

# Evaluation of Bread Supplemented with Osmo Dried Cashew Apple Powder

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## Abstract

'Vengurla-4' is one of the preferred variety by farmers of Konkan region because of larger size (> 7.5 g) of cashew nut and higher productivity. Cashew fruit comprises kidney shaped nut attached to the apple (cashew apple) which is technically a swollen peduncle. Baked products are good carrier for fibre enrichment, since they have become indispensable part of our life and are ideal for supplementation due to palatability, compactness, convenience and long shelf life of the product and being widely consumed by every individual irrespective of age. The perishable cashew apple generates high amount waste residues and the wastage rate exceeds about 90 – 95 % of production in India. Economic and efficient methods for handling and processing could help facing this problem through processing and transformation into good quality attractive breads with extended shelf life. The bread was prepared from refined wheat flour and cashew apple powder composite as A (95:05%), B (90:10%) and C (85:15%). The moisture content, fat, protein and ash percent was found in the range of 36.74 to 38.49 percent, 1.77 to 2.05 percent, 8.07 to 8.71 percent and 1.04 to 1.35 percent respectively among the treatments. The color and appearance, flavor, texture, taste and overall acceptability of osmo-convectively dried cashew apple powder composite as 95:05%, 90:10% and 85:15% varied significantly. The breads of treatment B i.e.90:10% wheat flour and cashew apple powder had obtained significantly higher score in all sensory attributes.

**Key words :** Osmo dried, cashew apple powder, bread, proximate composition, sensory.

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Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth Dapoli, Maharashtra, has released and recommended the nine varieties of cashew i.e. *Vengurla-1*, *Vengurla-2*, *Vengurla-3*, *Vengurla-4*, *Vengurla-5*, *Vengurla-6*, *Vengurla-7*, *Vengurla-8* and *Vengurla-9*, respectively (Bhuwad *et al.*, 2017). 'Vengurla-4' is one of the preferred variety by farmers of Konkan region because of larger size (> 7.5 g) of cashew nut and higher productivity. Cashew fruit comprises kidney shaped nut attached to the apple (cashew apple) which is technically a swollen peduncle. The cashew apple is about 6-7 times greater in weight than the raw nut. At present about 90-95 % cashew apple is wasted, owing to its rapid perishable nature, lack of harvesting techniques, improper post harvest handling and non

adoption of cashew processing technologies (Salvi *et al.*, 2016). Through the cashew apple is very juicy, sweet, spongy somewhat fibrous having a unique smell with thin waxy skin is not consumed fresh owing to its astringency and acrid principles. Cashew apple can be utilized for value added products such as juice, syrup, canned fruits, pickles, jam, chutney, candy, etc.

Utilization of substantial quantum of fruits in bakery product such as bread not only improves the food functionality of these foods but also helps in reducing the post-harvest losses of fruits. Develop bread by incorporating banana, aonla and sapota powders and to study the physicochemical and sensory quality of bread. Bread prepared by incorporating powders of fruits (banana -10%, 20%; aonla - 5%, 10%; sapota - 10%, 20%;) at different proportions to the standard recipe were evaluated for various

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physico-chemical and sensory parameters. Addition of banana, sapota and aonla powder enhanced nutritional quality in terms of crude fibre and carbohydrates (Rajeswari *et al.*, 2018).

Baked products are good carrier for fibre enrichment, since they have become indispensable part of our life and are ideal for supplementation due to palatability, compactness, convenience and long shelf life of the product and being widely consumed by every individual irrespective of age (Sahni, 2017; and Wade, 1988). Fruits powders in relation to wheat flour content had higher preference levels for the sensorial attributes which were higher than the controls. Therefore, it is possible to use them as partial ingredients for wheat flour substitution as well as functional ingredients in formulated foods (Uchoa *et al.*, 2009).

The perishable cashew apple generates high amount waste residues and the wastage rate exceeds about 90-95% of production in India. Economic and efficient methods for handling and processing could help facing this problem through processing and transformation into good quality attractive breads with extended shelf life.

### Materials and Methods

The osmo-convective dried cashew apple slices of 'Vengurla-4' were grounded by using hammer mill (Make: M/S. Sagar Engineering Works Pvt. Ltd, Kudal) and pass through the 0.150 mm sieve to obtain osmo convective dried cashew apple powder.

**Bread preparation :** The bread was prepared from refined wheat flour and cashew apple powder composite as 95:05%, 90:10% and 85:15%. The bread loaves were produced using the straight dough method. Composite flours and other ingredients were weighed using laboratory-scale. Flour and rest of baking ingredients were thoroughly mixed and kneaded

to optimum consistency in a planetary mixer (Make: M/s. Jmb Baker Pride, Model: SP-800A) with low speed of 85 rpm for 5 min. Resulting dough was put into oil smeared aluminum box and then kept for proofing for 40 min at 35°C and then baked in deck oven (Make: M/s. Orange Foodstuff Equipment Pvt. Ltd) for 35 minutes at temperatures 200°C after which it was packaged into transparent polyethylene bags.

**Properties of bread :** Proximate composition of bread Moisture content (%), fat content (%), protein content (%), and ash (%), was estimated according to the methods mentioned below.

**Properties of bread :** The properties such as diameter, thickness, breaking strength, moisture content, fat, protein, and ash content were determined as per the procedure as below.

**Moisture content :** Five gram of bread sample was weighed and transferred to pre-dried, covered dish. Weighed sample was then placed in a hot air oven at  $105 \pm 1^\circ\text{C}$  for 4 h. The dish with the dried sample was transferred to the desiccator and cooled to room temperature. The dish was then weighed. Moisture content in percent was calculated as per the AOAC (2010).

**Fat content :** Fat content of bread was determined by Soxhlet's fat extraction system AOAC (2010) by Soxhlet's apparatus (Make: Elico, Hyderabad).

**Protein :** Crude protein of the bread was determined by Kjeldahl method according to AOAC (1990).

**Ash :** Ash content of bread was determined by using muffle furnace.

The experiment was repeated three times and average value of moisture, fat, protein and ash content was calculated.

**Sensory analysis and Statistical analysis of cookies :** Sensory scores of bread prepared from osmo-convectively dried cashew apple powder were evaluated in terms of (a) color and appearance, (b) flavor, (c) texture, (d) taste and (e) overall acceptability. The data obtained was analyzed statistically to determine statistical significance of treatments. Completely Randomized Design (CRD) was used to test the significance of results. The analysis of variance revealed at significance of S.E and C.D. at 5 percent level was mentioned.

To identify the best treatment for bread, the quality characteristics of bread having good moisture content, fat, protein and ash content with maximum sensory score of colour and appearance, flavor, texture, taste and overall acceptability is considered.

## Results and Discussion

The bread was prepared from refined wheat flour and cashew apple powder composite as A (95:05%), B (90:10%) and C (85:15%). The bread loaves were produced using the straight dough method.

**Proximate composition of bread :** Table 1 shows the proximate composition of bread sample prepared from the osmo convective dried cashew apple powder for various treatments i.e. A, B and C.

**a) Moisture :** Table 1 (a) shows the moisture content of bread. The moisture content of breads in the experiment had a range from 36.74+0.07 to 38.49+0.06 per cent. A significantly maximum moisture content (38.49 %) was recorded in treatment C. However, the minimum moisture content (36.74%) was associated with the bread made from treatment A which was at par to the treatment B (37.60). This might be attributed to good water holding capacity of osmo convective dried cashew apple powder. Similar trend of moisture content was

reported by Rajeshwari *et al.*, (2018) for bread fortified with banana, anola and sapota powder.

**Table 1.** Proximate composition of bread prepared from osmo convective dried cashew apple powder composite with wheat flour

Treat-ments	(a) Moisture content	(b) Fat	(c) Protein	(d) Ash
A	36.74±0.07	2.05±0.05	8.71±0.04	1.04±0.06
B	37.60±0.07	1.92±0.01	8.60±0.03	1.13±0.03
C	38.49±0.06	1.77±0.05	8.07±0.04	1.35±0.03
SE	0.07	0.04	0.03	0.04
CD (p< 0.05)	0.20	0.13	0.11	0.13

**b) Fat :** Table 1 (b) shows the fat content ranged from 1.77±0.05 to 2.05±0.05 percent. A significantly maximum fat content recorded in treatment A (2.05%) which was at par to the treatment B (1.92%) and the minimum fat content (1.77 %) was in treatment C. It is clearly seen that the increase in proportion of osmo convective dried cashew apple powder the fat content was decreased and found significant at  $p < 0.05$ .

**Protein :** Table 1 (c) shows the protein content of bread prepared from osmo convective dried cashew apple powder was significantly maximum protein (8.71%) noticed in A which was at par with treatment B (8.60), whereas the significantly minimum protein (8.07%) was recorded in treatment C. The protein content decreased as the amount of wheat flour replaced by osmo convective dried cashew apple powder increased. It is obviously due to less protein content of fruits than the wheat flour. Similar result of decrease in protein content has been reported by Malomo *et al.*, (2011) for bread prepared from bread fruit and bread nut and Rajeshwari *et al.*, (2018) for bread fortified with banana, anola and sapota powder.

**c) Ash :** Table 1 (d) shows the ash content

of bread prepared from the osmo convective dried cashew apple powder for A, B and C treatments. The highest ash content was observed in C (1.35 per cent), whereas the lowest ash content was observed in A (1.04 per cent) at par with B (1.13 percent). The ash content increases with increase in proportion of osmo convective dried cashew apple powder.

**Sensory properties of breads :** Sensory scores of breads were evaluated in terms of (a) color and appearance, (b) taste, (c) crispiness, (d) texture and (e) overall acceptability. Table 2 shows the score of sensory properties of bread prepared from osmo convective dried cashew apple powder.

**Colour and Appearance :** The mean score of colour and appearance of breads prepared from osmo convective dried cashew apple powder (Table 2) shown that all the breads prepared from osmo convective dried cashew apple slices powder blends were significantly affected by colour and appearance at  $p < 0.05$ . The breads of treatment B i.e.90:10% wheat flour and cashew apple powder had significantly higher (8.34) for colour and appearance followed by treatment A i.e. 95:05% wheat flour and cashew apple powder (8.00).

**Flavour :** The mean score of flavor of breads prepared from osmo convective dried cashew apple powder were significantly affected at  $p < 0.05$ . The breads of treatment B i.e.90:10% wheat flour and cashew apple powder had significantly higher (8.44) for flavour followed by treatment A i.e. 95:05% wheat flour and cashew apple powder (7.90).

**Texture :** The mean score of texture of breads prepared from osmo convective dried cashew apple powder were significantly affected at  $p < 0.05$ . The breads of treatment B i.e.90:10% wheat flour and cashew apple powder had significantly higher (8.44) for

texture followed by treatment A i.e. 95:05% wheat flour and cashew apple powder (7.84).

**Taste :** The mean score of taste of breads prepared from osmo convective dried cashew apple powder (Table 4.26) shown that all the breads prepared from osmo convective dried cashew apple slices powder blends were significantly affected by taste at  $p < 0.05$ . The breads of treatment B i.e.90:10% wheat flour and cashew apple powder had significantly higher (8.46) for taste followed by treatment A i.e. 95:05% wheat flour and cashew apple powder (7.68).

**Overall acceptability :** The mean score of overall acceptability of breads shown that all the breads prepared from osmo convective dried cashew apple slices powder blends were significantly affected by overall acceptability at  $p < 0.05$ . The breads of treatment B i.e.90:10% wheat flour and cashew apple powder had significantly higher (8.52) for overall acceptability followed by treatment A i.e. 95:05% wheat flour and cashew apple powder (7.68).

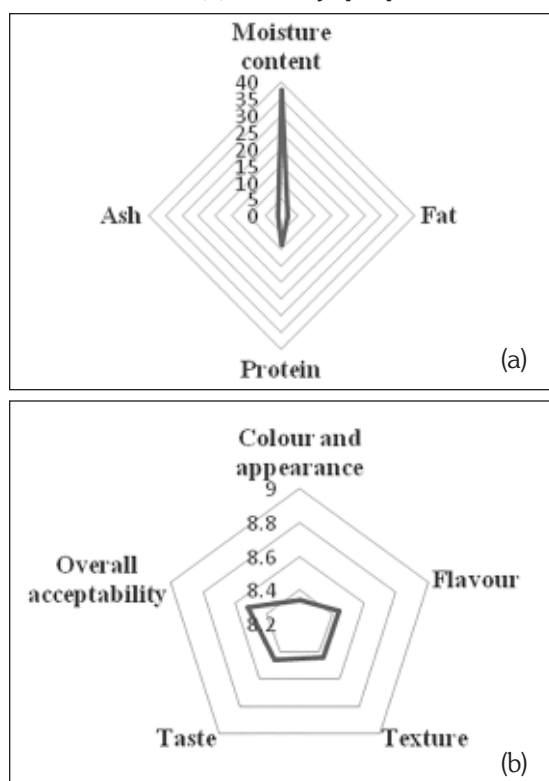
Table 2 shows that the color and appearance, flavor, texture, taste and overall acceptability of osmo-convectively dried cashew apple powder composite as A (95:05%), B (90:10%) and C (85:15%) varied significantly. The breads of treatment B i.e. 90:10% wheat flour and cashew apple powder had obtained significantly higher score in all sensory attributes. The results are confirmed with finding with (Rajeswari *et al.*, 2018) prepared breads of 10 per cent of banana powder were acceptable.

The bread prepared from cashew apple powder and its quality evaluation revealed that the treatment B i.e.90:10% wheat flour and cashew apple powder is appropriate to prepared bread having good moisture content, fat, protein and ash content with maximum sensory score of colour and appearance, flavor, texture, taste and

**Table 2.** Sensory evaluation of breads

Treat-ments	Colour and appearance	Flavour	Texture	Taste	Overall accepta-bility
A	8.00 ± 0.25	7.90 ± 0.20	7.84 ± 0.17	7.68 ± 0.28	7.72 ± 0.24
B	8.34 ± 0.24	8.44 ± 0.19	8.44 ± 0.14	8.46 ± 0.15	8.52 ± 0.23
C	7.28 ± 0.08	7.72 ± 0.18	7.52 ± 0.33	7.50 ± 0.14	7.54 ± 0.29
SE±	0.09	0.09	0.10	0.09	0.11
C.D. (p< 0.05)	0.29	0.26	0.32	0.28	0.35

overall acceptability. Table 3 shows the best treatment having nutritional and sensory properties. The excellent qualities of osmo convectively dried cashew apple powder offer immense opportunities for its processing to various bakery products. Fig 1 shows the (a) nutritional and (b) sensory properties of the



**Fig. 1.** (a) Nutritional; and (b) sensory properties of bread prepared from 90:10% wheat flour and cashew apple powder (best treatment).

bread prepared from osmo convectively dried cashew apple powder of the best treatment B (90:10) (wheat flour: cashew apple powder).

## Conclusions

The bread prepared from osmo convective dried cashew apple powder and its quality evaluation revealed that the treatment B i.e.90:10% wheat flour and cashew apple powder is appropriate to prepared bread having good moisture content, fat, protein and ash content with maximum sensory score of colour and appearance, flavor, texture, taste and overall acceptability.

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