Yoghurt is a fermented milk product traditionally obtained by lactic acid fermentation through the action of lactic acid bacteria 
*Lactobacillus delbrueckii* subsp. *bulgaricus* and *Streptococcus salivarius* subsp. *thermophilus*. The nutritional value of yoghurt is made up of the nutrients of the milk and the nutrient among metabolites produced during the fermentation by lactic acid bacteria. Yoghurt acts as an antibiotic, protects against gastrointestinal upset, decreases risk of cancer, lowers blood cholesterol especially low density lipoprotein cholesterol and help the body to assimilate protein, calcium and iron. Collectively, it contributes to a high level of nutrition and contribute to the strengthening the immune system. Fruits and vegetables are good sources of vitamins, minerals, antioxidants and fibres. So, certain fruits can be used in yoghurt production for improving the nutritional values and sensory properties. Papaya fruit is known for its high nutritional and fibre content and it is generally consumed ripe due to its characteristics flavour and aroma. Moreover, it is characterized by high content of proteolytic enzyme papain as well as a similar enzyme called chymopapain which may play an important role in food digestion. Considering all the above facts an attempt will be made to develop stirred yoghurt by incorporating papaya fruit in order to improve the nutritional benefit of yoghurt.

**MATERIAL AND METHODS**

Fresh cow milk obtained from the Dairy Farm, Veterinary College and Research Institute, Namakkal was used. Skim milk powder testing 5 per cent moisture and 95 per cent solubility was purchased from Aavin. Commercially available good quality cane sugar was used. Freeze dried DVS cultures containing yoghurt bacteria *Lactobacillus delbrueckii* ssp. *bulgaricus* and *Streptococcus salivarius* ssp. *thermophilus* obtained from was used in this study. Good quality papaya fruit purchased from local market in Namakkal.

**Preparation of fruit pulp:** Fresh ripe papaya fruit were purchased and after gentle wash under tap water, the fruits were subjected to pulp extraction.

1. Ripened papaya
2. Washing
3. Peal outer covering
4. Cut into slices
5. Remove the seeds
6. Extract fruit pulp

**Procedure for the preparation of plain yoghurt:** Plain yoghurt was prepared as per De.  

**DEVELOPMENT OF STIRRED PAPAYA [CARICA PAPAYA] YOGHURT AND ASSESSING THEIR SENSORY AND CHEMICAL QUALITIES**

A. Punnagaiairas*, G. Rajarajan, A. Elango, C. Pandiyan and N. Karthikeyan

Department of Livestock Products Technology (Dairy Science), Veterinary College and Research Institute, Namakkal-637 002, Tamil Nadu, India.

[Corresponding author E-mail*: punnagai90@rediffmail.com]

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An attempt was made to develop stirred yoghurt by incorporating papaya fruit in order to improve the nutritional benefit of yoghurt. Samples were analysed for sensory, physico-chemical analysis and textural properties. Significantly higher values were observed in sensory evaluation in 10 per cent papaya incorporated yoghurt when compared with the other treatments. Significant reduction in fat and protein were also observed in papaya incorporated yoghurt. From the results of the present study, it can be concluded that yoghurt can be incorporated with 10 per cent papaya fruit to enhance the nutritional quality without altering the sensory and physico-chemical characteristic of yoghurt.
Flow diagram of preparation of papaya stirred yoghurt:

Fresh milk

Addition of skim milk powder (4 per cent) and Sugar (6 per cent)

Homogenization (1000 psi)

Pasteurization (85°C for 30 min)

Cooling (42°C)

Inoculation (2 per cent yoghurt culture)

Incubating at 42 °C /4-5 hrs

Stirring

Addition of papaya fruit pulp

Mixing and storage (5°C)

Physico chemical analysis of yoghurt: Estimation of titratable acidity: Acidity was estimated as per the procedure described in IS:SP: 18 (part XI)-1981.

Estimation of pH: pH was estimated using digital pH meter.

Estimation of total solids: Total solids content was determined according to AOAC (1990), 15th edition.

Estimation of fat: Fat was estimated as per the procedure described in IS:SP:18 (Part XI) - 1981.

Estimation of protein: Protein was estimated as per the procedure described in AOAC (1995), Vol.II, 16th edition.

Sensory evaluation of yoghurt: Sensory evaluation was carried out by 9-point hedonic scale with their preferences according to the scale (Amerine et al., 1965).

Statistical analysis: The data obtained in all the experiments were analyzed statistically by applying one way and two way ANOVA (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Effect of Different Treatments of papaya on Sensory and Physico-chemical parameters of yoghurt: To find out the optimum level of papaya for the improvement of nutritional and therapeutic properties of yoghurt at different levels were added and the effect on sensory, and physico-chemical parameters were evaluated.

Sensory Evaluation: The results pertaining to sensory qualities like colour and appearance, taste, flavour and body and texture of yoghurt by using 9 - point hedonic scale are presented in Table-1. In general the use off fruit homogenate for making stirred yoghurt caused improvement in body and

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Protein (%)</th>
<th>Fat (%)</th>
<th>Ash (%)</th>
<th>Acidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3.92±0.007a</td>
<td>3.10±0.03a</td>
<td>1.19±0.00043a</td>
<td>0.74±0.00428a</td>
</tr>
<tr>
<td>T1</td>
<td>3.30±0.009a</td>
<td>2.75±0.04a</td>
<td>1.20±0.00287a</td>
<td>0.83±0.00764a</td>
</tr>
<tr>
<td>T2</td>
<td>3.65±0.006a</td>
<td>2.76±0.03a</td>
<td>1.23±0.00071a</td>
<td>0.85±0.14845a</td>
</tr>
<tr>
<td>T3</td>
<td>3.73±0.005a</td>
<td>2.38±0.04a</td>
<td>1.54±0.00231a</td>
<td>0.98±0.00577a</td>
</tr>
<tr>
<td>T4</td>
<td>3.82±0.007a</td>
<td>1.41±0.03a</td>
<td>1.90±0.00166a</td>
<td>1.02±0.00494a</td>
</tr>
</tbody>
</table>

Within a row values (Mean ±SE) with different superscript letters are significantly different (p<0.05)

Table 2: Chemical composition of stirred yoghurt made with papaya fruit homogenates.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Plain yoghurt (control)</th>
<th>Stirred papaya yoghurt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>Color and Appearance</td>
<td>7.91±0.004c</td>
<td>8.09±0.003c</td>
</tr>
<tr>
<td>Body and Texture</td>
<td>8.25±0.003c</td>
<td>7.98±0.004c</td>
</tr>
<tr>
<td>Flavor</td>
<td>8.05±0.003c</td>
<td>7.81±0.003c</td>
</tr>
<tr>
<td>Overall acceptability</td>
<td>8.07±0.003c</td>
<td>7.96±0.003c</td>
</tr>
</tbody>
</table>

Within a column, values (Mean ±SE) with different superscript letters are significantly different (p<0.005)
texture properties of the final product. This improvement could be due to the higher content of fibers associated with fruit homogenate added and this may lead to increase the viscosity and consequently improve the body and texture. It is clear that panelists preferred 10 per cent papaya stirred yoghurt compare to the other samples. So, addition of fruit to stirred yoghurt production may be contributed to increase the sensory quality of the final product. Erdogan and Zekai\textsuperscript{4} stated that, fruit additions have an increasing effect on yoghurt consumption. The sensory scores of all the samples were decreased during storage period. This may be due to the acidity development or the production of microbial metabolism which slightly harmed the rheological and sensory properties of the product.

**Chemical composition:** The results presented in Table-2 demonstrated that, fat content of stirred yoghurts ranged from 1.41 to 3.10\% (p>0.05) and protein from 3.30 to 3.92\%. There were significant difference in the protein, ash and titratable acidity contents among all treatments. Control stirred yoghurt had significantly highest protein content and lowest acidity, ash contents. It was clear that, addition of fruit homogenate in stirred yoghurt manufacture increased the acidity and ash contents and decreased the contents of fat and protein in the final product. These results are in agreement with those obtained by Erdogan and Zekai\textsuperscript{4}.

**CONCLUSION**

Incorporation of various fruit-flavoured yoghurts has significantly contributed to the consumption of yoghurt from all ages. Fruits may be added to yoghurt formulae as single or blends in the form of refrigerated, frozen, canned fruit, juice or syrup. It can be concluded from the present study that the 10 per cent papaya stirred yoghurt preferred over other treatments. Incorporation of fruits endorses the healthy image of yoghurts. This modification has made the yoghurt flavour attractive for them. Addition of fruit makes the yoghurt more delicious.

**REFERENCES**