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Development of instant chutney powder with incorporation of cabbage and green leafy vegetable

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Abstract

In view of migration of rural population to urban areas, the demand of processed vegetables is increasing. The product instant chutney powder was developed by using vegetables such as cabbage, basella leaves, spinach different combinations which was feasible to mix as ready to eat instant chutney powder. The green leafy vegetables such as, basella and spinach were blanched for 3 minutes and then dried for about 10-12 hours. Cabbage was not blanched to retain its natural flavor. The dried cabbage, basella and spinach powders were added to standard chutney powder in different ratios and subjected to sensory evaluation. One combination was extremely selected completely based on sensorially accepted and evaluated by 10 semi-trained panel members. The best combination which was selected from commonly used vegetables (CUV) was CVCP₁ (Cabbage, basella, spinach (1:1:1) incorporated instant chutney powder). It was noted that the combination of vegetable with greens was accepted better rather than only standard powder.

Keywords: Cabbage, basella leaves, spinach, blanching, dehydration, standardisation, chutney powder, sensory evaluation.

Introduction

Low cost processing technologies of vegetables with good aesthetic values are very important to cater the demand of urban population. Consumers can be attracted to these low cost processing technologies for serving the needs of off season vegetables. Furthermore, consumers in cities have very little time to cook vegetables daily and cater the nutritional and sensory perception of vegetables. The demand of convenience form of vegetables in form of easy-to-cook, ready-to-eat vegetables is increasing with time.

Settaluri *et al.*, (2015) ^[5] stated that cabbage is an excellent source of vitamin C and vitamin K, containing more than 20% of the daily value for each of these nutrients per serving. Cabbage is also a good source of dietary fiber, vitamin B₆ and folate, with no other nutrients having significant content per 100 gram serving.

Roughani *et al.*, (2019) ^[4] reported that green leafy vegetables such as spinach are rich sources of many nutrients and form a major category of vegetable groups that have been named as 'nature anti-aging wonders' and medicinal value. Spinach is a rich source of fiber, vitamins A, C, E, K, B₆, B₂ and also magnesium, manganese, iron, calcium, potassium, copper, phosphorus, zinc, selenium, folate, betaine, folic acid, protein, niacin, omega-3 fatty acids, carotenoids beta-carotene and lutein, and bioflavonoid quercetin with many other flavonoids. Spinach with poor source of fat is a suitable food for obese and diabetic people. It is also a good source of chlorophyll, which is known to aid in digestion.

Spinach is also called as "Life Protective Food". Spinach protects our life from cradle to grave as development of fetus in womb to degeneration in old age. Spinach vitalises every organ of human body that is brain, eyes, mouth, throat, lungs, heart, stomach, liver, intestine, skin, hairs, bones, teeth *etc.* Spinach can also be called as "queen of greens" which gives us gift of natural health (Tewani *et al.*, 2016) ^[6].

Adhikari *et al.*, (2012) ^[1] stated that *Basella alba* has been used from a long time back for the treatment of many diseases like dysentery, diarrhea, anemia, cancer *etc.* The chemical composition of the leaf extract has been found to be: proteins, fat, vitamin A, vitamin C, vitamin E, vitamin K, vitamin B₉ (folic acid), riboflavin, niacin, thiamine and minerals such as calcium, magnesium and iron. Some unique constituents of the plant are basella saponins, kaempferol and betalain. CNS depressant activity, anti-inflammatory activity has also been observed for this plant.

Jyothirmayi *et al.*, (2006) [2] developed instant raw tamarind chutney powder by mixing the dry raw tamarind powder with a suitable combination of spice powders and salt. The acid content as tartaric acid was 12.6% and 5.8% in the dry raw tamarind powder and instant chutney powder respectively. The polyphenol content increased in both samples during the storage period. Sensory analyses showed that the instant raw tamarind chutney powder scored 7.2 (above good) even after the 6-month storage period.

Literature is available on development and standardization of chutney powders based on the various raw materials. Interestingly, there was no literature available on utilization of green leafy vegetables and cabbage in such food adjuncts. Thus the present study was designed to incorporate green leafy vegetables and cabbage in instant chutney powder to improve the micronutrients without compromising the organoleptic properties.

Materials and methods

Process description of vegetables incorporated instant chutney powder

Pre-processing of selected vegetables: All the samples of leafy vegetables and other vegetable collected were washed thoroughly in running tap water to remove dust and dirt followed by distilled water. The tender part of stems and foreign material were removed and edible portion were separated. The outer layers of cabbage were removed and shredded.

Blanching: All the selected green leafy vegetables (basella, and spinach leaves) were blanched by emersion in hot water for 3 minutes. After blanching green leafy vegetables were

immersed in 0.2 per cent potassium meta bisulphate solution and the extra water was drained. Only cabbage shreds were not blanched to retain its natural flavour.

Drying: The green leafy vegetables were dried using a cabinet dryer at $55 \pm 2^\circ\text{C}$ for 10-12 hours to reach desired moisture level (9-10%) and until samples became crisp and brittle to touch. The cabbage shreds were dried using a cabinet dryer at $60 \pm 2^\circ\text{C}$ for 22-24 hours to reach desired moisture level (9-10%). After drying the samples were powdered (1.0 mm mesh) and stored in an airtight container and kept in a refrigerator for further usage.

Preparation of instant chutney powder from CUV: The unit operations involved in the preparation of vegetables and green leafy vegetable were incorporated into instant chutney powder is presented in Figure 1

Roasting: All the ingredients like black gram dhal, bengal gram dhal, cumin and coriander seeds were dry roasted separately up to development of flavour.

Powdering: All the roasted ingredients were powdered in blender and packed in air tight jars for further use.

Weighing: All the ingredients were weighed individually according to the proportions of each formula

Blending: All the powdered and weighed components were mixed, blended in a food processor and packed in air tight container and at room temperature and used for further analysis.

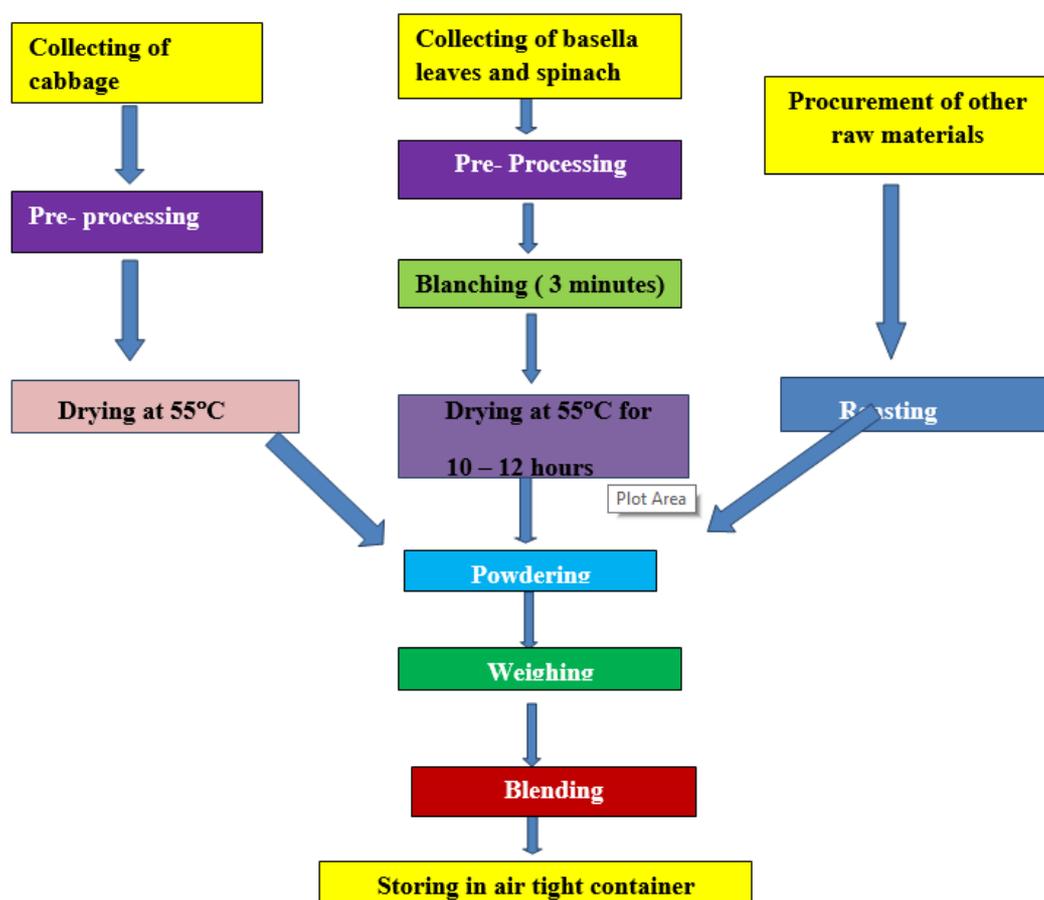


Fig 1: preparation of instant chutney powder

Table 1: Proportions of the ingredients used in standardization of CUV incorporated chutney powder

Ingredients	CNCP	CVCP ₁	CVCP ₂	CVCP ₃	CVCP ₄
Dried cabbage powder	0.0	25.0	25.0	25.0	25.0
Dried basella leaves powder	0.0	25.0	25.0	50.0	25.0
Dried Spinach leaves powder	0.0	25.0	25.0	25.0	50.0
Black gram dhal powder	4.0	4.0	4.0	4.0	4.0
Bengal gram dhal powder	2.5	2.5	2.5	2.5	2.5
Cumin powder	2.5	2.5	2.5	2.5	2.5
Coriander seed powder	5.5	5.5	5.5	5.5	5.5
Tamarind powder	5.5	5.5	5.5	5.5	5.5
Red chilli powder	7.0	7.0	7.0	7.0	7.0
Common salt	10.0	10.0	10.0	10.0	10.0

Note: All formulae were repeated three times. All ingredients were measured in grams

CNCP: Control instant chutney powder

CVCP₁: Cabbage, basella, spinach (1:1:1) incorporated instant chutney powder

CVCP₂: Cabbage, basella, spinach (2:1:1) incorporated instant chutney powder

CVCP₃: Cabbage, basella, spinach (1:2:1) incorporated instant chutney powder

CVCP₄: Cabbage, basella, spinach (1:1:2) incorporated instant chutney powder

Sensory evaluation: Standardization was done by sensory evaluation using 9-point hedonic scale at PGRC, PJTSAU where each product was coded with three-digit number and is tested by 10 semi-trained panellists. They were asked to score the product based on the sensory parameters like appearance, colour, flavour, texture, chewiness, taste and overall acceptability. They were provided water to rinse the mouth for avoiding over lapping of taste of other instant chutney powders and scored from 1 – 9 with 1 being I dislike extremely *i.e.*, very bad and 9 being I like extremely *i.e.*, the product is excellent in that particular attribute (Meilgaard *et al.*, 1999) [3].

Results and discussion

The instant chutney powders were selected based on sensory evaluation by the panel members. There were five products and each sensory parameter was given in (Table 2).



Fig 2: Standard instant chutney powder (CNCP)



Fig 3: CVCP₁-Cabbage, basella, spinach (1:1:1) incorporated instant chutney powder

Thus in the present study instant chutney powders were developed by incorporating blanched and dried basella leaves and spinach and cabbage was not blanched but it was dried. The developed products were subjected to sensory evaluation and the results are statistically analyzed and the selected products were presented in and Figure 2 and 3.

The mean sensory scores for commonly used vegetables incorporated chutney powders were presented in Figure 4. Among the five samples highest score for appearance was given to CNCP, CVCP₂ (8.00±0.00) where as all other products were less. The highest mean sensory score for colour was given to CVCP₁, CVCP₄ (8.10±0.73) followed by CVCP₂ (8.00±0.94), CNCP (8.00±0.00), CVCP₃ (7.70±0.67) respectively in experimental and control sample.

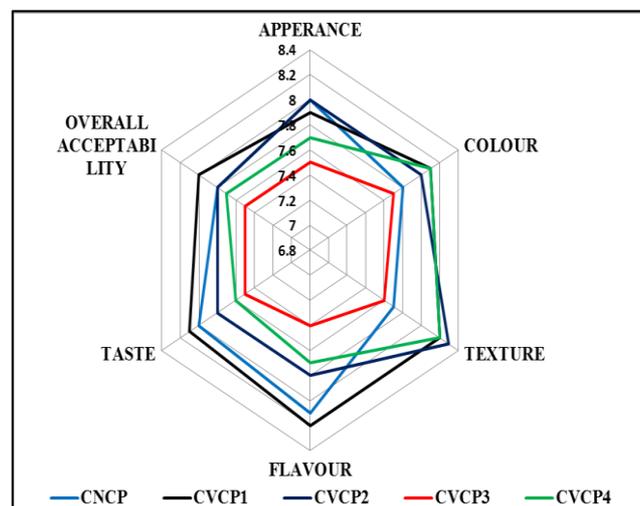


Fig 3: Mean sensory scores of CUV incorporated chutney powders

Note: Values are expressed as mean ± standard deviation of ten determinations

CNCP: Control instant chutney powder

CVCP₁: Cabbage, basella, spinach (1:1:1) incorporated instant chutney powder

CVCP₂: Cabbage, basella, spinach (2:1:1) incorporated instant chutney powder

CVCP₃: Cabbage, basella, spinach (1:2:1) incorporated instant chutney powder

CVCP₄: Cabbage, basella, spinach (1:1:2) incorporated instant chutney powder

The ascending order of mean sensory scores for texture was 7.60 ± 0.51 (CVCP₃) > 7.70 ± 0.67 (CNCP) > 8.20 ± 0.78 (CVCP₁, CVCP₄) > 8.30 ± 0.82 (CVCP₂). The mean highest sensory for flavour was given to CVCP₁ (8.20 ± 0.78) followed by CNCP (8.10 ± 0.73), CVCP₂ (7.80 ± 0.78), CVCP₄ (7.70 ± 0.67) and lowest score was given to CVCP₃ (7.40 ± 0.51). The mean sensory score for taste in ascending order is CVCP₃ > CVCP₄ > CVCP₂ > CNCP > CVCP₁ (7.50 ± 0.52) > 7.60 ± 0.69 > 7.80 ± 0.78 > 8.00 ± 0.00 > 8.10 ± 0.73). The overall acceptability of mean sensory scores was highest for CVCP₁ (8.00 ± 0.00) experimental sample when compared to that of other experimental samples and control.

The Figure 3 clearly shows that among the four combinations CVCP₁ has scored highest for the sensory parameters when compared to the control and also with the other experimental samples. The results showed that there was significant difference at ($p \leq 0.05$).

Conclusion: Presently, due to changing in life style of the people and desire for more leisure time, there is considerable change in food habits with a strong demand for processed food products. This trend has also resulted in huge demand for processed vegetables in markets for use in convenience foods, dry salad mixes, dehydrated soups, pizzas, etc. Thus, it can be concluded that the instant chutney powders with the commonly used vegetables (CUV) were having a greater health benefits and contain many nutrients. A vegetable and green leafy vegetable combination was best selected by panel members than compared to standard chutney powder.

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