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FORMULATION AND EVALUATION OF HERBAL TEA BAG CONTAINING DILL SEEDS (*Anethum Graveolens)*

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ABSTRACT

Herbal tea is gaining wide acceptance as a natural and healthy beverage because of its therapeutic value and refreshing nature. These beverages, also known as tisanes, are prepared using different medicinal plants, herbs, spices, flowers, and roots that possess beneficial biological properties. Herbal teas have been traditionally consumed in many cultures as part of daily lifestyle practices and social gatherings. They are believed to help improve immunity, reduce stress, promote relaxation, and maintain overall health and well-being. Since most herbal teas are naturally caffeine-free, they are considered a suitable alternative to conventional tea and other stimulant beverages.

Herbal teas are generally prepared by infusion or decoction of selected herbal ingredients soaked or boiled in water to obtain the required extract. Herbal teas contain several naturally occurring phytochemicals such as flavonoids, phenolic compounds, tannins, alkaloids, terpenoids, and saponins contributing to their antioxidant and medicinal activities. In herbal teas, these bioactive compounds may possess antimicrobial, anti-inflammatory, digestive and immunity enhancing properties.

Various herbal ingredients such as ginger, peppermint, tulsi, chamomile, cinnamon and lemongrass are used either alone or in combination to enhance the flavor and therapeutic efficacy. The present study deals with formulation and evaluation of herbal tea prepared from selected medicinal herbs. The study was aimed at developing a flavorful, safe and health promoting beverage with acceptable sensory characteristics and beneficial pharmacological properties.

Keywords: Herbal Tea, Camellia sinensis, Phytochemicals, Antioxidant, Medicinal Herbs, Tisanes

INTRODUCTION

Common health problems of the female reproductive system, also known as gynaecological disorders, such as postpartum bleeding, menstrual cramps, pain during childbirth, infertility, and pain after a caesarean section, affect millions of women around the world.

Menstrual cramps and pain during labor are very important.When the uterus contracts and the cervix and birth canal stretch, it may cause pain during labor, which is a natural and necessary part of the birth process. Long

labor can lead to problems for the baby and the mother, such as poor oxygen supply, baby or newborn death, head compression, low APGAR scores at birth, and poor outcomes for the newborn. Pain can cause the body to release stress hormones like adrenaline and cortisol because of fear and anxiety, which can make the pain worse and make labor last longer. It can also lead to serious problems for the mother, such as tearing in the perineum and a higher chance of needing a caesarean section (1,2,3).

Another major condition that affects women is menstrual cramps.These are pains in the lower abdomen or pelvis that happen at certain times and may spread to the back and legs. They can happen before or during a period. Prostaglandins are chemicals that cause the uterus to contract and are made in the lining of the womb.

When there is too much or an imbalance of these prostaglandins, it can increase the muscle tone of the uterus, make contractions irregular, and reduce blood flow to the uterus and increase sensitivity to pain (4,5,6).

Studies from India show that the problem affects between 50 and 87% of women. Other research says that up to 90% of women of childbearing age suffer from menstrual pain in some way (7,8). Some natural remedies have been found to be effective in treating menstrual pain, pain during childbirth, postpartum pain, and other health issues for women. However, many of these natural alternatives can have unwanted side effects.

Therefore, natural treatments can play an important role in dealing with these problems without the harmful side effects often linked to conventional medicine (9).An example of a herbal remedy that may help with menstrual cramps and childbirth pain, along with other health benefits, is dill seeds.

A tomb where Dill was discovered: tomb of Amenhotep II (1427-1401 BC). Hippocrates (circa 460-370 BC) used the leaves of dill as a sedative and made it into a gargle with wine. The doctor Dioscorides (circa 40-90 AD) recommended the use of burned dill seeds on wounds as a healing agent. In the 17th century, dill was introduced into North America and grown throughout Europe. In Southeast Asia and India, dill has been cultivated since ancient times (Le Strange, 1977). The largest producers and users of dill seeds are India, Pakistan, China, and Russia. The Greek name 'Anethum' stands for 'upright growth', and the Latin name 'graveolens' stands for 'strong odor'. The plant is an upright, freely branched annual or biennial, growing up to 1.5 meters in height at flowering or 0.5-0.9 meters at the vegetative stage. The lower leaves are larger than the upper ones, which may be up to 50 cm by 25 cm in size. The flower is protandrous, actinomorphic, and bisexual, with a yellow color. The fruit is a brown schizocarp with a lens-like shape, measuring 2.5-5 mm by 2-4 mm, with a brown-white border that is longitudinally ribbed. The scientific name is Anethum graveolens L., which is also known as dill or the aromatic annual herb and belongs to the family Apiaceae. It is known by various non-scientific names in different languages: English (Dill), Ayurvedic (Shatpushpaa), Unani (Soya), Siddha (Sadakuppai), Sanskrit (Shatpushpi), and Hindi (Sowa) (12,13). Among its synonyms are: Selinum anethum Roth, Peucedanum graveolens Benth & Pastinaca anethum Spreng. The fruit, leaves, and essential oil of Anethum graveolens are used medicinally. It is mainly cultivated in Madhya Pradesh, Rajasthan, Gujarat, Maharashtra, Andhra Pradesh, and Jammu & Kashmir. Besides its role in treating indigestion, the plant also demonstrates physiological activities that protect against gastric disorders and hypoglycemia, as shown by Anethum graveolens L. Seeds (AGS), leaves of Anethum graveolens L. are widely used for flavoring food preparations (14,15,16,17).

Dill seeds have many useful properties and are important for medicinal purposes, making them a great choice for herbal medicines that can be used in making health-supporting products. Because of this, the study was done to create and test herbal tea bags made from dill seeds so they can be easy to use and effective for improving women's reproductive health and overall well-being. A tea bag is a small, porous, sealed pouch that holds tea leaves. When placed in hot water and left to steep, it releases an infusion. Tea is the most commonly consumed drink in the world. Drinking any kind of herbal tea can offer several general health benefits, such as calming the mind and body, supporting heart health, helping with digestion, assisting the body in detoxifying, nourishing the nervous system, reducing stress, boosting immunity, fighting infections, and promoting overall health(18). In making herbal tea bags, dill seeds may offer specific health benefits for women by maintaining good health through their antioxidant, antispasmodic, and hormone-balancing effects when taken regularly. Dill seeds are also used in traditional Persian medicine as a remedy for nausea and muscle cramps(19). Recent studies have found that the essential oil of dill seeds contains carvone and dihydrocarvone (30-60%), limonene (33%), and α-phellandrene (21%) as the main components, along with carvone, carvacrol, terpinene, and dillapiol as minor components(20). Also, phytochemical research on dill seeds has found the presence of alkaloids, terpenoids, steroids, tannins, and flavonoids(21). Another study reports that the phenolic compounds

in dill seeds have antifungal activity in both laboratory and real-life conditions against Candida (22). Because of the wide variety of bioactive compounds and therapeutic effects found in dill seeds, they were chosen as an ingredient for making herbal tea bags to gain health benefits, especially for women's reproductive health.

MATERIALS AND METHODS

Collection and authentication of plant material:

Materials :

1. Dill seeds :

The dill seeds were gathered from Mankarnikaaushdhalaya, located in Pimpri Chinchwad, Pune, Maharashtra, in April 2026.

The herbarium specimen was authenticated by the Botanical Survey of India, Pune.

Here is the detailed information about the specimen:

1.Botanical name: *Anethum graveolens*

2.Common name: Mankarnikaaushdhalaya

3.Part collected: seeds

4.Date of collection: April 8, 2026

5.Collection location: Pimpri Chinchwad

6.Properties: carminative, antioxidant, anti-inflammatory

Biological Source- Dill is made from the dried, mature fruits of *Anethum graveolens Linn.*, which belongs to the Umbelliferae family.

Chemical constituents- The fruit contains approximately 3.5% essential oil, 20% fixed oil, and protein.The essential oil is an aromatic liquid made up of paraffin hydrocarbons and 40 to 60% d-carvone, along with D-limonene and other terpenes.

Medicinal Uses- The fruit of dill and its oil are known to have stimulant, aromatic, carminative, and stomachic properties, and are of significant medicinal value.

2. **Funnel seeds :**

The funnel seeds were collected from Mankarnikaaushdhalaya, located in Pimpri Chinchwad, Pune, Maharashtra, in April 2026.

Here is the detailed information about the specimen:

1. Botanical name*: Foeniculum vulgare*
2. Common name: Mankarnikaaushdhalaya
3. Part used: seeds
4. Date collected: April 8, 2026
5. Location collected: Pimpri Chinchwad Properties: antioxidant, anti-inflammatory, antimicrobial.

Biological Source- Dried ripe fruits of the plant from the Apiaceae (Umbelliferae) family. .

Chemical Constituents- Volatile Oil: Contains Anethole (C10H12O) which has a sweet taste, and Fenchone, which has a bitter or pungent taste. Fixed Oils and Proteins: Found in the endosperm.

Medicinal Uses- Acts as a carminative, helping with flatulence and digestive issues. Functions as an expectorant, aiding in clearing respiratory mucus. Serves as a flavoring agent in various pharmaceutical syrups.

3. **Cardamom:**

The cardamom seeds were gathered from Mankarnikaaushdhalaya, located in Pimpri Chinchwad, Pune, Maharashtra, on April 8, 2026.
Here is the detailed information about the specimen:
1. Botanical name: *Elettaria cardamomum*
2. Market name: Mankarnikaaushdhalaya
3. Part of specimen: seeds
4. Date of collection: April 8, 2026
5. Place of collection: Pimpri Chinchwad

Biological Source- Dried nearly ripe fruits (capsules) of the plant from the family Zingiberaceae.

Chemical Constituents- Volatile Oil: Contains a high amount of 1,8-cineole (Eucalyptol) and Terpinyl acetate. - Other components include Limonene and Linalool.

Medicinal Uses- Acts as a strong aromatic stimulant and carminative. - Serves as a flavoring agent in drinks and oral medicines. - Used to help with digestion and as a breath freshener.

4. Licorice:

The licorice powder was collected from Mankarnikaaushdhalaya, located in Pimpri Chinchwad, Pune, Maharashtra, in April 2026.

Here is the detailed information about the specimen:

1.Botanical name: *Glycyrrhiza glabra*

2.Market name: Mankarnikaaushdhalaya

3.Part of specimen: steam powder

4.Date of collection: April 8, 2026

5.Place of collection: Pimpri Chinchwad

Biological Source- The specimen consists of dried, unpeeled or peeled roots and stolons of the plant, which belongs to the family Fabaceae.

Chemical Constituents- Saponin Glycosides: Contains Glycyrrhizin, also known as glycyrrhizic acid, which is 50 times sweeter than sugar. (Leguminosae). Flavonoids: Liquiritin and Isoliquiritin, which are responsible for the yellow color.

Medicinal Uses- Expectorant and Demulcent: It is commonly used in cough lozenges and syrups. Anti-inflammatory: It is used in treating gastric ulcers, especially in the form of Deglycyrrhizinated Licorice or DGL. Sweetening agent: It helps in masking the bitter taste of other medications.

Preparation of Herbal Tea Bag

The materials were shade dried and reduced to coarse powder. The powder was passed through appropriate sieve and was weighed accurately

The A1 and A2 were formulated as per table

Formulation 1

Ingredients	Quantity
Dill seeds	1g
Funnel seeds	0.5g
Cardamom	0.3g
Licorice	0.2g

Table no.A1

Formulation 2

Ingredients	Quantity
Dill seeds	1.5g
Funnel seeds	0.75g
Cardamom	0.45g
Licorice	0.3g

Table no.A2

From the two prepared formulations, it can be seen that Formulation 1 is considered to have more desirable organoleptic qualities due to factors like color, taste, and aroma, and in general, it was found to be more acceptable. The use of dill seeds, fennel seeds, cardamom, and licorice in the mentioned proportion gave it a desirable taste and other organoleptic qualities that were more preferable than those exhibited by Formulation 2. Formulation 1 is considered to have more consumer acceptability with no excess bitterness.

Preparation of Herbal Tea Bag

The decoction of different formulations was prepared and evaluated. Decoction is a method of extraction by boiling the herbal tea powder to dissolve the chemicals present.

FIG NO.:-1 BOILING WATER

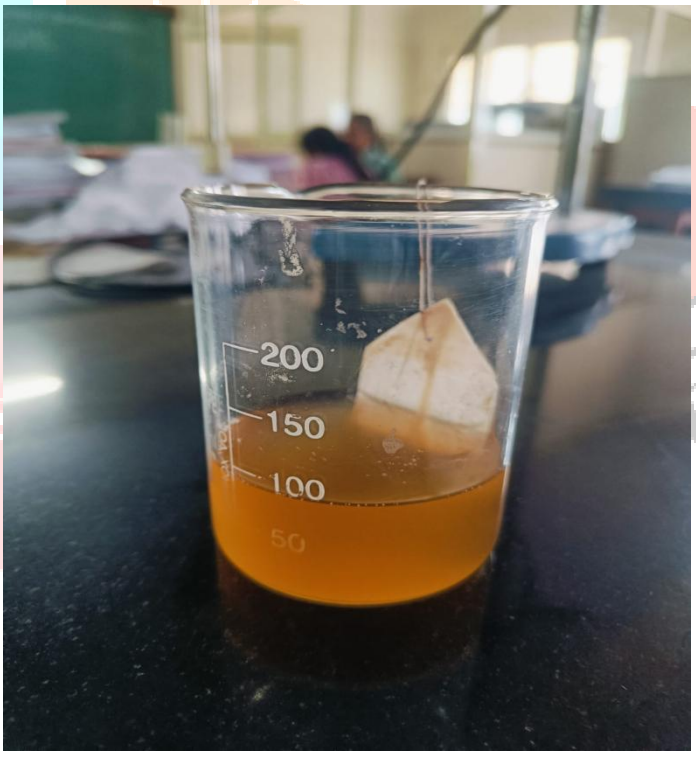

FIG NO.2:- HERBAL TEA

EVALUATIONS

Organoleptic test:

Organoleptic test was performed by visual inspection for appearance, colour, odor and taste.

Ingredients	colour	odour	Taste
Dillseeds	Brown	Strong aromatic	Bitter slightly pungent
Feneel seeds	Greenish brown	Sweet aromatic	Sweet
Cardemon	Green	Pleasant aromatic	Sweet and slightly pungent
licorice	Yellowish brown	Characteristics mild odour	

Ash value determination

Parameter	Observation or result (%w\w)
Total ash value	6.5%
Acid in soluble ash	1.2%
Water soluble ash	2.8%
Sulphated ash	7.0%

Moisture content determination

Sample no	Initial weight before drying	Final weight after drying
1	2.00	1.82
2	2.00	1.81
3	2.00	1.83

Weight variation test

Tea bag no.	Weight of filled tea bag	Weight of empty tea bag
1	3.82	0.32
2	3.83	0.32
3	3.84	0.32
4	3.81	0.32
5	3.83	0.32
6	3.79	0.32
7	3.85	0.32
8	3.81	0.32
9	3.82	0.32
10	3.80	0.32

Extractive value determination

Weight of sample	Weight of dry extract	% extractive value
2.00	0.46	23.0%
2.00	0.48	24.0%
2.00	0.47	23.5%

ANTI-OXIDANT TEST:

Sr.no	Concentration (ug/ml)	Absorbance of ascorbic acid	Absorbance of herbal tea extract
1	5	0.682	0.701
2	10	0.521	0.612
3	15	0.401	0.545
4	20	0.298	0.482
5	25	0.186	0.421
6	30	0.121	0.365

TABLE NO.: 1 ABSORBANCE OF ASCORBIC ACID AND HERBAL TEA EXTRACT

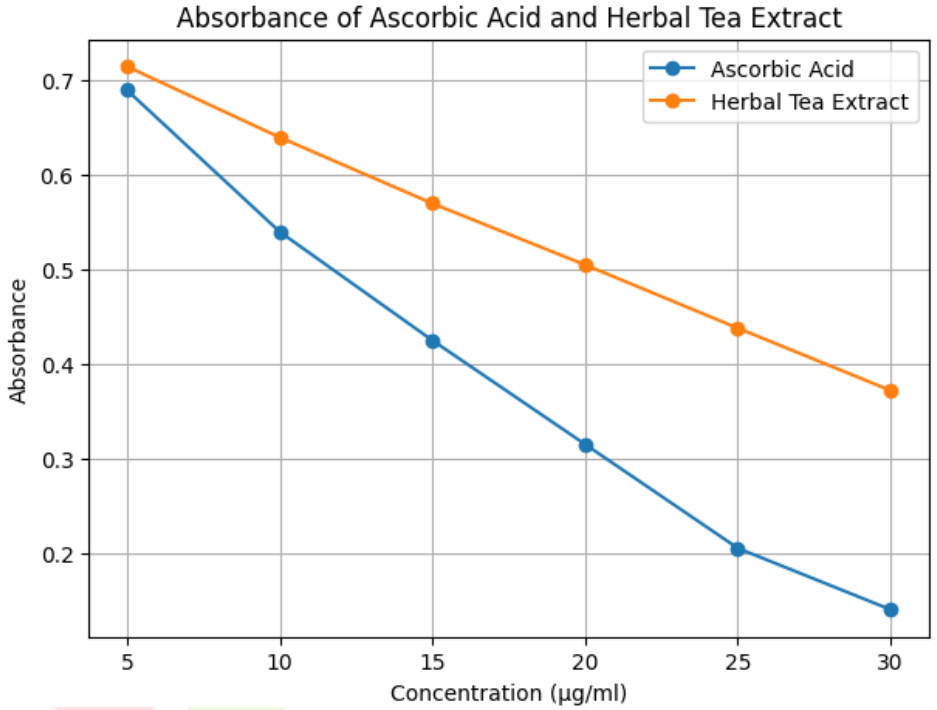

FIG NO.3 GRAPHICAL REPRESENTATIONABSORBANCE OF ASCORBIC ACID AND HERBAL TEA EXTRACT

Sr.no	Concentration (ug/ml)	% inhibition of ascorbic acid	% inhibition of herbal tea extract
1	5	31.8	29.9
2	10	47.9	38.8
3	15	59.9	45.5
4	20	70.2	51.8
5	25	81.4	57.9
6	30	87.9	63.5

TABLE NO.2 : % INHIBITION OF ASCORBIC ACID AND HERBAL TEA EXTRACT

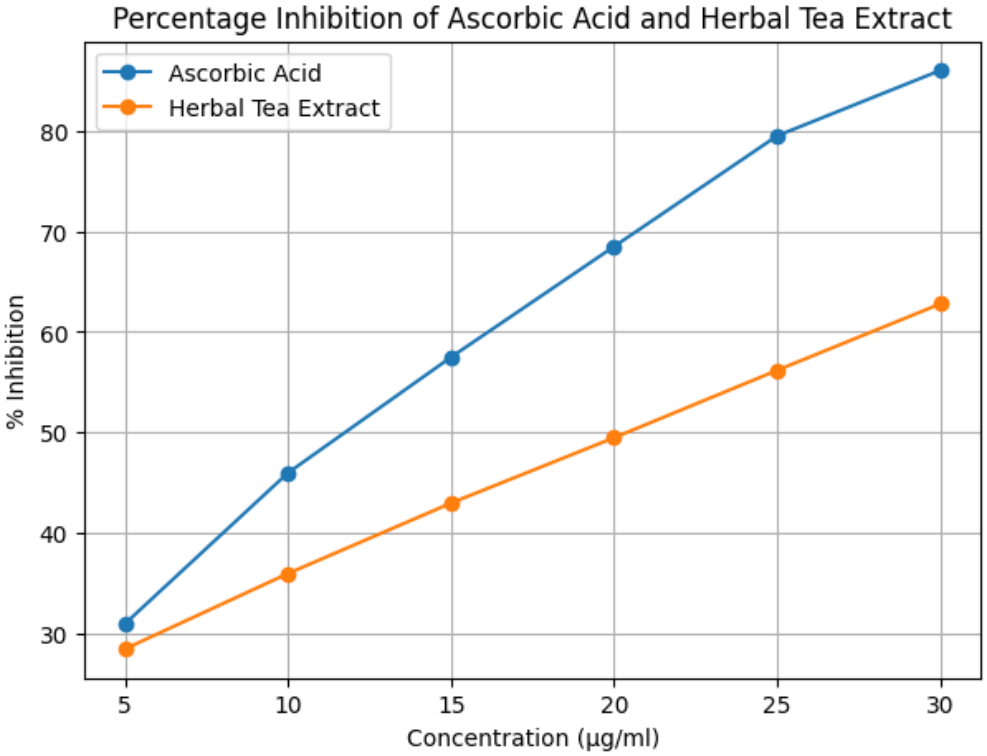

FIG NO.4: GRAPHICAL REPRESENTATION % INHIBITION OF ASCORBIC ACID AND HERBAL TEA EXTRACT

DISCUSSION:-

The purpose of this study is to create and test a herbal tea made from dill seeds, fennel seeds, cardamom, and licorice.These herbs were picked because they are important in medicine and can help improve the health of women dealing with certain conditions such as menstrual pain, digestion problems, stress, and inflammation.In recent times, more people are focusing on herbal medicines because they are natural, have fewer side effects, and are important for health.

Dill seeds were the main ingredient because they help with gas, have antioxidant properties, and reduce inflammation.Dill is commonly used to ease stomach discomfort and support digestion and menstrual issues.Fennel seeds were added for their antioxidant, antibacterial, and digestive benefits.Cardamom was included not only for its flavor and smell but also to help with digestion.Licorice was added for its calming, anti-inflammatory, and sweetening effects.

To check the antioxidant activity of the tea, the DPPH radical scavenging method was used.The results showed that the tea had strong antioxidant power, with an average ability to inhibit radicals around 62%.This antioxidant effect is likely due to the presence of active compounds like flavonoids, terpenoids, phenolics, and volatile oils in the herbs.Antioxidants help remove harmful free radicals and lower oxidative stress in the body.

The sensory evaluation showed positive results, with all samples having good qualities like color, smell, and taste.Using aromatic herbs like cardamom and fennel made the drink more appealing to the senses.The moisture content test showed that the product was dried properly, which helps prevent bacterial growth.High extractive values mean there are enough water-soluble active ingredients in the herbal tea.

The ash test showed no impurities in the preparation, as the inorganic content was within acceptable limits.Testing the weight of the tea in bags confirmed that the product was filled consistently and made well.Overall, the herbal tea has great physical and chemical properties, strong antioxidant effects, and is well accepted in terms of taste and appearance.

This research suggests that the herbal tea is a promising natural health drink.It may help reduce stress and digestive issues, as well as support women's comfort.

CONCLUSION:-

In this study, a proper formula for herbal tea was created and tested using dill seeds, fennel seeds, cardamom, and licorice.These ingredients were chosen because of their health benefits, antioxidant effects, and ability to support women's health.The results show that this herbal tea is a natural, healthy, and effective drink with good sensory and physical characteristics.

The physical and chemical features of the herbal tea were thoroughly checked and met acceptable standards.All the tea samples had good color, smell, and taste.The antioxidant power of the tea was measured using the DPPH method, and it showed an average inhibition rate of around 62%, which indicates that it contains useful plant-based compounds.

Each ingredient played a unique role in the tea.Dill and fennel seeds helped with digestion and eased gas.Cardamom added a nice flavor and also helped with digestion.Licorice gave the tea a soothing and anti-inflammatory effect.

The physicochemical tests showed that the herbal tea is of good quality and pure.The moisture content was checked, and it showed that the tea was well dried and stable, which means it was properly processed.The ash content indicated that there are enough inorganic materials present, which is a good sign.The extractive value test found that there are plenty of soluble substances in the tea, which are likely responsible for its health benefits.The weight of the tea bags was consistent, meaning each bag has a similar amount of tea.

Based on these findings, it's clear that the herbal tea is a promising product that can be enjoyed as a healthy drink.This study highlights how herbal preparations can be a natural alternative to chemical-based products.Future studies could look into how effective and safe this herbal tea is for long-term use.

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