



Green Tea Quality Evaluation: Identifying Common Defects

Randall T. Hamasaki¹, Takahiro Ino², and Stuart T. Nakamoto³

¹Plant and Environmental Protection Sciences, ²Mauna Kea Tea, ³Human Nutrition, Food and Animal Sciences

There is considerable interest in both drinking and producing tea. Consumers purchase tea based on their tastes and preferences and the price they are willing to pay. The selection of a tea for personal consumption is subjective; however, an understanding of its characteristics can add to the enjoyment of drinking tea. For grower-processors, the conventional markets for tea have certain expectations, and prices received are heavily determined by the quality of the product. For producers, it is necessary to have a knowledge of tea quality and especially of how production methods affect quality.

The objective of this publication is to help the consumer, grower, and processor understand how to evaluate green tea. The following three steps will be described to achieve this objective: 1) A description of the procedure for cupping tea; 2) A description of how the cupping procedure is used for evaluating green tea and the general characteristics that are evaluated; and 3) Identification of common defects in green tea and their associated causes. This publication is based on a workshop on green tea quality evaluation conducted by Mr. Takahiro Ino of Mauna Kea Tea.

I. Tea Cupping Procedure

The method described here is intended to help you to identify common defects in green tea rather than casually tasting tea for pleasure. Therefore, the ratio of tea to water, water temperature, and steeping time will be greater than what you would usually use for brewing green tea for casual drinking. The resulting brew is intended to be quite strong and intense to bring out the tea's characteristics. With training, the taster will be

able to identify defects. Quality evaluation also involves noting the aroma and appearance of the dry leaves, wet leaves, and liquor.

Uniformity is important: Use the same type of vessel (e.g., a standard 3-piece ceramic cupping set consisting of brewing cup with cover and bowl) and brew using the same conditions (amount of tea, type of water, temperature, and steeping time) for all the samples.



Fig. 1. Standard 3-piece cupping set

Materials and supplies

- standard 3-piece ceramic cupping set consisting of brewing cup with cover and bowl (Fig. 1)
- timer
- spoon
- container for discarded tea
- tea to be cupped: 3 grams
- water: 150 ml (5 ounces) per sample. Water should be of high quality, as dissolved minerals and chlorine will affect the tea's flavor. Tap water may be able to be used in Hawai'i, but if necessary, use distilled or bottled water.

II. Brewing Protocol**Step 1.**

Measure out 3 grams of tea. Examine the dry leaf (Fig. 2) for the following characteristics:

- Appearance: color, shape, size, rolling, uniformity, powder, stems
- Density (tightly rolled tea will be heavy, loosely rolled tea will be light)
- Feel: brittleness, flexibility, smoothness
- Aroma

Step 2.

Put tea in brewing cup and add 150 ml (5 ounces) of boiling water. Cover and start timer. At the end of 5 minutes, strain by holding cover and tipping into bowl. The cup

should rest comfortably on the bowl, as shown in Fig. 1. Let the liquor drain out.

Step 3.

Examine wet leaf (Fig. 4) and record your impressions.

- Aroma: most intense when the leaves are hot and the cover of the cup is slightly opened. The aroma is generally more revealing in the brewed leaf than in the aroma of the liquor. Aroma can indicate leaf maturity, stiffness, wither, fire used in roasting, and mishandling.
- Appearance: color, uniformity, oxidation, degree of openness, broken pieces
- Feel: Young leaves have “bounce.” They are resilient (like a soft sponge), whereas older leaves feel stiffer.

Step 4.

Examine liquor, then use spoon to slurp, swirl in mouth, and spit out. Taste twice. Record your impressions. Slurping involves sucking in the liquor quickly and forcefully so the tea is sprayed in and fully covers the mouth and tongue. This frees the volatile compounds while also cooling the tea.

- Aroma: should be strong, due to length of brew.
- Appearance: color, brightness, clarity/cloudiness, particles
- Taste: flavor, intensity/depth, astringency, lingering, and aftertaste. Also body, mouth feel, richness



Fig. 2. Examine the dry leaf



Fig. 3. The tea liquor before draining



Fig. 4. Examine the wet leaf



Fig. 5. Pour the liquor into the bowl and examine it

III. Common Defects in Green Tea Production and Processing and How to Detect Them

Improperly harvested tea: Lack of uniformity in leaf ages is a common problem. Young leaves contain more moisture than older leaves. After processing, over-matured leaves will appear yellow, flat, hard, and flaky.

Improperly withered tea: Over-withered green tea will show signs of oxidation—look for a reddish tinge along the leaf margins (Fig. 6).



Fig. 6. Improperly withered tea. Note the red leaf margins.

Insufficient heat during the fixation (kill-green) procedure: This results in continued oxidation, which causes the tea to lose its green color and fresh smell. The leaves may also have a reddish tinge (Fig. 7).

Excessive heat during the fixation (kill-green) procedure: Leaf turns yellow, similar to the way over-cooked broccoli is yellowed and limp rather than green and crisp. Leaf veins may show reddening (Fig. 8).

Inadequate rolling of tea: Liquor is light and has a flat taste. May also show red in liquor and brewed leaf.



Fig. 7. Insufficient heat used during fixation (kill-green) procedure



Fig. 8. Excessive heat used during fixation (kill-green) procedure

Excessive rolling of tea: Leaf edges appear tattered and falling apart. Look for powder and flakes in the dry leaves and in the liquor. The liquor is cloudy and may be bitter, and the wet leaves could be sticky and/or soft (Fig. 9A & B).

Insufficient drying: Tea becomes moldy in storage.

Excessive drying: The tea is very fragile and easily crumbled.

Disclaimer

Mention of a trademark or proprietary name does not constitute an endorsement, guarantee, or warranty and does not imply recommendation to the exclusion of other suitable products.



Fig. 9 A & B. Excessively rolled tea.