The Mean ± Standard deviation for sensory evaluation of yogurt enriched with freeze dried tomato peel powder were analyzed and presented in Table 4.7 and Figure 4.6

The sensory analysis of yogurt incorporated with different concentration of freeze-dried tomato peel powder was evaluated using 9-point hedonic scale with ten panel members. The sensory parameters such as Colour and Appearance, Body and Texture, Sourness, Whey separation and Overall acceptability were evaluated.

Table: 4.7 Sensory analysis of Developed Yogurt

Parameters	Treatment		
	T0	T1	T2
Colour & appearance	8.33 ± 0.02	8.33 ± 0.02	8.00 ± 0.05
Body & Texture	8.00 ± 0.05	8.33 ± 0.02	8.17 ± 0.02

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Sourness	8.33 ± 0.02	8.67 ± 0.02	8.02 ± 0.02
Whey Separation	8.33 ± 0.02	8.67 ± 0.02	8.83 ± 0.01
Overall Acceptability	8.17 ± 0.02	8.33 ± 0.02	8.00 ± 0.05

@Average of six trails

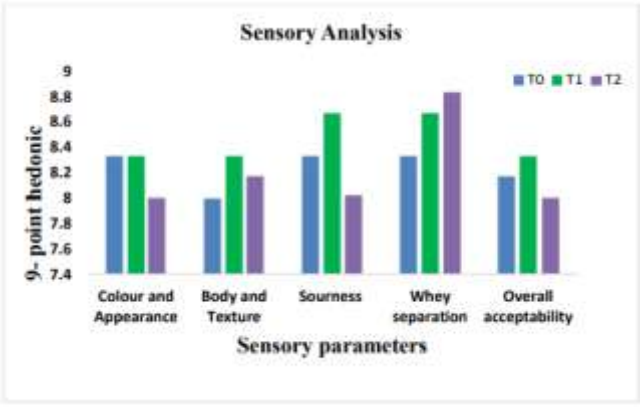

Figure. 4.6 Sensory Analysis of Developed Yogurt

T_0 – Plain Yogurt
T_1 – Addition of 0.1 % of tomato peel powder
T_2 – Addition of 0.2% of tomato peel powder

The colour and appearance scores ranged from 8.00 to 8.33 for T_0, T_1 and T_2 and body and texture scores ranged from 8.00 to 8.33 for T_0, T_1 and T_2, sourness scores ranged from 8.02 to 8.67 for T_0, T_1 and T_2, Whey separation ranged from 8.33 to 8.83 for T_0, T_1 and T_2, and overall acceptability scores ranged from 8.00 to 8.33 for T_0, T_1 and T_2, respectively.

Colour & Appearance
From sensory analysis, we observed that the value for colour and appearance of T_0 and T_1 was significantly higher than T_2 showed in the Figure 4.7.

Body & Texture
We observed that in sample T_1 and T_2 yogurt got thickened due to addition of tomato peel powder which is rich in pectin leads to thickening of yogurt. We observed that the value for body and texture of T_1 was higher than T_0 and T_2 showed in the Figure 4.8.

Sourness
We observed that the sourness was observed high in T_2 due to addition of tomato peel powder than other two samples. We observed that T_1 has higher value than T_0 and T_2 showed in the Figure 4.9.

Whey Separation
We observed that the whey separation was observed high in T_0 as whey separation was less in T_1 and T_2 showed in the Figure 4.10 due to addition of tomato peel powder which leads to thickening of yogurt samples.

Overall Acceptability
We observed that from the analysis it was observed that the overall acceptability for T_1 value was higher than control sample (T_0).

IV. CONCLUSION

Yogurt is a fermented product of milk produced by Streptococcus thermophilus and Lactobacillus delbrueckii spp. bulgaricus. Yogurt has more nutritious and is an excellent source of Protein, Calcium, Phosphorus, Riboflavin, Thiamin, Vitamin B-12, Folate, Niacin, Magnesium and Zinc. Yogurt plays a potential role in decreasing intestinal disorders and chronic diseases. Many consumers are buying nutritious food like yogurt to enjoy as a lite meal or snack, as opposed to something more indulgent. The increase in demand isbeing driven by health and nutrition in the yogurt. The global yogurt market is projected to register a Compound Annual Growth Rate (CAGR) of 4.5% during the forecast period (2020-2025). The demand for yogurt is fueled by the availability of numerous flavours and growing consumers indulgence for exotic flavours.
Tomato is one of the most consumed vegetables in the world either as a raw fruit or a processed product. The direct use of food processing by-products means reducing waste and less environmental damage. Recent research suggested the possibility of reusing tomato pomace/peel as a cheap source of many bioactive compounds, such as antioxidants, soluble dietary fibers and Vitamins. Vegetable and fruit by-products are well- incorporated into dairy products such as cheese, ice cream and yogurt. Studies has proven that, the addition of tomato peels significantly enhanced the antioxidant activities of dairy products, without affecting the organoleptic acceptability of consumers.
In this project, tomato peels are freeze dried and added to yogurt in different concentration to increase the nutritional value. Yogurt with addition of 0.1% (T_1) incorporation of TPP gained high scores for overall acceptability by sensory evaluation. In this present study moisture content, pH, titratable acidity, Vitamin C, protein was determined using standard procedure. The moisture content was found to be 83.01±0.05%, 75.80±0.02% and 73.80±0.01% for T_0, T_1 and T_2 respectively. The pH and titratable acidity were found to be 4.4±0.02, 4.5±0.02 and 4.5±0.02 & 0.63±0.01, 0.72±0.01, 0.74±0.01 % LA for T_0, T_1 and T_2 respectively. The Vitamin C content was 42.55±0.02,

85.1±0.011mg/100g of the sample for T_1 and T_2. The protein content was found to be 3.11±0.01, 5.25±0.02, 7.23±0.02% for T_0, T_1 and T_2 respectively. Coliform, Yeast and Mould was not found in the developed sample.

Thus, we conclude that the development of yogurt enriched with freeze dried Tomato peel powder (TPP) significantly indicates increase in Vitamin C. Tomato peel is a rich source of lycopene which can be used as a natural antioxidant and colorant in food products. These results suggest the possibility of utilizing dried tomato peel powder as a source of Vitamin C enriched ingredient in yogurt manufacture.

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