Development and standardization of lemongrass into coffee powder for preparing Cappuccino

Abstract

Herbal incorporated beverages are very much popular now days and its popularity has been increasing day by day . Due to this growing popularity there are significant development happening in herbally incorporated beverages. Also people are also more focused on a healthy lifestyle. People prefer this type of beverages for their health benefits and unique organoleptic properties. In response to growing popularity for herbal beverages , a development of lemongrass incorporated coffee powder makes a lot of sense and ambition to improve the health benefits of a very popular beverage that has been consumed all around the world. Using this incorporated sample we are making a cappuccino as well, which will this popular beverage a completely different twist to it. The research involves incorporation of lemongrass powder into coffee powder in different ratio's and developing cappuccino with it . Then organoleptic evaluation has been done to understand which one is the best sensory properties or more balanced. Incorporation of herbal constituents into coffee is still an unexplored territory when compared to tea and other beverages . Lemongrass has a lot health benefits because of its anti-oxidant , anti-inflammatory and digestive properties etc… Lemongrass will also give its distinct flavour and aroma to the cappuccino when developed.When sensory evaluation was conducted the T3 sample which is of 15% lemongrass got the highest sensory scores compared to that of T1 and T2. More panel members preferred the flavour and aroma of the T3 sample with 15% lemongrass .

Keywords: Coffee, lemongrass, cappuccino, health benefits, value added product, sensory evaluation.

Introduction

For several reasons, including a growing interest in health, well being, and creative flavor combinations, the use of herbs in tea and coffee has grown in popularity. Here's a summary of this trend and the reasons why so many people find it appealing: Customers are looking for natural solutions to enhance their well-being since they are increasingly aware of their health. Herbal teas are frequently advertised as having potential health advantages, including lowering stress, promoting immunity, improving digestion, and offering antioxidants. Most of the herbs that are incorporated into tea and coffee are rich in anti-oxidants, so when it is incorporated with tea or coffee it will improve the anti oxidant profile. Incorporation of

herbs also improves the flavour and aroma of the beverage as well. Many of the herbs have anti-inflammatory properties that will also be incorporated into the tea or coffee. The consumption of herbal incorporated beverages will also improve the immunity and metabolism (1).

The name lemongrass is derived from the typical lemony odour of the essential oil present in the shoot.The herb originated in Asia and Australia. Lemongrass was one of the herbs to travel along the spice route from Asia to Europe.Lemongrass belongs to the family Graminae (Poaceae) and the genus Cymbopogon.The Cymbopogon genus widely grows in tropical and subtropical lands of the Indian subcontinent, South America, North America, Africa,Australia and Europe (2). This grass is so named for its distinctive citrus aroma of the green leaves when they are crushed (3).

Uses:

Asian cuisine frequently uses lemongrass in its recipes. Lemongrass gained widespread recognition when Thai cuisine gained popularity in the United States. It only takes a little experimenting with this pleasantly scented herb to discover that its uses are not limited to Asian cuisine. Fruit salads can benefit from a simple syrup created by steeping lemongrass in a solution of equal parts hot water and sugar. It can also be used to make homemade soda by combining it with seltzer. During the winter, an oil, garlic, ginger, and lemongrass mixture will keep well in the freezer.This paste makes a great sauce for noodle, vegetable, or seafood meals when it is sautéed until fragrant and then boiled down with a can of coconut milk (strain to remove rough lemongrass fibers).Oil of lemongrass is used to flavor food. The majority of the main food categories—meat and meat products, frozen dairy desserts, sweets, baked goods, gelatines and puddings, and fats and oils—all include it, including alcoholic and nonalcoholic beverages. It can be used to flavor wines, sauces, and other foods in addition to enhancing the flavor of particular fish. The primary uses of lemongrass oleoresin are in bakery preparations, beverages, and food flavorings (4).

This grass's lovely lemon scent has long been utilized in the food and fragrance industries, as well as in associated cosmetics.In the beginning, lemongrass was used in Thai and Vietnamese cooking to flavor meals. It is helpful when used to flavor tea in South America and Africa. It is well-liked in both alcoholic and non-alcoholic beverages. It is also traditionally used in Ayurveda medicine as a diuretic, tranquilizer, antipyretic, and anti-inflammatory. There are several instances of people from many ethnic backgrounds using lemongrass as a medicinal herb. For example, in Brazil, the main uses of tea derived from lemon grass leaves are as an antispasmodic, analgesic, antipyretic, sedative, diuretic, and anti-inflammatory .In Argentina, it is used to treat dyspepsia and sore throats; in Cuba, it is used to treat rheumatism, catarrh, and low blood pressure. Furthermore, lemongrass has been linked to other biological features over the

years, such as antibacterial, antifungal, antiprotozoal, anti-inflammatory, antioxidant, antitussive, anti-septic, anti-carcinogenic, cardioprotective, and anti-rheumatic effects (5).

Although coffee has a lengthy history, it was first grown commercially in the fifteenth century. Presently, it stands as the second most traded commodity globally, right behind petroleum, with an annual value of $10 billion. Although this plant is grown in more than 70 nations, the top producers are Brazil, Colombia, Ethiopia, and India. The two biggest countries, holding 39% of the global market share, are Brazil and Colombia (ICO, 2004) (6).

The question of whether coffee is good or bad for human health is still up for debate. Consuming it has been linked to a significant decline in chronic conditions such diabetes mellitus, Parkinson's disease, and multiple cancer types (7). Conversely, several research studies have provided evidence regarding its involvement in cardiovascular problems and certain types of cancer (8). Additionally, several cardioprotective medications, such as atrovastatin, seem to be less effective when used with coffee (9,10,11).Undoubtedly, there are enough health benefits linked to coffee drinking to suggest it as a table beverage; yet, there are still some discrepancies that call for more study on the topic. Worldwide coffee consumption is rising, and sales of the beverage are increasing in developing nations, particularly in Pakistan and India. Given how much coffee is used, especially in the West, North America, and some Asian nations, this review article can serve as an extensive guide on the advantages and disadvantages of the beverage (6).

To produce the finished coffee, the coffee bean must be picked, dried, roasted, ground, and brewed. Sometimes components like caffeine and fat fraction are removed through decaffeination and filtration. The coffee beans go through numerous physical and chemical changes during this process, including alterations to their flavor and antioxidant qualities (12)

Coffee and disease correlations

Numerous chronic diseases, including various forms of cancer, type 2 diabetes, heart disease, kidney disease, neurological problems, liver disease, and endocrine disorders, have been linked to coffee consumption (13).The effects of oral coffee administration on allergy and immunological response are poorly studied (14). Rich in polyphenols, coffee has been shown to have potential effects on immunological response and chronic inflammation (15). About half of the dry weight of a coffee bean is made up of the polysaccharide components arabinogalactan proteins (AGP), cellulose, and galactomannan. According to (16), AGPs exhibit the following qualities: prebiotic, cholesterol-lowering, emulsifier, and immunomodulatory.

According to the International Agency for Research on Cancer (IARC), coffee does not cause cancer in people. There has been much research done on its usage and the different cancer risks.

Numerous investigations on coffee's anticancer properties have revealed that one of the primary substances involved in cancer chemoprevention is kahweol, which is contained in coffee. Because kahweol is an antioxidant, it shields DNA from oxidative stress caused by hydrogen peroxide by eliminating reactive oxygen species (ROS) and activating hem oxygenase-1 to regulate intracellular ROS levels.Apart from kahweol, coffee contains polyphenols such chlorogenic acid that have anti-inflammatory and antioxidant properties. Moreover, caffeine has been linked to the inactivation of multiple processes involved in the tumorigenic process, including apoptosis, stress and inflammatory response, and cell cycle regulation. It also demonstrates the capacity to decrease DNA methylation in cancer cells (16).

One of the most prevalent neurodegenerative diseases in the world is Parkinson's disease. Caffeine, one of coffee's main bio active components, has a preventive effect on Parkinson's disease. Although the precise mechanism by which coffee affects Parkinson's disease is unclear, it is believed to be mediated by the impact of caffeine on the adenosine A2 receptor. By blocking adenosine A2 receptors, caffeine stimulates the central nervous system and functions as an adenosine receptor antagonist. Because it can block adenosine A2 receptors located in dopamine-rich brain regions, caffeine has a neuroprotective impact on the brain. Additionally, caffeine reduces MTP-induced neurotoxicity in animal models of Parkinson's disease, which has neuroprotective properties.According to a review study, drinking two to three cups of coffee a day may help prevent Parkinson's and Alzheimer's disease (16).

A cappuccino is a blended coffee beverage that consists of steamed milk and espresso. A classic Italian cappuccino typically consists of one espresso shot (or sometimes two) topped with equal amounts of frothed and steamed milk (1:1:1). In order to have a fuller and softer espresso flavor, many Americans have modified this recipe by adding additional steamed and frothed milk.Excellent cappuccinos have the most delicious flavor and texture. It tastes strongly of coffee with a hint of sweetness from the lactose sugar that is naturally present in milk. In addition, flavorings such as sugar, flavored simple syrups, and other additions can be added.

The objective of this study was to develop a coffee powder incorporated with a beneficial herb most specifically lemongrass and develop a cappuccino with it and test its acceptance among the consuming population.The reason for choosing lemongrass as the herb incorporated was because of its distinct flavour ,aroma and also the health benefits it adds to the coffee . The development such an incorporated coffee powder will give a lot health benefits and gives a different sensory profile to the cappuccino. To analyse its acceptance sensory evaluation has been conducted.

Materials and Methods

The present research was conducted in the Babasaheb Bhimrao Ambedkar University , Lucknow 226025, Uttar Pradesh at the Department of Food and Nutrition's School of Home Science. The study was focused on ‘Efficacy of lemongrass into coffee powder for the development of cappuccino’. For this

study the raw materials coffee powder has been bought from the local mart and lemongrass has been collected from the hostel garden of Babasaheb Bhimrao Ambedkar University , Lucknow .

Collection of lemongrass leaves and coffee powder

Lemongrass leaves are collected from the hostel garden of Babasaheb Bhimrao Ambedkar University, Lucknow and the Nescafe classic coffee powder has been bought from local mart near the university.

Dehydration of lemongrass leaves to make powder

Lemongrass leaves collected from the Hostel , BBAU , Lucknow ,was placed in the dehydrator to dry the leaves . These leaves were dried to make the lemongrass powder that will be blended with coffee powder in different ratios. Dehydration of lemongrass leaves was done in Dehydrator at a temperature of 38-43°C for 4-6 hours.These dehydrated lemongrass was then manually grinded using a mortar to get the lemongrass powder .Sieving is done using a sieve to get more refined powder.

Blending of lemongrass powder and coffee powder in different ratios.

Dried lemongrass leaves powder was added at the levels of 0%, 5.0%, 10% and 15% of coffee powder weight, respectively.The lemongrass powder and coffee powder was blended manually.

Development of cappuccino using these blends of different ratios.

Cappuccino has been made with all the samples of blends developed that is 0%, 5%, 10% and 15%.The 0% or the one with only coffee powder was taken as reference sample .

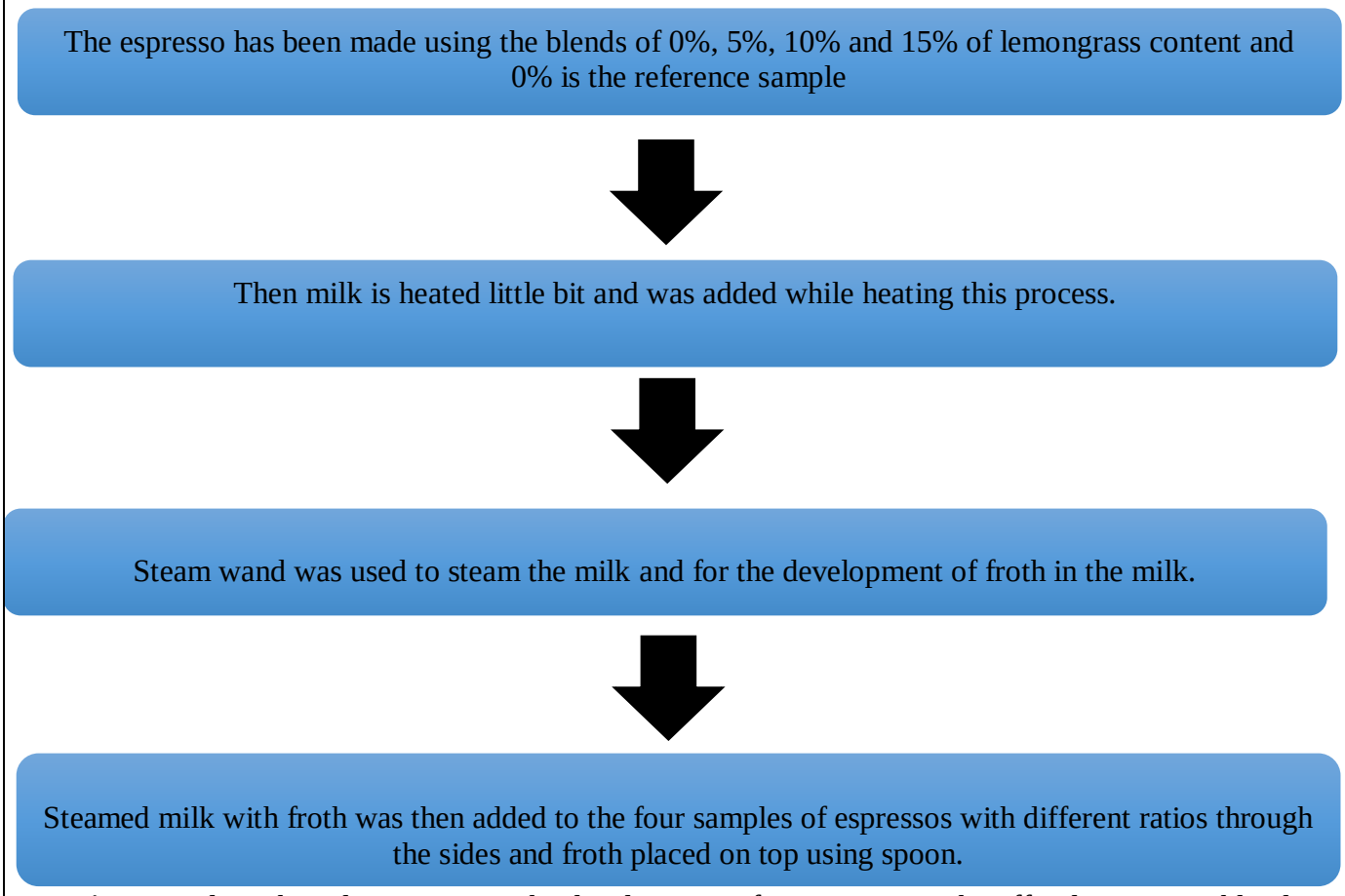

Figure 1 Flow chart demonstrating the development of cappuccino with coffee-lemongrass blends

Figure 2 Cappuccino made with different coffee-lemongrass blends

Sensory Evaluation

The semi-trained panel, consisting of 40 members who were friends, staff, and students of Babasaheb Bhimrao Ambedkar University, evaluated the cappuccino made with coffee-lemongrass blends of different ratios. The evaluation was done based on the organoleptic properties of the developed cappuccino: appearance, taste, flavour, aroma, texture, and acceptability. The evaluation was carried out using a composite scale. Since there are T1,T2,T3 and R ,sensory evaluation has been done for each of them and mean score has been found and compared.

Composite Scoring Test

Name : ..... Date: .....

Product: .....

		Sample scores		
Quality	Possible scores	Reference sample	Test sample 1	Test sample 2
Colour	20	____	____	____
Consistency	20	____	____	____
Flavour	40	____	____	____
Absence of defects	20	____	____	____
Total score	100			

Comments:

Signature

Figure 3 Composite card for sensory evaluation

Results and discussions

Based on the panelists assessment the data gathered from the sensory evaluation of cappuccino made with coffee-lemongrass blend is thoroughly evaluated. In addition to tasting the developed cappuccino they analyzed the flavour, aroma, colour, consistency and acceptability of the product. The evaluation was very much effective and gave positive results.

SI.No	Sample	Coffee powder (g)	Lemongrass (g)
1	R	3.5	0
2	T1	3.5	0.175
3	T2	3.5	0.350
4	T3	3.5	0.525

Table 1 Ratio's of coffee and lemongrass in different samples

The sensory evaluation suggests the development of cappuccino from a coffee-lemongrass blend is very much possible and will very much acceptability within the consumers. Through sensory it was found that the T3 sample with 15% lemongrass got the highest score in sensory evaluation. 15% of lemongrass to the coffee weight was found optimal as it has got best reviews among the panel members. The cappuccino with 15% lemongrass has been chosen because of the improvement in the nutritional qualities without compromising the sensory attributes. Lemongrass have a lot nutritional qualities , so when it is integrated into the coffee powder it will improve the nutritional profile as a whole. Mainly the antioxidant and phytochemical profile of the coffee powder.

Quality	Possible score	R	T1	T2	T3
Colour	20	17.7	17.0	15.6	17.4
Consistency	20	17.3	16.7	16.7	17.1
Flavour	40	36	35.8	35.2	35.9
Absence of defects	20	17.5	16.7	16.9	17.4

Table 2 score of sensory evaluation

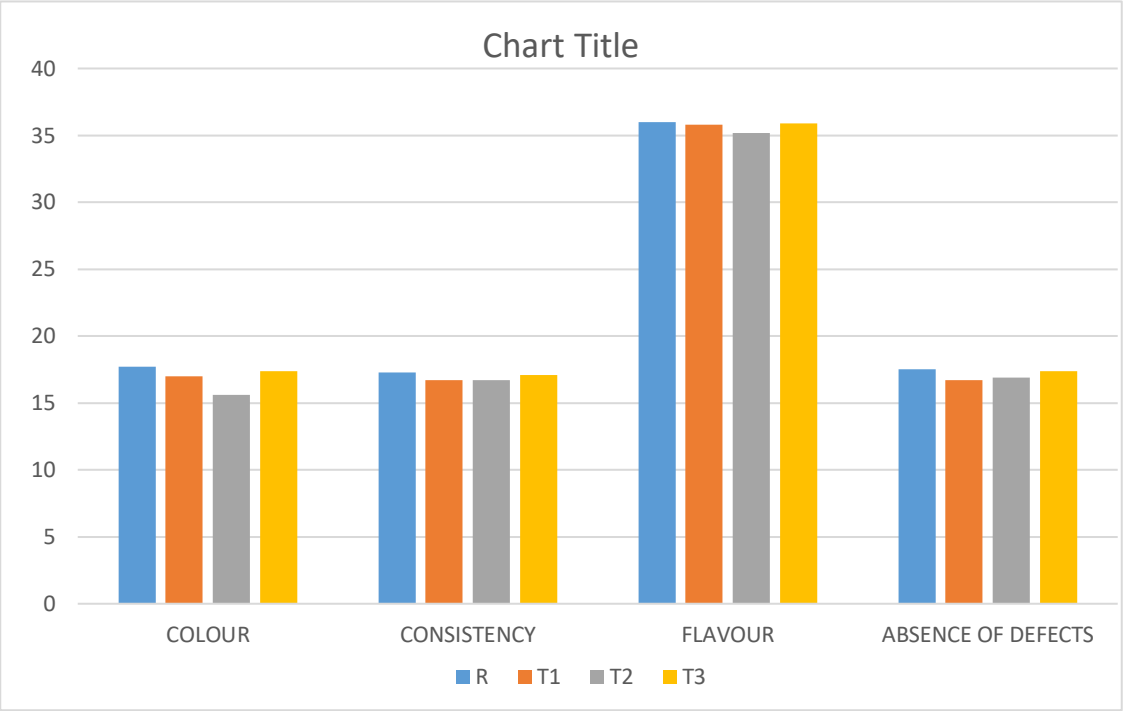

Figure 4 Graphical representation of sensory evaluation

Conclusion

After all the research and evaluation was done the best combination was found which is T3 .T3 is the sample with 15% of the lemongrass to that of total weight. This sample has been selected through sensory evaluation as well.So by doing all the doing all the analysis it was found that incorporation of lemongrass Into coffee powder will boost a lot of nutritional properties of the coffee powder. The sensory evaluation conducted using the composite scale has yielded a favourable result. The addition of lemongrass into the coffee powder not only improved its nutritional profile it also improved the sensory attributes as well. The addition has imparted a unique flavour, aroma and texture to the final product.

In conclusion, the development of cappuccino with coffee-lemongrass blend presents an innovative approach in an already growing field of herbal infusion into our day to day beverages. The development of such a product will give the consumer an option to improve health condition without compromising the flavour.

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