

# Formulation and Evaluation of green tea.

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The formulation and evaluation of green tea involve the careful selection of ingredients, processing methods, and the assessment of various quality parameters. Here's a general outline of the steps involved:

## Formulation:

### 1. Selection of Green Tea Leaves:

- Choose high-quality green tea leaves, preferably young leaves, as they tend to have a milder flavor.

### 2. Blending:

- Blending different varieties of green tea leaves can create a more complex flavor profile. Consider factors like aroma, taste, and color.

### 3. Addition of Ingredients (Optional):

- Some formulations may include additional ingredients for flavor enhancement or health benefits, such as herbs, spices, or fruit extracts.

### 4. Quality Control:

- Ensure the quality of raw materials by conducting tests for purity, moisture content, and other relevant parameters.

## Processing:

### 1. Withering:

- Allow the freshly plucked leaves to wither, reducing moisture content and initiating the oxidation process.

### 2. Pan-Firing or Steaming:

- Green tea is typically not oxidized as much as black tea. The leaves are either pan-fired or steamed to halt oxidation and preserve the green color and natural compounds.

### 3. Rolling:

- Rolled tea leaves develop the desired shape and release natural juices, contributing to the tea's flavor.

### 4. Drying:

- Dry the tea leaves to the desired moisture content to prevent spoilage and preserve freshness.

### 5. Grading:

- Sort tea leaves based on size and quality. This step helps ensure uniformity in the final product.

**Evaluation:****1. Organoleptic Evaluation:**

- Conduct sensory evaluations, including tasting panels, to assess the aroma, flavor, and appearance of the tea.

**2. Chemical Analysis:**

- Perform chemical tests to determine the levels of catechins, caffeine, polyphenols, and other chemical compounds associated with green tea.

**3. Microbiological Analysis:**

- Check for the presence of harmful microorganisms to ensure the safety of the product.

**4. Moisture Content:**

- Measure and control the moisture content to prevent mold growth and maintain the tea's quality.

**5. Color Analysis:**

- Evaluate the color of the tea infusion, which can indicate the degree of withering and processing.

**6. Caffeine Content:**

- Determine the caffeine content, as it can vary depending on factors such as leafage and processing methods.

**7. Particle Size Analysis:**

- Assess the particle size of the tea leaves to ensure consistency and brewing quality.

**8. Packaging and Storage Evaluation:**

- Evaluate the packaging to ensure it preserves the freshness of the tea and prevents exposure to moisture, light, and air.

**INTRODUCTION**

Green tea, derived from the leaves of the *Camellia sinensis* plant, is a popular beverage celebrated for its rich cultural history and a myriad of health benefits. Unlike black tea, green tea undergoes minimal oxidation during processing, preserving its natural color, flavor, and nutritional compounds. This gentle processing method results in a distinctive taste profile, with a more delicate flavor and lower caffeine content compared to other types of tea.

**Cultural and Historical Significance:**

Green tea has deep roots in Asian cultures, particularly in China and Japan, where it has been consumed for thousands of years. It is an integral part of traditional ceremonies and holds cultural significance as a symbol of hospitality, purity, and respect.

In China, green tea is often associated with the philosophy of balance and harmony, and it has been an essential element in Chinese medicine for centuries. In Japan, the famous Japanese tea ceremony, known as "chanoyu" or "sadō," emphasizes the preparation, serving, and drinking of matcha, a powdered green tea.

**Processing Method:**

The unique character of green tea is attributed to its minimal processing. After harvesting, the leaves are quickly heated through methods such as pan-firing or steaming to halt oxidation. This step preserves the natural green color of the leaves and maintains the high concentration of antioxidants, such as catechins and polyphenols.

**Flavor Profile:**

Green tea offers a diverse range of flavors, influenced by factors such as the tea cultivar, growing conditions, and processing techniques. Common descriptors include grassy, vegetal, nutty, or even sweet. The flavor can vary from mild and subtly sweet in varieties like Dragon Well (Longjing) to more robust and astringent in Sencha or Gunpowder tea. **Health Benefits:**

Green tea has gained recognition for its potential health benefits, backed by scientific research. It is rich in antioxidants, particularly epigallocatechin gallate (EGCG), which may have anti-inflammatory and anti-cancer

properties. Regular consumption of green tea has been associated with improved heart health, enhanced metabolism, and potential benefits for brain function.

### **Brewing and Serving:**

Brewing green tea is an art that requires attention to water temperature and steeping time. Typically, green tea is brewed at lower temperatures (around 160–185°F or 71–85°C) for a shorter duration to avoid bitterness. The leaves can be steeped multiple times, revealing different nuances with each infusion.

### **ABSTRACT**

Green tea, derived from the leaves of the *Camellia sinensis* plant, has garnered global attention for its rich cultural heritage and potential health benefits. Unlike black tea, green tea undergoes minimal oxidation during processing, preserving its natural color, delicate flavor, and nutritional compounds. With roots deeply embedded in Asian cultures, particularly China and Japan, green tea serves as a symbol of balance, purity, and respect. **BACKGROUND AND INVENTION OF GREEN TEA.**

#### **1. Ancient Chinese Discovery:**

According to popular legend, the discovery of tea dates back to 2737 BCE during the reign of Emperor Shen Nong. The story tells of tea leaves accidentally falling into a pot of boiling water, creating a fragrant infusion. This serendipitous event is often credited as the beginning of tea consumption.

#### **2. Medicinal Use:**

In ancient China, tea was initially consumed for its medicinal properties. The Chinese believed that tea had health benefits, and it was used as a remedy for various ailments. The processing of tea leaves, particularly the minimal oxidation method that characterizes green tea, likely evolved as a means to preserve its perceived medicinal qualities.

#### **3. Tang and Song Dynasties:**

During the Tang (618–907) and Song (960–1279) dynasties, tea culture in China began to flourish. The practice of drinking tea for pleasure, as well as for health, became more widespread. Tea preparation methods evolved, and the distinctions between green tea and other types of tea, such as black tea, became more defined.

#### **4. Cultural Significance:**

Green tea became deeply integrated into Chinese culture and philosophy. The Taoist monks, in particular, embraced tea for its calming and meditative properties. The appreciation of tea extended beyond its medicinal uses to become a symbol of refinement and hospitality.

#### **5. Development of Processing Techniques:**

The specific processing techniques that distinguish green tea, such as pan-firing or steaming to halt oxidation, were refined over centuries. These methods helped preserve the natural green color of the leaves and maintain the delicate flavors associated with green tea.

#### **6. Spread to Japan:**

During the Tang Dynasty, tea seeds were brought to Japan by Japanese Buddhist monks who had studied in China. Over time, the Japanese developed their unique tea culture, emphasizing the preparation and consumption of matcha, a powdered green tea. The

Japanese tea ceremony, known as "chanoyu" or "sadō," further elevated the cultural significance of green tea.

**BOTANICAL SOURCE OF GREEN TEA:** The botanical source of green tea is the **Camellia sinensis plant**. Green tea, black tea, white tea, oolong tea, and other tea types all come from this same plant. The differences in flavor, aroma, and color among these teas are

primarily the result of variations in processing methods applied to the leaves after they are harvested. The *Camellia sinensis* plant is an evergreen shrub or small tree native to East

Asia. It is cultivated in various parts of the world with suitable climates for tea production. The key factors influencing the characteristics of the tea include the specific tea cultivar, the growing conditions (climate, altitude, and soil), and the methods used to process the leaves after harvesting.

**CHEMICAL CLASS:** Green tea contains a variety of chemical compounds that contribute to its flavor, aroma, and potential health benefits. The major chemical classes found in green tea include:

**1. Polyphenols:** Catechins: The predominant class of polyphenols in green tea.

Epigallocatechin gallate (EGCG) is one of the most abundant catechins and is known for its potent antioxidant properties

**2. Alkaloids:** Caffeine: Green tea contains lower levels of caffeine compared to black tea. The stimulating effects of green tea are attributed to caffeine, which is present alongside other compounds, like theophylline and theobromine.

**3. Amino Acids:**

L-Theanine: An amino acid unique to tea plants, L-theanine contributes to the umami flavor of green tea and is associated with inducing a calming effect. It works in synergy with caffeine to provide a balanced mental alertness.

**4. Carotenoids:** Lutein and Zeaxanthin: These carotenoids contribute to the color of green tea and have antioxidant properties. Vitamin C (Ascorbic Acid): Green tea contains small amounts of vitamin C, contributing to its antioxidant content

**5. Flavonols:** Quercetin and Kaempferol: These flavonols contribute to the antioxidant activity of green tea.

**6. Chlorophyll:** Chlorophyll A and B: Green tea owes its vibrant green color, in part, to chlorophyll. The levels of chlorophyll are preserved due to the minimal oxidation process in green tea production.

**7. Terpenoids:** Monoterpenes and Sesquiterpenes: These aromatic compounds contribute to the aroma of green tea.

**FAMILY AND SYNONYMS:** The botanical family of green tea is **Theaceae**. The scientific name of the tea plant is *Camellia sinensis*. Theaceae is a family of flowering plants that includes several species of *Camellia*, but *Camellia sinensis* is the primary species cultivated for tea production. The synonyms of green tea is **cuppa , herb tea , caffeine .**

Ingredients	Amount
Harad	0.30g
Baheda	0.30g
Amla	0.30g
Pippali	0.40g
Tulsi	0.10g
Ajmoda	0.25g
Vayu vidang	0.25g
Tea extract	0.16g
Lemon extract	0.50g
ginger	0.50g
Ajwain	0.50g

Saunf	0.45g
jeera	0.50g
Black pepper	0.50g
Rock salt	0.52g
Sulphar less sugar	4.60g
Natural flavours	0.12g

**Requirement :** High-quality green tea leaves or tea bags Fresh, clean water Tea infuser or teapot with a built-in strainer Optional: Tea kettle, timer, and a teacup or mug

### 1. Procedure : Choose Quality Tea:

- Start with high-quality green tea leaves or tea bags. The freshness and quality of the tea can significantly impact the flavor of the final brew.

### 2. Measure the Tea:

- For loose-leaf tea, measure approximately 1 to 2 teaspoons of green tea leaves per 8 ounces of water. Adjust based on personal preference and the specific tea variety.

### 3. Water Temperature:

- Heat fresh water to a temperature between 160°F to 185°F (71°C to 85°C). Green tea is delicate, and using water that is too hot can result in a bitter taste. If you don't have a thermometer, allow the water to cool for a few minutes after boiling.

### 4. Preheat the Teapot or Teacup:

- Pour a small amount of hot water into the teapot or teacup to warm it. Swirl the water around and then discard it. This helps maintain the temperature of the brewing vessel.

### 5. Add Tea Leaves:

- Place the measured green tea leaves into the teapot or infuser. If you're using tea bags, place one bag in the cup.

### 6. Pour Hot Water:

- Pour the hot water over the tea leaves. Ensure that the water covers the leaves completely. Use the recommended water-to-tea ratio for the specific type of green tea you're using.

### 7. Steeping Time:

- Allow the tea to steep for 1 to 3 minutes. Steeping time can vary depending on the type of green tea and personal preference. Shorter steeping times generally result in a milder flavor, while longer steeping times can intensify the taste.

### 8. Strain or Remove Tea Leaves:

- If you used loose-leaf tea, strain the leaves from the liquid using a fine mesh strainer or by removing the infuser. If you used tea bags, you can remove the tea bag from the cup.

## 9. Optional Additions:

- Green tea is often enjoyed as is, but you can customize it by adding a slice of lemon, a sprig of mint, or a touch of honey if desired.

## 10. Serve and Enjoy:

- Pour the brewed green tea into your teacup or mug. Sip and savor the delicate flavors of the green tea.

**Evaluation parameters :** The evaluation of green tea involves assessing various parameters to determine its quality, flavor profile, and overall characteristics. Tea experts, also known as "cuppers," use a combination of sensory, chemical, and physical analyses to evaluate green tea. Here are some key parameters considered during the evaluation:

### 1. Aroma:

- Dry Leaf Aroma: The scent of the dry tea leaves before brewing.
- Wet Leaf Aroma: The aroma of the leaves after they have been steeped.

### 2. Appearance:

- Dry Leaf Appearance: Examining the color, shape, and size of the dry tea leaves.
- Wet Leaf Appearance: Observing the expanded, steeped leaves.

### 3. Color of the Infusion:

- Liquor Color: Evaluating the hue and clarity of the brewed tea. Green tea typically has a pale green or yellowish color.

### 4. Flavor Profile:

- Vegetal Notes: Describing the presence of grassy, seaweed, or vegetal flavors.
- Umami: Assessing the savory and full-bodied characteristics.
- Astringency: Evaluating the level of astringency, which can vary from mild to pronounced.
- Sweetness: Noting any natural sweetness in the flavor.

### 5. Body and Mouthfeel:

- Body: Describing the weight or thickness of the tea on the palate.
- Mouthfeel: Evaluating the texture, smoothness, or any lingering sensations in the mouth.

### 6. Balance:

- Harmony: Assessing how well the different flavor components come together for a balanced taste.

### 7. Leaf Quality:

- Whole Leaf vs. Broken Leaf: Examining whether the leaves are intact or broken, as this can impact flavor.

## 8. Aromatic Notes:

- Nose: Assessing the aroma of the brewed tea, including any floral, fruity, or herbal notes.

**Conclusion:** In conclusion, green tea stands as a remarkable beverage with a rich history, cultural significance, and a host of potential health benefits. Originating from the *Camellia sinensis* plant, the artful processing methods employed in the creation of green tea preserve its natural color, delicate flavors, and numerous bioactive compounds.

Cultivated for thousands of years, green tea has woven itself into the fabric of various cultures, particularly in China and Japan, where it serves as more than just a beverage, embodying principles of balance, purity, and respect.

The chemical composition of green tea, featuring polyphenols like catechins, especially the potent antioxidant EGCG, alongside amino acids, vitamins, and minerals, contributes to both its distinctive taste and its potential positive impact on health.

The preparation of green tea requires attention to detail, from the selection of high-quality leaves to the precise brewing temperature and time. The varied types of green tea, such as Sencha, Dragon Well, Matcha, and others, offer diverse flavor profiles and aromatic experiences, inviting exploration and appreciation.

Scientific studies suggest that regular consumption of green tea may be associated with numerous health benefits, including antioxidant and anti-inflammatory effects, cardiovascular support, and potential contributions to metabolic health.

In the cup, green tea unfolds a world of flavors — from the grassy notes of Sencha to the nutty sweetness of Dragon Well. The brew's gentle astringency, umami undertones, and the interplay of aroma and taste create a sensory experience that captivates tea enthusiasts worldwide.

As individuals continue to explore and embrace the diverse offerings within the world of green tea, the beverage remains a symbol of both tradition and innovation, continuing to influence cultures, health practices, and tea rituals around the globe. Whether enjoyed for its nuanced flavors, cultural significance, or potential health benefits, green tea holds a steadfast place in the hearts and cups of tea connoisseurs everywhere.

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