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Process optimization & standardization of soy milk based herbal beverage incorporating hibiscus, Asian pigeon wings & basil leaves

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Abstract

The aim of this study is to optimize and standardize the production process of a novel soy milk-based herbal beverage enriched with the natural extracts of hibiscus, Asian pigeonwings, and basil leaves. The combination of these herbal ingredients is believed to offer unique health benefits, such as antioxidants, protein, carbohydrate, vitamins, and minerals. Through process optimization and standardization, the goal is to develop a flavorful, nutritious, and commercially viable beverage that caters to health-conscious consumers seeking alternative plant-based options. The present paper focuses on the herbal beverage as it is prepared by mixing hibiscus powder, Asian pigeonwings powder and Basil powder with Soy milk with the objective of assessing the sensory acceptability of the product with physicochemical and microbiological properties. Each treatment was replicated five times. Four drink formulations were prepared by mixing soy milk with other three ingredients in the ratio (100:00, 90:04:05:01, 85:06:07:02, 80:08:09:03) and they were marked as T₀, T₁, T₂, and T₃ respectively. The product's sensory evaluation was conducted using a 9-point Hedonic scale. Analysing variance and critical difference approaches were used to statistically analyse the data collected throughout the investigation. All the experimental treatments were also analysed using a chemically AOAC procedure.

Keywords: Soy milk, hibiscus powder, Asian pigeonwings powder, herbal beverage, health

Introduction

A herbal beverage is a drink made from infusing various herbs, spices, flowers, or other plant-based materials in hot water as well as normal water. These beverages are often enjoyed for their aromatic, flavorful, and potential therapeutic properties. Herbal beverages can encompass a wide range of flavors and health benefits, and they are often consumed for relaxation, hydration, or even for specific health-related purposes.

From the ancient wisdom of traditional herbal remedies to the innovative blends of modern herbalists, these beverages reflect the synergy between nature and human creativity. Some blends focus on promoting tranquility and stress relief, while others invigorate the senses and boost energy levels. Some might even address specific health concerns, drawing on the age-old knowledge of herbal medicine.

In general, herbal beverages are prepared from natural ingredients of different morphological plant parts, namely leaves, stems, roots, fruits, buds and flowers. Herbal teas/beverages are rich sources of natural bioactive compounds such as carotenoids, phenolic acids, flavonoids, coumarins, alkaloids, polyacetylenes, saponins and terpenoids, among others. Scientific evidence shows that these bioactive compounds render a myriad of biological effects, such as antioxidant, antibacterial, antiviral, anti-inflammatory, antiallergic, antithrombotic and vasodilatory action, as well as antimutagenicity, anti-carcinogenicity and antiaging effects, among others.

Since the dawn of civilization, milk has been one of the most frequently consumed foods by humans. However, as attitudes towards animal rights and food preferences change, more people are becoming vegans, which is expanding the global market for plant-based milk. Owing to the variety and nutritional value in satiating appetite. Modern clinical studies have revealed, however, that a number of milk ingredients are connected to adverse health outcomes like cow milk allergy (CMA), lactose intolerance (LI), anaemia, and coronary heart disease, which has alarmed the public's concern for their health and aversion to risk. Plant-based milk can be a respectable substitute for dairy products for those who are looking for alternatives, and more people are choosing vegan diets than typical mammalian milk nowadays.

One of the plant species found all over India is (*Hibiscus rosa sinensis*). Despite its name, India is thought to be the original home of *Hibiscus rosa sinensis*. The variety of blossoms on this plant, each with a unique form, size, and colour, is what makes it so beautiful. According to Oktiani *et al.* (2013) [14], this plant offers a variety of advantages, including the use of its flowers as natural food and beverage colours. It is particularly advantageous to human health due to its mineral, vitamin, and antioxidant content.

China rose, or *Hibiscus rosa-sinensis*, is a member of the Malvaceae family. In some tropical nations, this plant is used for a number of significant medical purposes, including the treatment of gastric ulcers, alopecia, infections caused by bacteria and fungi, diabetes, inflammation, fever, and coughing. The primary bioactive mixtures responsible for its therapeutic benefits, according to phytochemical study, include various flavonoids, tannins, terpenoids, saponins, and alkaloids. Recent research has demonstrated that different types of extracts from the *H. rosa-sinensis* corridor have a wide range of beneficial properties, including cancer prevention, diabetes management, crack repair, and abortifacient activity.

Additionally, the flower's C. ternatin level has the power to stop the body's ability to make new fat cells. For instance, a research of 15 males revealed that drinking a beverage with butterfly pea flower extract increased antioxidant levels and lowered blood sugar and insulin levels despite the beverage's high sugar content. According to one study, the butterfly pea flower's antioxidants may even help to prevent diabetes-related problems including cell damage. Furthermore, a study on animals revealed that administering diabetic rats butterfly pea flower extract considerably lowered their blood sugar levels in contrast to a control group.

Tulsi (*Ocimum sanctum* L.), sometimes known as holy basil in English and Tulasi in Sanskrit, is an extremely popular

culinary and healing plant from the Lamiaceae family that is native to the Indian subcontinent and has been used in Ayurvedic medicine for over three thousand years. Tulsi is widely referred to as a "Solution of Life" in the Ayurvedic tradition for its healing properties and has been used to treat a variety of common health issues. Tulsi leaf separates are shown as treatments for bronchitis, illness, and pyrexia in the Indian Materia Medica. In India, it is considered to be a widespread plant. It is a flowering plant belonging to the Lamiaceae family. The annual herb known as basil (*Ocimum basilicum* L.) is a member of the Lamiaceae, or mint family.

Materials and Method

Procurement of raw ingredients

Soy milk, Hibiscus powder, Asian pigeonwings powder, Basil powder, Ginger powder, Turmeric powder, water, Jaggery and Sodium Benzoate were purchased from the local market of Prayagraj.

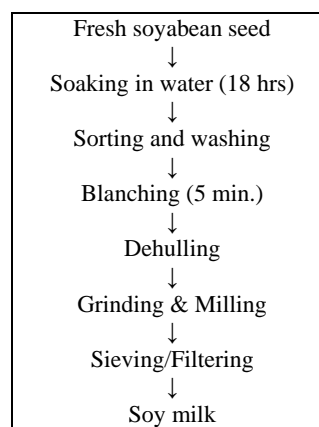


Fig 1: Flow Chart for Extraction of soy milk from soy seeds

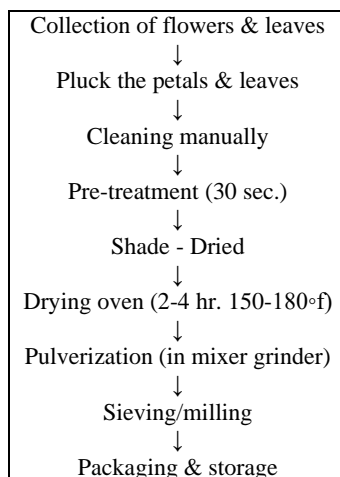


Fig 2: Flow Chart for extraction of powder from Hibiscus flower & Basil leaves

Table 1: Formulations of Different treatments

Treatments	Ingredients			
	Soy milk	Hibiscus powder	Pigeonwings powder	Basil Powder
T ₀	100	0	0	0
T ₁	90	4	5	1
T ₂	85	6	7	2
T ₃	80	8	9	3

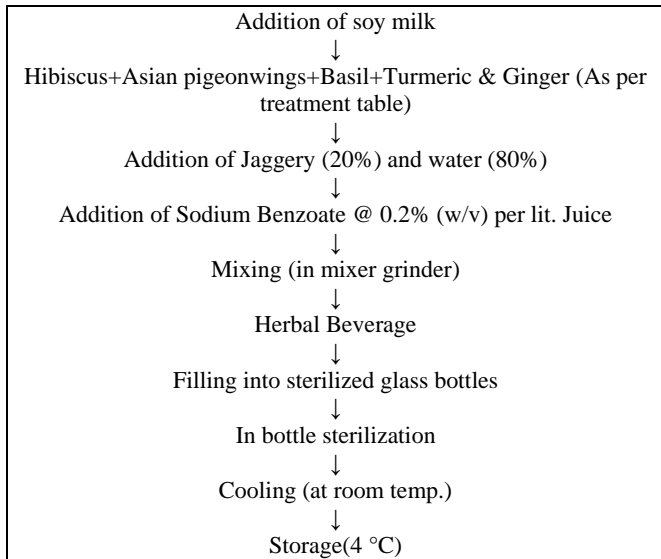


Fig 3: Flow Chart for Preparation of Herbal Beverage

Results and Discussion

Colour and Appearance

From the above data of colour and appearance score in samples of different treatments and control, the highest mean colour and appearance percentage was recorded in the sample of T₂ (7.2) followed by T₀ (6.2), T₃ (6.4) and T₁ (6.2).

Flavour and Taste

From the above data of flavour and taste score in samples of different treatments and control, the highest mean flavour and taste percentage was recorded in the sample of T₂ (7.4) followed by T₀ (6.4), T₁ (6.7) and T₃ (7.2).

Consistency

From the above data of Consistency score in samples of different treatments and control, the highest mean Consistency percentage was recorded in the sample of T₁ (7.6) followed by T₂ (7.4), T₀ (6.4) and T₃ (7).

Overall Acceptability

From the above data of overall acceptability score in samples of different treatments and control, the highest mean overall acceptability percentage was recorded in the sample of T₂ (8.6) followed by T₀ (7.8), T₃ (7.4), and T₁ (7).

TSS

From the above data of total soluble solid in samples of different treatments and control, the highest mean T.S.S was recorded in sample followed by T₃ (11.10), T₂ (10.62), T₁(10.14) & T₀ (2.79).

Moisture

The highest mean moisture was recorded in sample T₀ (91.1) followed by T₁ (80.30), T₂ (78.22) and T₃ (76.80).

Fat

The highest mean fat was recorded in sample T₀ (0.85) followed by T₁ (0.81), T₂ (0.8) and T₃ (0.78).

Protein

From the above data of protein in samples of different treatments and control, the highest mean protein was recorded in sample T₃ (8.02) followed by T₂ (7.7), T₁ (6.82) and T₀ (3.03).

Ash

From the above data of ash in samples of different treatments and control, the highest mean ash was recorded in sample T₃ (0.91) followed by T₂ (0.86), T₁ (0.83) and T₀ (0.61).

Carbohydrate

From the above data of carbohydrate in samples of different treatments and control, the highest mean carbohydrate was recorded in sample T₃ (17.17) followed by T₂ (13.7), T₁ (11.37) and T₀ (4.32).

Titration Acidity

From the above data of titration acidity in samples of different treatments and control, the highest mean titration acidity was recorded in sample T₃ (0.52) followed by T₁ (0.43), T₂ (0.47) and T₀ (0.19).

Antioxidants

From the above data of antioxidant in samples of different treatments and control, the highest mean antioxidant was recorded in sample T₃ (78.47) followed by T₂ (76.32), T₁ (72.23) and T₀ (41.47).

TPC

From the above data of standard plate count in samples of different treatments and control, the highest mean standard plate count was recorded in sample T₂ (3.96) followed by T₁ (3.92), T₃ (3.94) and T₀ (2.88).

Yeast and Mould

The Value obtained in the performed test was found to be negative indicating that the product was prepared in hygienic conditions.

Average Table

Parameter	Treatments			
	T ₀	T ₁	T ₂	T ₃
Physico-Chemical Analysis				
TSS (° brix)	2.79	10.14	10.62	11.10
Moisture	91.1	80.05	76.82	73.01
Fat	0.85	0.81	0.8	0.78
Protein (%)	3.03	6.82	7.7	8.02
Ash (%)	0.61	0.83	0.86	0.91
Carbohydrate (%)	4.32	11.37	13.7	17.17
Titration Acidity (%)	0.19	0.43	0.47	0.52
Antioxidant (%)	41.47	72.23	76.32	78.47
Microbial Analysis				
SPC (x10 ⁻³ cfu/ml)	2.88	3.92	3.96	3.94
Yeast and mould (x10 ⁻³ cfu/ml)	Nil	Nil	Nil	Nil
Sensory Evaluation				
Colour and Appearance	6.2	6.4	6.4	7.8
Flavour and Taste	6.6	6.7	7.6	7
Consistency	7.2	7.4	7.4	8.6
Overall Acceptability	6.4	7.2	7	7.4
Cost per litre (Rs.)	20.95	20.53	22.80	24.96

Conclusion

The process optimization and standardization of the soy milk-based herbal beverage incorporating Hibiscus, Asian Pigeonwings, and Basil leaves have been successfully achieved. Through careful experimentation and adjustments to the formulation and processing steps, the final product exhibits improved taste, aroma, and nutritional value. The incorporation of the herbal ingredients has not only enhanced the sensory attributes of the beverage but also provided

additional health benefits owing to the bioactive compounds present in the herbs. Herbal beverage production sounds common but the novelty of this work is the use of Hibiscus powder, Asian pigeonwings powder and Basil powder at different levels. From the results of present investigation, it was concluded that the Hibiscus powder, Asian pigeonwings powder & Basil powder can be successfully incorporated into soy milk with no adverse effect on the acceptable quality. It may also be concluded that the physico-chemical characterizes of in all beverages Treatment T₂ was highly significant. Antioxidant activity and TSS content of the beverage is increasing from T₀ to T₃ as the incorporation level was increased. It can be concluded from this study that herbs can be effectively used as an alternative source of drinks.

References

- Preciado-Saldaña AF, González-Aguilar GA. Formulation and characterization of an optimized functional beverage from hibiscus (*Hibiscus sabdariffa* L.) and green tea (*Camellia sinensis* L.). *Food Science and Technology International*. 2019;25(7):547-561.
- Afrianto WF, Tamnge F, Hasanah LN. A relation between ethnobotany and bioprospecting of edible flower Butterfly Pea (*Clitoria ternatea*) in Indonesia. *Asian Journal of ethnobiology*. 2020;3(2):51-61
- Aris HM, Kasim ZM, Zubairi SI, Babji AS. Antioxidant capacity and sensory quality of soy-based powder drink mix enriched with functional hydrolysates of swiftlet (*Aerodramus fuciphagus*). *Arabian Journal of Chemistry*. 2023;16(3):104553.
- Chandrasekara A, Shahidi F. Herbal beverages: Bioactive compounds and their role in disease risk reduction-A review. *Journal of traditional and complementary medicine*. 2018;8(4):451-458.
- Durazzo A, Gabrielli P, Manzi P. Qualitative study of functional groups and antioxidant properties of soy-based beverages compared to cow milk. *Antioxidants*. 2015;4(3):523-532.
- Eksi G, Kurbanoglu S, Ozkan SA. Fortification of functional and medicinal beverages with botanical products and their analysis. In *Engineering Tools in the Beverage Industry*. Wood head Publishing; c2019. p. 351-404.
- Hajmohammadi A, Pirouzifard M, Shahedi M, Alizadeh M. Enrichment of afruit-based beverage in dietary fiber using basil seed: Effect of Carboxymethyl cellulose and Gum Tragacanth on stability. *LWT*. 2016;74:84-91.
- Kumar HV, Kaur J, Gat Y, Chandel A, Suri S, Panghal A. Optimization of the different variables for the development of a cucumber-based blended herbal beverage. *Beverages*. 2017;3(4):50.
- Makinen SM, Paakkonen KK. Processing and use of basil in foodstuffs, beverages and in food preparation. *Basil: the genus Ocimum*. Harwood Academic Publishers, Amsterdam, Netherlands; c1999. p. 137-152.
- Onaolapo AY, Onaolapo OJ. Herbal beverages and brain function in health and disease. In *Functional and Medicinal Beverages*. Academic Press; c2019. p. 313-349.
- Pyrzynska K, Sentkowska A. Herbal beverages as a source of antioxidantphenolics. In *Natural beverages*. Academic Press; c2019. p. 125-142.
- Ramírez-Rodrigues MM, Plaza ML, Azeredo A, Balaban MO, Marshall MR. Phytochemical, sensory attributes and aroma stability of dense phase carbon dioxide processed Hibiscus sabdariffa beverage during storage. *Food Chemistry*. 2012;134(3):1425-1431.
- Santos RO, Keller LM, Oliveira VSD, Bucher CA, Barbosa Junior JL, Vicente J, *et al*. Degradation kinetics and *in vitro* digestive stability of selected bioactive compounds from a beverage formulated with butterfly pea flowers. *Ciência Rural*; c2021. p. 52.
- Sari B, Oktiarni D, Ratnawati D. Pemanfaatan Ekstrak Bunga Kembang Sepatu (*Hibiscus rosa sinensis* Linn.) sebagai Pewarna Alami dan Pengawet Alami pada Mie Basah, *Prosiding Semirata*. 2013;1(1):103-109