

DEVELOPMENT OF FLAVORED HEALTHY HERBAL MULBERRY (*MORUS SP.*)TEA WITH LEMON GRASS

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ABSTRACT

*The cultivation of mulberry (*Morus sp.*) is an age-old agricultural practice for production of silk cocoons through rearing of silkworms. The nutritional parameters of mulberry leaves and silk production are directly related to each other. The nutritional composition of mulberry leaves vary depending on the soil and other environmental factors of the locality. The biological functions of the tea have been analyzed and found to contain a wide range of biogenic amines. The mulberry is a good source of GABA (Gama aminobutyric acid) and DNJ (1-Deoxynojirimycin) which are very useful for human health. In the present study, the herbal material of mulberry leaves is successfully prepared by collecting, washing, cutting, dry sorting, packaging and storing the leaves. Drying is done by infrared dryer or microwave drying. The dried mulberry leaves are treated as chopped, coarse powder and fine powder to make flavored herbal with addition of lemon grass. The flavored herbal tea of mulberry plus lemon grass leaves found very much similar to the green tea in appearance flavor and taste. Overall acceptability of the tea found fair and the flavored formulations of mulberry tea with lemon grass was rated better. In the present study many avenues are worked out to explore abundant opportunities for manufacture of flavored mulberry herbal tea with herbal flavor of lemon grass and its entrepreneurship.*

Key words: Silk, Agriculture, Herbal tea, Mulberry leaves, Health benefits lemon grass

1. INTRODUCTION

Mulberry leaf contains crude protein about 45%, carbohydrate 25%, crude fat 5%, rich in Calcium, Potassium, Vitamin C, Vitamin B1, Vitamin B2, Vitamin A, etc. Cu, Zinc, Boron, Magnesium, etc. Mulberry leaves contains beta-ecdysone, lupeol, rutin, moracetin, quercetin-3-triglucoside. Mulberry leaves are rich source of proteins, carbohydrates, chlorophyll a, chlorophyll b, total chlorophyll and total carotenoids. Drinking mulberry leaf tea has also been proven to deal with type 2 diabetes that is triggered by inordinately high levels of glucose (blood sugar). Drinking tea made of mulberry leaves has also been linked with substantially reduced levels of bad cholesterol in the bloodstream. Well, as one can see mulberry leaf tea is undeniably one of the most health-promoting beverages currently in existence.

Mulberry tea, an aromatic herbal drink, is prepared from the fresh and dried leaves of the white and black mulberry tree. As it contains all the essential nutrients, the **caffeine-free** herbal decoction has several health-promoting benefits.

Mulberry green tea has been the most popular health drink among the Japanese for a very long time. Both Thai and Japanese scientists have discovered that this excellent herbal not only contain important minerals but also contains phytosterol, which reduces cholesterol, moreover it does not have tannin which a cause of constipation.

A. Mulberry Plant :

Mulberry trees are around 30 feet tall and are often wider than tall. Mulberry leaves are thin, glossy, and light green in colour. The shape of the leaf can be quite variable even on the same tree. Some leaves have 5 lobes while others have one lobe, two lobes, three lobes, or no lobes at all.

B. Cultivation of mulberry plant:

Mulberry can be grown from seed, and this is often advised as seedling-grown trees are generally of better shape and health, but they are most often planted from large cuttings which root readily. The mulberry plants which are allowed to grow tall with a crown height of 5–6 feet from ground level and a stem girth of 4–5 inches or more is called tree mulberry. They are specially raised with the help of well-grown 8–10 months old of any of the varieties recommended for rain-fed areas like S-13(for red loamy soil) or S-34 (black cotton soil) which are tolerant to drought or soil moisture stress conditions. Usually, the plantation is raised and in block formation with spacing of 6 feet x 6 feet, or 8 feet x 8 feet, as plant to plant and row to row distance. The plants are usually pruned once a year during the monsoon season (July –August) to a height of 5–6 feet and allowed to grow with a maximum of 8–10 shoots at the crown. The leaves are harvested 3–4 times a year by a leaf picking method.

C. Collection of mulberry leaves:

The leave of plant may be up to 30cm lobes rounded. On older trees the leaves are generally 8-18cm long chordate at base and rounded to aluminates at the tip and serrated at margins and collection was done by hand picking method. From mulberry garden the collection of leaves was done for performing the work. (Suresh G Killedar *et.al.* 2017)



Figure 1. Mulberry plant

Lemongrass is a tropical perennial plant which yields aromatic oil. The name lemongrass is derived from the typical lemon-like odour of the essential oil present in the shoot. Dried lemongrass leaves are widely used as a lemon flavor ingredient in herbal teas, prepared either by decoction or infusion of 2-3 leaves in 250 or 500 ml of water and other formulations. Harvesting is done by cutting the grass 10 cm above the ground level, with the help of sickles. The number of harvests in a year depends on the climatologically factors such as temperature, rainfall and humidity and level of soil fertility. Generally the crop thrives best in humid condition.(P. P. Joy *et.al.*2006)

III. MATERIAL AND METHODS

- **Material :**
Mulberry leaves , Lemon grass
- **Method:**
- First harvest only tender and disease free mulberry leaves.
- Wash the leaves you have gathered under clean running water to get rid of any dirt or impurities you may have overlooked.
- After doing this get some of the leaves and then dried using infrared dryer or microwave drying.
- The dried leaves then crushed by hand.
- The formulation of flavored mulberry tea was done in flavor of Lemon grass and control.
- The mulberry lemon grass tea constituted 80:20.



Figure 2. Dried mulberry leaves



Figure 3. Infrared dryer used for drying mulberry and lemon grass leaves



Preparation of mulberry tea:

- Place few fresh mulberry leaves or a tablespoon of dried leaves in a tea pot
- Add 2 cups of boiling water to the pot (71°C-93°C)
- Steep the mixture for 3 to 5 minutes
- Filter out the leaves using a strainer
- Add sugar or honey as a sweetener



Figure 4. Mulberry tea (control)



Preparation of mulberry herbal tea with Lemon Grass flavor

- Place few fresh mulberry leaves or a tablespoon of dried leaves in a teapot
- Add 2 cups of boiling water to the pot (71°C-93°C)
- Add lemon grass
- Steep the mixture for 3 to 5 minutes
- Filter out the leaves using a strainer
- Add sugar or honey as a sweetener



Figure 5. Mulberry lemon grass tea

IV. RESULTS AND DISCUSSION

The mulberry tea is beneficial to human health because it has been reported as an anti-diabetic, antioxidant, anti-aging, useful in lowering the blood pressure, promotes kidney and liver health, improves digestion, controls weight loss, fights cholesterol, treats cold and fever. The present study was carried out to prepare flavored formulation of mulberry + lemon grass. The sensory analysis was carried out as per standard procedure. The taste of mulberry tea is bitter without honey and slightly sweet with honey and the flavor of mulberry tea is mild herbal. The other prepared flavors of mulberry tea have little bitterness and slightly sweet taste. Overall acceptability of mulberry tea with the lemongrass found best.

Proximate analysis of mulberry leaves:

Sr.No.	Constituents	Percent
1	Moisture	60-78%
2	Protein	20-27%
3	Fat	0%
4	Carbohydrate	21-26%
5	Crude fibre	30-40%

The above proximate analysis of mulberry leaves sample contains water, protein, fat, carbohydrates, and crude fibre of mulberry leaves. Mulberry leaves are high in protein and water content. It is low in fat. It is also good sources of chlorophyll a, chlorophyll b, carotenoids and also rich sources of GABA and DNJ.

Formulation of lemon grass powder

INGREDIENTS	CONTROL SAMPLE	SAMPLE A	SAMPLE B	SAMPLE C
Mulberry powder	1 gm	0.9 gm	0.8 gm	0.7 gm
Lemon grass powder	0	0.1 gm	0.2 gm	0.3 gm
water	100ml	100 ml	100 ml	100 ml

The mulberry tea is made by using ingredients like mulberry powder, water and lemon grass powder. Variations are made by adding different amount of lemon grass powder such as control sample contains 0 gm of lemon grass powder, sample A contain 0.1 gm of lemon grass powder, sample B contain 0.2 gm of lemon grass powder and sample C contain 0.3 gm of lemon grass powder.

SR.NO.	PARAMETERS	MULBERRY TEA	LEMON GRASS mulberry tea
1	Moisture	4.01%	4.56%
2	Protein	0%	0%
3	Carbohydrate	0%	0%
4	Fat	0%	0%
5	Crude fiber	0%	0%
6	Ash	28.10%	36.45%

TABLE1. SENSORY ANALYSIS OF CONTROL AND FLAVOURED MULBERRY TEAS

Type of Mulberry tea developed and sensory attributes evaluated by sensory panellists	Colour	Flavour	Taste With honey/Sugar	Taste without honey/Sugar
Mulberry tea (plain)	Light green	Mild herbal	Neutral sweetness	Bitter
Mulberry lemon grass tea	Light green	Mild Lemon grass	Slightly sweet	Little bitter

TABLE 2. OVERALL ACCEPTABILITY AND SCORE ON SENSORY EVALUATION

Overall acceptability on sensory evaluation	Fair	Good	Better	Best
Mulberry tea		✓		
Mulberry Lemon grass tea				✓

HEALTH BENEFITS:

- Reduces anxiety and stress
The GABA (gamma-amino butyric acid) in mulberry tea is known to resolve anxiety and mood disorders. According to some studies, it is also an effective remedy for stress.
- Controls weight loss
Mulberry tea is often used as a part of a weight loss diet to treat obesity. It is believed that 1-deoxynojirimycin (DNJ) in mulberry leaf prevents the body from absorbing carbohydrates.
- Fights cholesterol
The antioxidant properties in the herbal drink are attributed to the presence of flavonoids such as quercetin, rutin. According to some researchers in Japan, it prevents the accumulation of cholesterol in the arteries, thereby improving blood circulation.

- For diabetes

Drinking this healthy caffeine-free drink daily after meals can lower the blood sugar levels in diabetic patients. Some studies have shown that DNJ blocks glucose from entering the bloodstream. However, consulting a physician would be better prior to its use.

- Treats cold and fever

The common cold symptoms like sore throat, cough, fever, headache, and red eyes can be treated by consuming mulberry tea.

- Lowers blood pressure

The GABA, calcium, and potassium in mulberry tea play a vital role in maintaining normal blood pressure levels. Sipping a cup of this herbal tea on a regular basis decreases the risk of cardiovascular disorders caused by high blood pressure.

- Promotes liver and kidney function

As a natural detoxifier, mulberry tea flushes out the toxins from the body for cleansing the liver and kidneys, thereby preventing liver cancer.

- Improves digestion

It helps in treating common abdominal conditions like constipation and flatulence by boosting digestion.

V. CONCLUSION

- It is concluded that mulberry leaves / powder reported to be in use as tea for very long time. But novel flavored mulberry teas can be more acceptable as well as healthy drink.
- Mulberry leaves obtained were processed for preparation of herbal tea. The leaves of mulberry plant have antioxidant activity hence they can be used in order to improve the health of human beings owing to their free radical scavenging effect.
- Hence, by using leaves of the mulberry plant and natural herbal flavors (healthy bioactive such as ginger, tulsi, and lemon grass) novel herbal mulberry tea was prepared.
- There are lots of uses of ginger, tulsi, and lemon grass which act like anti-oxidant, anti-aging, anti-diabetic, anti-viral material (besides many reported bioactivities).
- The taste of this herbal (medicinal) blends with natural ingredients was acceptable and for better compliance can be served with or without sugar.
- It is possible to develop mulberry herbal tea entrepreneurship at community/village level.
- Individual sericulture farmers can process and consume this herbal tea for self and family as a healthy drink.
- As this herbal tea does not have caffeine and tannin hence, very healthy.
- This entrepreneurship requires little investment.
- This entrepreneurship can become another source of income with less investment for doubling the farmers' income.

VI. REFERENCES

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