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Development and Physicochemical Evaluation of a Rosemary (*Rosmarinus officinalis*) Herbal Tea Blend

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ABSTRACT: Rosemary (*Rosmarinus officinalis* L.) is an aromatic, perennial shrub native to the Mediterranean region that has been used for centuries in both culinary and traditional medicine applications. This review explores the multifaceted therapeutic potential of rosemary tea, focusing on its phytochemical composition, antioxidant and anti-inflammatory properties, and effects on human health. The increasing consumer demand for natural, functional beverages has brought renewed interest to herbal infusions, with a focus on their bioactive compounds and health benefits. Beyond its anti-inflammatory and antioxidant effects, rosemary tea is noted for its potential cognitive and neurological benefits. Research suggests that inhaling the aroma or consuming the tea can improve memory, concentration, and mood, possibly due to compounds like 1,8-cineole which affect brain activity. In addition, rosemary tea has been traditionally used to aid digestion, reduce stress and anxiety, and alleviate headaches. Its antimicrobial and diuretic properties further contribute to its reputation as a wellness tonic. Studies have shown that these phytochemicals can protect the body from oxidative damage caused by free radicals, a major contributor to chronic diseases like cancer, heart disease, and diabetes. Furthermore, the tea's anti-inflammatory properties may help manage conditions such as arthritis and neurodegenerative disorders.

KEYWORDS: Rosemary, antioxidant, anti-inflammatory, diuretic properties

I. INTRODUCTION

Rosemary (*Rosmarinus officinalis* L.) is a perennial evergreen shrub in the mint family (Lamiaceae), originally from the Mediterranean region but now cultivated in many parts of the world. Rosemary has been valued for culinary, preservative, and medicinal uses across cultures for centuries. Historical sources indicate its use by ancient civilizations, who believed it supported memory and cognitive health. Today, these traditional uses inspire ongoing scientific research into rosemary's possible health benefits. Recently, there has been a renewed interest in herbal infusions such as rosemary tea, partly due to a preference for natural and functional beverages. The potential health benefits of rosemary tea stem from its rich content of bioactive compounds like phenolic acids, flavonoids, and volatile terpenes. Key components such as rosmarinic acid, carnosic acid, and carnosol are recognized for their antioxidant and anti-inflammatory effects, which may help protect against oxidative stress and inflammation—processes linked to various chronic conditions.

In addition to its antioxidant and anti-inflammatory effects, research suggests that rosemary tea may offer significant benefits for cognitive function and overall neurological health. Studies have shown that both consuming and inhaling the aroma of rosemary can enhance memory, improve concentration, and reduce anxiety. The neuroprotective effects are thought to be linked to compounds that can inhibit the breakdown of acetylcholine in the brain, a neurotransmitter vital for learning and memory. Furthermore, rosemary tea is traditionally used to aid digestion, boost immunity, and even promote healthy hair growth. While centuries of traditional use and a growing body of scientific evidence support the health benefits of rosemary, further research, particularly human clinical trials, is needed to confirm many of these

claims. This introduction will explore the historical background, primary phytochemical composition, and a range of potential health applications of rosemary tea, providing a comprehensive overview that bridges traditional wisdom with modern scientific validation. It sets the stage for a detailed examination of how this fragrant, evergreen herb can serve as a simple yet powerful addition to a health-conscious lifestyle.

II. LITERATURE REVIEW

ROSEMARY

Rosemary Rosemary (*Salvia rosmarinus*) in flower.rosemary, (*Salvia rosmarinus*), small evergreen plant of the mint family (Lamiaceae), the leaves of which are used to flavor foods. Native to the dry and rocky areas of the Mediterranean region, it has been introduced and cultivated across Europe, Asia, and the Americas. Its leaves have a pungent, slightly bitter taste and, dried or fresh, are commonly used to season meats, vegetables, soups, and beverages. The taxonomy of rosemary was revised in 2017, when it was moved from the genus *Rosmarinus* to *Salvia* and reclassified from *Rosmarinus officinalis* to *Salvia rosmarinus*. See also *Salvia*.



Fig. Rosemary dried leaves

DRY TEA LEAVES:

Tea plant, (*Camellia sinensis*), evergreen flowering plant valued for its young leaves and leaf buds, from which the tea beverage is produced. Two principal varieties are used commercially, the small-leaved China plant (*Camellia sinensis*, variety *sinensis*) and the large-leaved Assam plant (*C. sinensis*, variety *assamica*). Hybrids of these two varieties are also grown. For information on the processing of tea and the history of its use, see tea. The natural habitat of the tea plant is considered to be within the fan-shaped area between Nagaland, Manipur, and the Assam-Myanmar frontier in the west through to China, probably as far as Zhejiang province, in the east and from this line south through the hills of Myanmar and Thailand into Vietnam. The three main varieties of the tea plant—China, Assam, and Cambodia (*C. sinensis*, variety *cambodiensis*)—each occur in their most distinct form at the extremes of the fan-shaped area. Most of the world's tea is cultivated within the plant's native range, though significant production does occur in parts of Africa—namely, Kenya—and in South America.



Fig. Dry Tea Leaves

DRY LEMON LEAVES:

Lemon Leaves (*Citrus limon*) are aromatic leaves from the lemon tree, commonly used in various cuisines around the world for their fragrant flavor. They are particularly popular in Southeast Asian cooking and are known for their refreshing citrusy aroma. Lemon leaves can be used fresh or dried and are often used to infuse flavor in dishes or as a wrapping for steaming.

**Fig. Dried leamon leaves****CLOVE**

Clove Cloves are the dried flower buds of the clove tree (*Syzygium aromaticum*). clove, (*Syzygium aromaticum*), tropical evergreen tree of the family Myrtaceae and its small, reddish-brown flower buds used as a spice. Cloves were important in the earliest spice trade and are thought to be indigenous to the Moluccas, or Spice Islands, of Indonesia. Strong in aroma and hot and pungent in taste, cloves are used to flavor many foods, particularly meats and bakery products; in Europe and the United States the spice is a characteristic flavoring in Christmas holiday fare, such as wassail and mincemeat. It is one of the five dried spices—including fennel, cassia, star anise, and Sichuan pepper—that make up the famed Chinese five-spice powder.

**Fig. Cloves****CINNAMON**

(*Cinnamomum verum*), bushy evergreen tree and the spice derived from its bark. The tree is native to Sri Lanka (formerly Ceylon), the neighboring Malabar Coast of India, and Myanmar (Burma), and it is also cultivated in South America and the West Indies. The spice, consisting of the dried inner bark, is reddish brown to brown and has a delicately fragrant aroma and a warm sweet taste. Cinnamon is used to flavor a variety of sweet and savory foods, from confections to curries to beverages, and it is popular in baked goods in many places. Essential oil is distilled from the bark fragments for use in food, liqueur, perfume, and drugs.

**Fig. Cinnamon**

MATERIALS AND METHODS:

Rosemary leaves (dried) – 0.50 g

Main herb, provides refreshing aroma and antioxidant properties.

Black tea leaves (dried) – 0.20 g

Acts as the tea base, gives color and mild caffeine

Cardamom pods (dried, dehusked and powdered) 0.05g Provides sweet, spicy flavor and digestive benefits. Cinnamon bark (dried, ground/powdered) – 0.05g Adds warmth and flavor, also aids in metabolism.

Dried lemon leaves – 0.10g Enhances citrus aroma and freshness.

Clove – 0.07g Adds pungent, spicy note and antimicrobial activity

EQUIPMENT

- Stainless steel tray
- Hot air oven or shade drying setup
- Grinder/mixer mill
- Sieve (mesh size 30–40)
- Airtight glass jars/laminated pouches for storage
- Digital weighing balance

III. METHODOLOGY

Step 1: Selection and Pre-treatment of Ingredients

Rosemary: Select fresh sprigs, wash with clean water, and dry in shade or hot air oven at 40–50°C until crisp.

- Black tea leaves: Use standard dried, graded tea leaves.
 - Cardamom: Husk the pods, grind the seeds into fine powder.
 - Cinnamon bark: Break into small pieces and grind into coarse powder.
 - Dried lemon leaves: Wash thoroughly, shade-dry until brittle, then crush lightly by hand.
- Clove: Grind into fine powder

Step 2: Drying and Moisture Standardization

All ingredients should be dried to 8–10% moisture content to prevent microbial growth.

If necessary, re-dry in a hot air oven at 45°C for 2–3 hours.

Step 3: Grinding and Sieving

Grind rosemary, lemon leaves, and spices to a coarse texture (not too fine, to retain aroma).

Sieve through a 30–40 mesh sieve to obtain uniform particle size.

Step 4: Blending

- Weigh each ingredient according to formulation:
- Rosemary: 20%
- Tea leaves: 30%
- Cardamom powder: 10%
- Cinnamon powder: 10%
- Lemon leaves: 15%
- Clove powder: 5%
- Ensure homogeneity by mixing for 10–15 minutes.

Step 5: Packaging

Immediately pack the blend in airtight laminated pouches or glass jars to retain aroma. Avoid exposure to light, air, and moisture. Label properly with batch number, date, and storage instructions.

Step 6: Storage

- Store at cool, dry place (25°C or below).
- Shelf life: 6–9 months if packed airtight.

Flow Sheet of Preparation of Rosemary tea blend



IV. RESULTS AND DISCUSSION

PROXIMATE ANALYSIS:

Parameters (%)	Results
PH value	7.8 to 8.0
Ash content value	9.81
Moisture content	8.90
Fat	6.04
Protein	5.93

Moisture Content

As shown in Table the moisture content of Rosemary tea blend was founded to be 8.90% which was compared with the moisture content of rosemary.

Ash Content

Total Ash: Ash content of Rosemary tea blend was recorded as 9.81% and it was compared with the ash content of calculated

PH value

The PH value of Rosemary tea blend was calculated using PH meter. The obtained result is the PH value of Rosemary tea blend is 7.8 to 8.0.

Protein Content

The Protein content of Rosemary tea blend was calculated as 5.93.

Fat

The Protein content of Rosemary tea blend was calculated as 6.04.

Evaluation of Microbial Analysis

The total bacterial count was found to be 8.0×10 CFU/g. which falls within the limits while the total fungal count was found to be < 25 CFU/g which also is within limits.

Shelf-Life study

According to our research by doing sensory analysis we observe that the Rosemary tea blend shelf life is more than 5 months. The taste, texture and aroma of the blend is good during these 5 months.



Fig. Sensory analysis samples of Rosemary tea blend

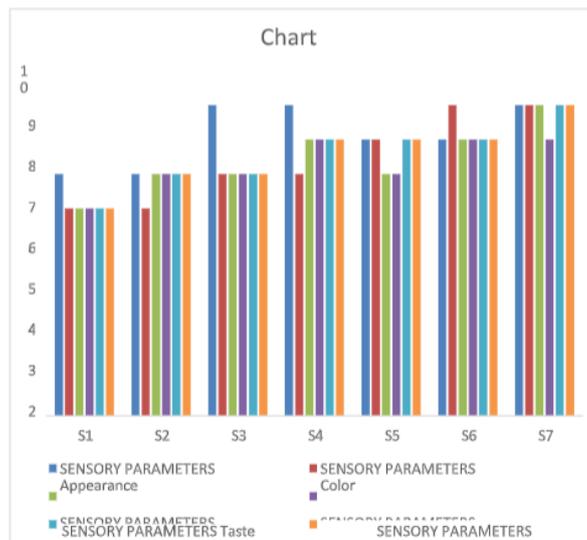


Fig. Graph parameter

V. CONCLUSION

Limited human research: Much of the research on rosemary's benefits has been conducted on animals or with concentrated extracts and essential oils. While promising, more human studies are needed to confirm the effects of brewed tea. A rosemary tea blend is a versatile and potentially beneficial herbal infusion, but its precise effects depend entirely on its composition. While rosemary itself provides antioxidant, cognitive, and digestive benefits, the inclusion of other herbs can either amplify or balance these effects. Its use should be approached with awareness of its potential side effects and interactions with medication. The key takeaway is that a rosemary blend is a complex and nuanced product, and its detailed conclusion is inseparable from the other ingredients it is paired with. As with any herbal remedy, consumers should understand the components, consume in moderation, and consult a doctor if they have underlying health concerns.

The bold conclusion of a masterfully crafted rosemary tea is its ability to be simultaneously sharp and soothing, earthy and bright. The intensity of rosemary's distinct flavor must be met with ingredients that can both stand up to it and temper it. This creates a complex and balanced tea, where the assertive, woody character of the rosemary is harmonized by other flavors instead of being overpowered. This tea isn't just a drink; it's a sensory experience that grounds you while it invigorates.

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