Technology development for pulse Extracts blended orange juice and its quality evaluation

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ABSTRACT
Preparation of orange juice blended with green gram pulse extract was studied. The extracts of green gram were prepared by providing different processing techniques including soaking, soaking and cooking, germination and germination and cooking. Blends prepared by mixing orange juice with four different green gram extracts in a ratio of 50:50 were evaluated for organoleptic properties. The blend orange juice mixed with soaked and cooked green gram extract (OJ-SCGE) was selected best and further analyzed for nutritional quality. The blended juice was compared with the nutritional components of pure orange juice (OJ-PURE) and revealed that blended juice was superior in terms of nutritional quality.

Key words: Extracts, Juice blends, Nutritional components, Organoleptic evaluation.

INTRODUCTION
India being a tropical country, cold beverages are in great demand almost throughout the year having turnover of about Rs. 21,600 million per annum. Many synthetic drinks are consumed which have very low nutritive value (Kannan and Banumathi, 2005). Synthetic drinks contain only water (about 88%) and sugars (about 12%) whereas, fruit based drinks provide vitamins and minerals in addition to calories. Pure fruit juices, being a source of energy, phytonutrients, vitamins and minerals are not only indispensable for the maintenance of health but also considered as the beverages of refreshment which quenches thirst and encourages liquid intake. They are becoming popular due to their pleasing flavor and nutritional characteristics (Bhuvaneshwari and Gowda, 2006). Citrus fruits and juices have long been considered as a valuable part of healthy and nutritious diet and it is well established that some of the nutrients in citrus promote health and provide protection against chronic diseases, among which orange juice is the most nutrient-dense fruit juice commonly consumed. Orange juice is low in sodium, rich in vitamin C and a good source of riboflavin, folic acid, potassium and thiamine. In addition to these nutrients, orange juice contains more than 60 plant phytochemicals, especially flavonoids that function as antioxidants, potential anti-inflammatory agents and may also have other physiological actions. However fruit juices are poor sources of protein. The inherent lack of protein in fruit juices can be made up by addition of an ingredient, which provides protein. It may influence color and flavor of pure orange juice to some extent but such beverages can be used for therapeutic purposes. Therefore according to lande et al (2010), keeping in a view the above facts, the present investigation was undertaken to standardize the technology for processing the four different kind of green gram extract into orange juice. The blended orange juices were evaluated for their acceptability and nutrient content. Highly accepted blended orange juice was further analyzed and compared with the pure orange juice.

MATERIALS AND METHODS
Preparation of pulse extract: Whole green gram was purchased from the local market in a single lot. It was cleaned and divided into four lots. Each lot was given different household processing techniques including soaking, soaking and cooking, germination and germination and cooking. The detailed procedure followed during preparation of pulse extracts is described in Fig. 1:

Extraction of fruit juice: Fresh oranges were purchased from the local market. These were washed, peeled and cut into pieces/segments and juice was extracted in citrus juicer.

Blending of fruit juice with pulse extracts: Orange juice was blended with pulse extracts obtained by different processing techniques as shown in Table 1:

Sensory Evaluation: All the four samples of protein enriched orange juice blends were evaluated organoleptically with the
help of ten semi trained panel of judges comprising of PG students of the department. Nine point hedonic scale was used for the sensory evaluation (Swaminathan, 1995).

Nutritional Quality Assessment: Most accepted protein enriched orange juice blend was assessed for nutritional quality parameters. Moisture, ash, calcium and iron contents were estimated by methods described in NIN manual (2003). Crude protein content was determined by Lowry method and Vitamin C was assessed by titration method (Sharma, 2007). The nutritional components of blended orange juice were compared with that of pure orange juice as given in Nutritive Value of Indian Foods (Gopalan et al, 2004).

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussions have been presented under following heads:

Sensory quality of developed fruit juices blends: As evident from Table 2, the highest score was awarded for color, taste and flavor to the orange juice blended with soaked and cooked green gram extract (OJ-SCGE) whereas appearance was found to have scored best in orange juice enriched with germinated green gram extract (OJ-GGE). Table 2 also shows that score for overall acceptability was maximum in sample OJ-SCGE and minimum in OJ-GCGE.

It is clearly evident from the above data (table 2) that orange juice blended with soaked and cooked green gram extract was superior over rest of the treatments. Therefore sample OJ-SCGE was selected for further study. The results of present study were in line with that of Bhatia and Chawla (2004) who also reported that apple juice enriched with black gram extract in the ratio of 50:50 was considered best.

Nutritional quality of developed fruit juice blends: Results of nutritional quality of protein enriched orange juice blend are presented in Fig 2 to 7. Data reveal comparison of nutritional components between pure orange juice (OJ-PURE) and orange juice blended with soaked and cooked green gram extract (OJ-SCGE).

Moisture analysis was the preliminary step of chemical analysis of the blended beverage. It is the account of water present in the product. Water has its own significance.

![FIG 1: Flow Sheet for preparation of green gram extract.](image)

![FIG 2: Moisture Content of Juices](image)

<table>
<thead>
<tr>
<th>TABLE 1: Orange Juice Blended with processed green gram extracts.</th>
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<tbody>
<tr>
<td>Orange Juice + Soaked Green Gram Extract (OJ-SGE)</td>
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<tr>
<td>Orange Juice + Soaked and Cooked Green Gram Extract (OJ-SCGE)</td>
</tr>
<tr>
<td>Orange Juice + Germinated Green Gram Extract (OJ-GGE)</td>
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<tr>
<td>Orange Juice + Germinated and Cooked Green Gram Extract (OJ-GCGE)</td>
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</tbody>
</table>

| TABLE 2: Sensory Scores (Mean±S.D.) of orange juice blended with pulse extracts. |
|---------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| ATTRIBUTES                      | SAMPLEOJ-SGE                 | SAMPLEOJ-SCGE                 | SAMPLEOJ-GGE                  | SAMPLEOJ-GCGE                 |
| Colour                          | 7.5 ± 0.67                   | 7.8 ± 0.97                   | 7.1 ± 0.94                   | 7.5 ± 1.10                   |
| Appearance                      | 7.3 ± 1.10                   | 7.7 ± 1.10                   | 7.8 ± 1.40                   | 7.3 ± 1.10                   |
| Taste                           | 6.7 ± 0.90                   | 7.0 ± 1.00                   | 6.2 ± 0.87                   | 6.0 ± 1.09                   |
| Flavour                         | 6.6 ± 1.01                   | 6.8 ± 0.94                   | 6.3 ± 1.02                   | 6.2 ± 0.87                   |
| Overall Acceptability           | 7.0 ± 0.63                   | 7.2 ± 0.77                   | 6.8 ± 1.10                   | 6.6 ± 1.35                   |
because of an array of important functions it performs in geological system. Fruit juice beverages are very good source of water as indicated in Fig.2 which shows 94.71 percent and 97.7 percent moisture content being higher in pure orange juice. The lower moisture content in blended juice was due to the addition of pulse extract.

It is well known that fruits contain an abundant variety of vitamins and minerals but are lacking in an important nutritional component i.e. protein which is required for growth and maintenance of body tissues. As shown in Fig 3, the protein content of blended orange juice was 2.1 percent and it was mainly due to blending of pulse extract in juice. Pure orange juice contains 0.2 percent protein. Blending of green gram extract in present study resulted increase in protein content.

The ash content of any food gives an idea about its minerals and trace elements. The higher the mineral content higher would be the ash content. The ash content of blended orange juice was higher (0.16%) than pure orange juice (0.1%) as revealed in Fig 4.

The data pertaining to calcium, iron and vitamin C contents of the pure and blended orange juice is shown in Fig 5, 6, and 7 respectively. It is evident from the data that there is a difference between calcium, iron and vitamin C content of pure and blended orange juice.

Calcium is an important nutrient of animal body which is required for healthy teeth and bones and irons as a component of hemoglobin plays an important part in the transport of oxygen from the lungs to the tissues. The sample, orange juice blended with soaked and cooked green gram extracts (OJ-SCGE) containing 10.88mg/100ml of calcium and 3.02mg/100ml of iron was found nutritionally better than
The ascorbic acid is an anti scurbutic substance which prevents scurvy. It was found higher in sample, OJ-PURE (64mg/100ml) and lower in sample, OJ-SCGE (49.33mg/100ml) this decline in vitamin C content is because of blending of orange juice with pulse extract.

Orange juice blend (OJ-SCGE) in the present study was found superior with respect to protein, ash, calcium and iron content of pure orange juice. However with respect to moisture content and vitamin C content the blended orange juice sample showed slightly less value than the pure orange juice sample.

CONCLUSION

From the results obtained in the present study, it can be concluded that among all the processing techniques for preparing pulse extracts, soaked and cooked sample was found most acceptable when mixed in the ratio of 50:50 to respective orange juice. Further nutrient analysis revealed that the developed orange juice blend enriched with the pulse extract was superior in terms of nutrient quality than pure orange juice.

FIG 7: Ascorbic acid Content of Juices

REFERENCES


