**Value-Added Product Development: Soup Powder from Selected Perennial Greens and Its Sensory Profiling**

**ABSTRACT**

An attempt was made to develop a soup powder mix using various perennial green leafy vegetables and evaluate their organoleptic qualities. Fresh leaves of Moringa, Agathi, Chekurmanis, Malabar spinach, Ivy gourd, and Latchakottai were processed and ground into fine powder. Soup powders were prepared by blending the leaf powders with other ingredients, and sensory evaluation was conducted. Among the formulations, Chekurmanis soup powder received the highest scores across all organoleptic parameters, followed by Latchakottai and Moringa. The study suggests that these perennial greens have potential for commercial soup powder production to enhance nutritional intake and combat malnutrition.

**Keywords**: *Perenial greens; Soup powder; Organoleptic; Malnutrition*

**INTRODUCTION**

Perennial greens have been consumed from ages by mankind not only for food security but also for nutritional security. Even though the nutritional properties of popular vegetables are known, still there are ample numbers of vegetables which are obscure to mankind. These perennial greens have handful of vital nutrients, trace minerals, antioxidants and medicinally important bioactive compounds. Lack of knowledge in consumers and farmers tendency to grow these greens renders its importance in human diet.

*Moringa oleifera* is a nutrient-rich tropical tree valued for its protein, vitamins, and minerals, especially beneficial for mothers and children. Traditionally used in Ayurvedic and Unani medicine, it contains a range of bioactive compounds. Its health benefits include anti-diabetic, antioxidant, anti-inflammatory, and cardioprotective properties (Mahaveerchand and Salam, 2024). *Sesbania grandiflora*, commonly known as Agathi, is a fast-growing legume tree native to Southeast Asia, valued for its edible leaves and flowers. Rich in bioactive compounds like alkaloids, flavonoids, and glycosides, it exhibits antibacterial, antioxidant, anti-inflammatory, and hepatoprotective properties (Ansil *et al.,* 2022). Sauropus androgynus, known as Thavasikkeerai in Tamil, is a perennial shrub from the Phyllanthaceae family, often called the “multivitamin green” for its exceptional nutritional value. Its bioactive components offer protective effects against cancer, cardiovascular and renal disorders, neurological issues like Alzheimer’s, and other ailments (Anju *et al.,* 2022). Basella alba, commonly known as Malabar spinach, is a fast-growing, edible perennial vine native to tropical Asia and Africa, rich in protein, vitamins A and C, and essential amino acids. Its mucilaginous leaves have antioxidant, hypoglycemic, and gastro-protective properties (Ahmed, 2022). Coccinia indica, commonly known as Little gourd, is a climbing perennial herb from the Cucurbitaceae family, native to India, Asia, and Africa. It is widely recognized for its antidiabetic and hypoglycemic properties and is used in traditional medicine for various ailments (Selvaraj, 2024). Pisonia alba, commonly known as the lettuce tree, is an evergreen plant from the Nyctaginaceae family with edible leaves. In traditional medicine, its leaves are valued for their analgesic, anti-inflammatory, diuretic, hypoglycemic, and antifungal properties. They are used to treat wounds, ulcers, dysentery, snake bites, rheumatism, and arthritis (Sarvananda and Premarathna., 2021).

 Although perennial greens have been used in the preparation of various medicines, it’s use as a vegetable has not still been explored. Extracts produced from its leaf, stem and roots are widely available as herbal supplements. They can be available in form of capsule, powder or syrup form. Since the raw form of the greens cannot be stored for long time and also not available in all vegetable markets throughout the year it is dehydrated and made into powder and could be made widely available in market for consumers.

**MATERIALS AND METHODS**

***Collection of raw samples***

The tender leaves samples of Moringa, Agathi, Chekurmanis, Malabar spinach, Ivy gourd, and Latchakottai were collected from Orchard, TNAU. The leaves were wiped thoroughly with clean dry tissue paper.

***Preparation of perennial green powder***

The clean dry leaves were subjected to drying at in hot air oven with frequent turning. The dehydrated sample was made into powder using mixer and it was immediately stored in air tight container.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|

|  |  |
| --- | --- |
| **Name of perennial greens** |  |

 | **Temperature****( °C)** | **Duration****(hours)** |
| Moringa  | 55  | 4.00  |
| Agathi  | 55  | 4.50  |
| Chekurmanis  | 55  | 4.30  |
| Malabar spinach  | 55  | 6.30  |
| Ivy gourd  | 55  | 5.00  |
| Latchakottai  | 55  | 7.30  |

***Preparation of perennial greens soup powder***

Tomato and small onion, each weighing 50 grams, were selected and thoroughly washed. The vegetables were then chopped into small pieces and blanched in a vessel for 5 minutes. Following blanching, they were dried in a cabinet dryer at 51°C for 24 hours. Once fully dehydrated, the vegetables were ground into fine powder and stored separately.

For soup powder formulation, the required quantities of ingredients were weighed as follows: 100 grams of dehydrated vegetable powder, 10 grams of cumin, 6 grams of black pepper, 5 grams of salt, and 5 grams each of selected perennial green leaf powders. The cumin and black pepper were coarsely ground prior to mixing. All the ingredients were thoroughly blended and packed into airtight containers for storage.

**RESULT AND DISCUSSION**

The soups from various perennial greens was evaluated organoleptically by a panel of judges of various age groups and scoring was given on the basis of 9 to 1 hedonic scale. The sensory attributes viz., appearance, texture, flavour, taste and overall acceptability of the products were assessed and it was compared with one another. Among the six perennial green leafy vegetable soup, Chekurmanis recorded highest score values for the sensory attributes viz., texture, flavour, taste and overall acceptance which was followed by, Latchakottai, Moringa, Agathi, Malabar spinach and Ivy gourd. Owing to its high score values, mean acceptance was also high for Chekurmanis. Value-added products from chekurmanis have also been reported by Rashmi *et al*. (2022) and Shilpa *et al.* (2023).

**Table 1. Organoleptic score for the Perennial green soups**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameters** | **Appearance** | **Texture** | **Flavour** | **Consistency** | **Taste** | **Overall Acceptability** | **Mean acceptance ± SD** | **Mean****CV** |
| Moringa | 7.75 | 8.95 | 7.50 | 8.15 | 8.40 | 8.25 | 8.17±0.509 | 0.062 |
| Agathi | 7.50 | 7.65 | 7.45 | 8.45 | 7.55 | 7.50 | 7.68±0.382 | 0.050 |
| Chekurmanis | 8.40 | 8.00 | 8.60 | 8.60 | 8.35 | 8.80 | 8.46±0.276 | 0.033 |
| Malabar Spinach | 7.60 | 7.40 | 6.55 | 8.55 | 7.65 | 7.40 | 7.53±0.641 | 0.085 |
| Ivy Gourd | 6.15 | 7.10 | 6.35 | 6.35 | 6.55 | 6.70 | 6.53±0.336 | 0.051 |
| Lachakottai | 6.20 | 8.50 | 8.50 | 7.10 | 8.50 | 8.55 | 1.0 ±0.320 | 0.127 |



 **Figure 1. Organoleptic score for perennial green soup powder**

From the above pie chart it is concluded that Chekurmanis soup powder scored highest in attributes like texture, flavour, taste and overall acceptability than other soup powders which is highly desirable. Hence the product can be produced in large scale commercially and marketed in order to meet up the nutrient requirements of the people.

**CONCLUSION**

The study demonstrated that soup powders formulated using various perennial green leafy vegetables exhibit notable differences in sensory attributes. Among the six greens tested, Chekurmanis-based soup powder achieved the highest scores for texture, flavour, taste, and overall acceptability, followed by Latchakottai and Moringa. These findings highlight the potential of Chekurmanis and other perennial greens as valuable ingredients for developing nutritious, palatable, and commercially viable soup powders. Their rich nutrient profile, ease of dehydration, and year-round availability make them ideal candidates for addressing dietary deficiencies and promoting health through convenient food products.

**Funding acknowledgement**

No external funding was received to carry out this research.

**Ethics Statement**

There was no human participants and/or animal included in this research

**Consent for publication**

All the authors agreed to publish the content.

**Competing interest**

There is no conflict of interest for publishing this content

**Authors contribution**

Experiments - Mythili E, Narenthiran C. K, Naveen Kumar V, Kousalya R and Praneetha S, Writing -Praneetha S and Kousalya R, Reviewing and editing- Praneetha S and Kousalya R

**REFERENCE**

Ahmed, F. 2022. Hypoglycemic potential of Basella alba Linn.-an in vitro study. Arch. Pharm. Pract., 13(1): 18-23. https://doi.org/10.51847/uE5RG9zRch

Anju, T., Rai, N. K. S., and Kumar, A. 2022. *Sauropus androgynus* (L.) Merr.: A multipurpose plant with multiple uses in traditional ethnic culinary and ethnomedicinal preparations. *J. Ethn. Foods****.***,***9*(1)**: 1-29. https://doi.org/10.1186/s42779-022-00125-8

Ansil, P. N., Soumya, S., & Shafna, S. 2022. *Sesbania grandiflora*: A Potential Source of Phytopharmaceuticals. AkiNik Publications 169, C-11, Sector-3, Rohini, Delhi-110085, India.

Camilleri, E., and Blundell, R. 2024. A comprehensive review of the phytochemicals, health benefits, pharmacological safety and medicinal prospects of *Moringa oleifera*. *Heliyon*.**10(6)**; e27807. <https://doi.org/10.1016/j.heliyon.2024.e27807>

Sarvananda, L. and Premarathna, A. D. 2021. Investigation of Total Phenolic, Tannins, Flavonoid Contents, and Antioxidant Activity of *Pisonia Alba*. *Pharmacophore.*, **12(6)**: 43-49. https://doi.org/10.51847/gQlSFWlOGP

Selvaraj, S. 2024. Phytochemical Profiling, GC-MS Analysis, In-vitro, and In-silico Aldose Reductase Activity of Coccinia Indica (L.) Fruit Extract: A Step Towards the Management of Hyperglycemia. *Phys. Chem. Res.,* ***12*(3)**: 647-661. https://doi.org/10.22036/pcr.2023.417279.2424

Shilpa, H. S., Sadananda, G. K., Suresha, G. J., Manchali, S., Kumar, S. M., Darshan, M. B., & Hongal, S. 2023. Development of ready-to-eat extruded snack fortified with dehydrated beetroot powder and Chekurmanis leaf powder. J. Pharm. Innov., **12(2):** 2213-2218.

Rashmi, K. 2022. *Development of Value Added Products from Underutilized Chakramuni Greens (Sauropus androgynus)* (Doctoral dissertation). https://krishikosh.egranth.ac.in/handle/1/5810192148