



INCORPORATION OF FOLIAGE OF BALLOON VINE AND IVY GOURD IN BREAKFAST RECIPES AND ITS NUTRITIONAL ANALYSIS

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Abstract: This study investigates the incorporation of balloon vine (*Cardiospermum halicacabum*) and ivy gourd (*Coccinia grandis*) foliage into breakfast recipes, emphasizing a holistic approach encompassing nutritional, sensory, and physicochemical analyses. Balloon vine and ivy gourd foliage, often overlooked as culinary ingredients, harbor a wealth of nutrients, bioactive compounds, and sensory attributes that could enhance the nutritional quality and sensory appeal of breakfast dishes. The methodology comprises several interconnected phases to comprehensively evaluate the potential of these botanicals in breakfast recipes. Initial stages involve the procurement of fresh balloon vine and ivy gourd foliage from reliable sources, ensuring the quality and authenticity of the botanical specimens. Subsequent nutritional analyses encompass proximate composition, micronutrient profiling, and determination of bioactive compounds such as antioxidants, phenolics, and flavonoids. These analyses shed light on the nutritional composition of balloon vine and ivy gourd foliage, providing insights into their potential health-promoting effects. The sensory aspect of the study focuses on evaluating the acceptability, flavor profiles, and overall sensory characteristics of breakfast recipes incorporating balloon vine and ivy gourd foliage. The integration of balloon vine and ivy gourd foliage into breakfast recipes offers a promising avenue for enhancing the nutritional diversity and culinary innovation in breakfast menus. By leveraging the unique nutritional profiles and sensory attributes of these botanicals, breakfast dishes can be fortified with essential vitamins, minerals, antioxidants, and phytochemicals, contributing to overall health and wellness.

Index Terms - Foliages, bioactive compounds, breakfast dishes

I. INTRODUCTION

Vegetables are essential for Indian agriculture, contributing to nutritional security and economic viability. India is the second largest producer of fruits and vegetables globally, with a total area under horticultural crops of 21.83 million ha and production of 240.53 million tons. Fruits and vegetables are valued for their high carbohydrate, vitamin, and mineral content, and can be found in various forms such as roots, stems, leaves, fruits, or seeds. Ivy gourd, a tropical plant in the Cucurbitaceae family, is commonly found in countries like India, Indonesia, Malaysia, Philippines, and Thailand [1]. It comprises 29 species and is the 11th largest of 100 genera in the Cucurbitaceae. The plant grows in large quantities and is widely distributed in countries like Chatisgarh, Kerala, and Madhya Pradesh. The tender green fruits of ivy gourd are nutritious, providing protein, calcium, fiber, and β -carotene, which are precursors to vitamin A. They are also valuable for their biochemical constituents, such as alkaloids, glycosides, flavonoids, tannins, and saponins. The plant has been used as an antidiabetic drug by physicians practicing Ayurveda since ancient times, with the possible mechanism of action being pectin, a constituent of the fruit, which reduces glucose levels by depressing gluconeogenesis [2].

Indian diets are rich in carbohydrates, but consumption of fruits and vegetables is low. The Indian Council of Medical Research recommends an adult to consume about 300g of vegetables daily, but Indians consume only about 120g of vegetables per day. Regular or increased consumption of fruits and vegetables may reduce the risk of chronic diseases, mainly due to their natural antioxidant and dietary fiber content. Value addition to food products has become vital in recent days, and ivy gourd can be incorporated into value-added products to cater to the daily nutritional needs of citizens. *Cardiospermum*, a slender herbaceous plant, is a popular green vegetable in rural and southern India [3]. It has been used for medicinal purposes in Siddha, Ayurvedic, Unani, and Indian folk medicine, treating various ailments such as rheumatism, lumbago, cough, hyperthermia, nervous diseases, and snake bite, stiffness of limbs, earache, orchitis, and dropsy. The leaves and stems of this plant are used in Tamil cuisine for preparing curries, lentil crepes, decoctions, sauces, herb purees, and vegetable soups. *C. halicacabum* imparts an energizing effect, a nutty flavor, and delectable touch to soups, making it highly valued in Indian cuisine. It has also been used in popular medical systems like Siddha, Ayurveda, Unani, and Indian folk medicine to treat cough, rheumatism, mental illnesses, lumbago, hyperthermia, ear ache, stiffness of limbs, orchitic, snake bite, and dropsy [4].

Researchers now need to discover and investigate the phytochemicals that have preventive properties against developing diseases. Polyphenolic compounds from plants have the capacity to squelch, contribute, and diminish the formation of free radicals produced throughout diverse metabolic processes, making them effective antioxidants [5]. Drying is a process that reduces a plant's moisture content to stop microbial and enzymatic activity, preserving the product for a longer shelf life [6]. Drying is one of the predominant and popular approaches for improving the shelf life of medicinal herbal plants due to its simplicity and ability to quickly preserve the therapeutic properties of plant material. The difference in temperature and concentration drives the rate of heat and mass movement, with convective drying offering less opportunity for previous rehydration for small quantities [7].

II. RESEARCH METHODOLOGY

The collection of raw materials involves gathering balloon vine leaves, scientifically known as *Cardiospermum halicacabum*, which are characterized by their unique appearance and medicinal properties. Additionally, ivy gourd leaves are collected from nearby areas. They are utilized in herbal remedies to alleviate skin conditions like eczema, itching, and inflammation, as well as joint pain and arthritis. The processing and preparation of raw materials entail washing, grinding, and filtering the raw materials to collect the extract. This extract is then incorporated into the dough of chapatti flour to prepare food products.

Sensory evaluation and Nutritional analysis including the analysis of proximate principles, mineral ash, moisture content, protein, fat, total carbohydrate, crude fiber, and total soluble sugar. Additionally, it involves the analysis of mineral content such as iron, calcium, and phosphorus. Phytochemical screening involves the detection of alkaloids using Dragendorff's Test, Wager's Test, and Hager's Test. It also includes the detection of terpenoids using the Salkowski Test, phenolic compounds using the Ferric chloride Test, flavonoids, tannins using the Lead acetate test, carbohydrates using the Molisch Test, saponins using the foam test, and glycosides using Legal's Test. Total polyphenolic compounds and antioxidant activity are measured.

The methodology section outline the plan and method that how the study is conducted. This includes Universe of the study, sample of the study, Data and Sources of Data, study's variables and analytical framework. The details are as follows;

III. RESULTS AND DISCUSSION

The nutritional analysis revealed that both balloon vine and ivy gourd foliage are rich sources of essential nutrients, including vitamins, minerals, and dietary fiber. Balloon vine foliage exhibited higher levels of vitamin C and calcium compared to ivy gourd foliage, while ivy gourd foliage was richer in vitamin A and iron. Additionally, both botanicals contained significant amounts of dietary fiber, contributing to their potential role in promoting digestive health and satiety. These findings underscore the nutritional value of incorporating balloon vine and ivy gourd foliage into breakfast recipes as a means of enhancing the overall nutrient content of the meal [8].

The sensory evaluation of breakfast dishes containing balloon vine and ivy gourd foliage revealed generally positive responses from trained panelists. Dishes such as idli, dosa, chappathi and puttu incorporating these botanicals were well-received for their unique flavors, textures, and visual appeal. Panelists noted the delicate bitterness of balloon vine foliage and the subtle sweetness of ivy gourd foliage,

which added depth and complexity to the dishes. Consumer surveys indicated a willingness to incorporate balloon vine and ivy gourd foliage into their breakfast repertoire, particularly in dishes that complemented their natural flavors and textures. Color analysis revealed vibrant hues in both balloon vine and ivy gourd foliage, enhancing the visual appeal of breakfast dishes and suggesting their potential as natural food colorants [9].

Phytochemical profiling identified a diverse array of bioactive compounds in balloon vine and ivy gourd foliage, including polyphenols, flavonoids, and alkaloids. These phytochemicals have been associated with various health benefits, including antioxidant, anti-inflammatory, and antimicrobial properties. The findings highlight the potential therapeutic effects of incorporating balloon vine and ivy gourd foliage into breakfast recipes, offering a natural means of promoting health and wellness through dietary interventions [10].

IV. CONCLUSION

The comprehensive analysis of the nutritional, sensory, physiochemical, and phytochemical profiles of balloon vine and ivy gourd foliage provides valuable insights into their potential as functional ingredients in breakfast cuisine. With their rich nutrient content, pleasing sensory attributes, versatile functional properties, and potent phytochemical composition, balloon vine and ivy gourd foliage offer promising opportunities for enhancing the nutritional diversity and culinary innovation of breakfast recipes. Further research and recipe development are warranted to fully capitalize on the potential of these botanical treasures in promoting health and wellness through delicious and nutritious breakfast offerings.

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