

## **Study on the Shoot Characteristic and Made Tea Quality of Rare Local Cultivars**

Hun-Yuan Cheng Horng-Jey Fan<sup>1,\*</sup>

The purpose of this experiment was to understand the tea shoot characteristic, made tea quality and chemical composition of rare local cultivars, for the establishment of the production and manufacture technology achieve to develop special tea production. Experimental cultivars were including eleven local cultivars and two control cultivars for the shoot characteristics, made tea quality, chemical composition analysis. The experimental result showed that the catechin contents of Dah Nan Wan Bair Mau Hour and Bair Mau Hour were higher than other local cultivars. The EGCG content of Bair Mau Hour cultivar series was up to 80 mg/g. Heh Mau Hour and Bair Mau Hour cultivar series had more higher tea quality, Bian Joong Oolong also had best tea quality, Jy Lan cultivar series, Shiang Yuan, Gau Lu had slightly lower quality.

**Key words:** Tea tree, Local cultivar, Made tea quality

## **Resource and Utilization of Taiwan Wild Tea Tree**

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Taiwan wild tea trees were distributed in Nantou, Chiayi, Kaohsiung, Taitung county and were located in east and west side of the central mountains at 800-1,600 meters above sea level. The relatively completed distribution areas were Dongshin Forest District Office of Mei-Yuan mountain in Nantou city, Liouguei Research Center, Taiwan Forestry Research Institute in Kaohsiung county, Nan-fong and Min-ghai mountain of Maolin district, due to mainly had set up protected areas in the early stage. In addition to distributed area, the Fanlu township, Chiayi county, Yushan forest district office, Shuei-ling and Cao mountain. Yong-kang mountain, Yanping township, Taitung county for the distribution of most eastern margin. However, some of the original habitat ecological environment had been destroyed due to development or reforestation, so that the habitat of the wild tea trees and the number are decreasing gradually. For the maintenance of biological diversity, and to conserve plasma of wild tea tree, make them as an experimental materials and development of new products, the tea cultivar gardens in the Tea Research and Extension Station, Yuchin and Taitung branches had been set up to save the collection of germplasm. But only parts of wild tea from original habitat population were collected, wild tea tree protection and their habitats should also conduct at the same time, so as not to be lost the important genetic resources due to man-made or natural factors. According to the Bi-Hei travels diary (1697) attached brochure aboriginal territory Addendum, Zhu-luo county annals (1717), Record of a tour of duty in the Taiwan strait (1723) by reference according to topic begins with Chi-kan sketches and notes, Taiwan ancestors had utilized the wild tea trees to produce and roast teas for sale. From inhabitants' dictation of Taitung Yong-kang also knew that the local people also had been to the mountains to collect and process wild tea in 1971. There were few artificialcultivated wild teas for sale in Liouguei and Taoyuan district, Kaohsiung city. This was the recent utilization example of wild tea tree. Native wild tea has a special taste and aroma. To retain the original characteristics, the direct utilization to process tea can become alternative new products. Its shoot and leaf morphology and quality characteristics are different from the cultivated cultivars, and have showed significant differences. It is a local tea product that worth to develop and utilize.

**Key words:** Taiwan wild tea tree, Resource, Utilization

## **Selection of Fungicides for Suppression of Coffee Anthracnose Mycelium Growth**

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Anthracnose disease is one of the economic limiting factors in coffee production. Coffee anthracnose is caused by the several *Colletotrichum* species producing damages on leaf, branch and particularly on fruit. Several disease syndromes on susceptible coffee cultivars reportedly included growth reduction and yield loss. There is no pesticides that are registered for use in coffee plants in Taiwan under the regulations legislated by Council of Agriculture of Executive Yuan in Taiwan. In this study, among 9 candidate pesticides were tested to control anthracnose disease on coffee plants. Three *Colletotrichum* isolates, designed as TYL-1, MML-3, and MMF-8, were isolated from diseased leaves and fruit of arabica coffee plants cultivated in "Tea Research and Extension Station" in Taoyuan county and Dahu Township in Miaoli County. Potato dextrose agar added with individual pesticide was used to evaluate the efficacy of different concentrations on inhibiting the mycelium growth of these three isolates. The tested pesticides of "Pyraclostrobin", "Difenoconazole" and "Fluazinam" could inhibit the mycelial growth of the three *Colletotrichum* isolates completely with EC50 values < 10µg/ml. The results of tested with "Tebuconazole", "Benomyl", and "Kasugamycin hydrochloride + Carbendazim" were showed the inhibitions of mycelial growth of all isolates with EC50 values < 100µg/ml.

**Key words:** Coffee anthracnose, Sensitive/resistance, Fungicide

## **The Study of Brewing Rules for Different Teas**

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The teas including green tea, white tea, Paochong tea, red oolong tea, and black tea were made from the tea leaves of same harvest-conditions in this study. The objective of this study was to investigate the variation of chemical constituents and sensory comments of teas which were made from different producing processes and techniques and in continuous extraction. Results showed that soluble solid contents (SSC) of teas in descend order were white tea (30.65%), Paochong tea (30.64%), green tea (29.34%), black tea (28.79%) and red Oolong tea (24.91%). The soluble solid contents were decreased with the increase of brewing times in continuous extraction. There were significant differences of SSC among various teas. At the first brewing, black tea had higher SSC (16.10%) than 6.87% of white tea. At the fifth brewing, white tea had higher SSC (3.12%) than 2.85% of black tea. The results revealed that different teas might have different extraction rates.

**Key words:** Tea, Brewing, Biochemical composition, Extraction, Soluble solid contents (SSC)

## **The Investigation of Increasing the Extraction Rate of Tea Chemical Components by Freezing and Cutting Processes**

Chih-Chun Kuo<sup>1</sup> Kuo-Jen Chen<sup>2</sup>

Taiwan tea beverages are very popular and widely consumed. The annual tea consumptions have reached 20 thousand tons. The tea beverage market is well-prospected. We compared the tea chemical components extraction rate of the hot-brewed and cold-brewed tea which was treated by cutting or freezing to the traditional process of green tea and Paochoung tea. We try to find out a process which could cost down by higher tea ingredients but still conserve the high quality of Taiwan tea. The result shows that both cutting and freezing can increase the extraction rate of tea chemical components,

especially hot-brewed tea. The hot-brewed tea which was treated both by cutting and freezing has the higher chemical components, the stronger taste and the better aroma. The extraction rate of the tea chemical components has better improvement in cutting Paochoung cold-brewed tea. The freezing treatment can make chemical components of non-cutting cold-brewed tea's reach the cutting cold-brewed tea's level. The taste and the aroma of the freezing cold-brewed teas are better than teas with hot-brewed. Therefore, we recommend cold-brewed teas with freezing process for getting higher extraction rate and better taste.

**Key words:** Freezing process, Cutting process, Extraction rate

## **A Study on the Energy Efficiency of Traditional Continuous-flow Type Tea Dryer**

Cheng-Hou Chang<sup>1</sup>

Because the excess energy consumption and heat lost in tea processing operations, the energy efficiency of traditional tea dryer should be studied and improved. The research would study energy efficiency of the tea dryer which was continuous-flow type by preheated test and tea drying tests. According to the results of experiments, the energy consumption rate of dryer was maximum during temperature increase period of dryer preheated process and the energy efficiency of dryer was proportional to moisture content of tea, but the energy cost and the ratio of carbon dioxide exhaust were reverse proportional. Especially, those ratios were higher when the moisture of tea was less than 5%. Additionally, the cost and the carbon discharge of fuel ratio were above 97% in amount of energy and the temperature of the middle and bottom layer was higher than that of the top layer in the chamber of dryer, the averaged temperature of output air was about 1.9 times higher than the input air, and the average temperature of combustion exhaust gas was about 1.4 times higher than the drying temperature. The energy efficiency of the tea dryer is suggested to be improved by recycled heating in the tea processing.

**Key words:** Tea, Dryer, Energy efficiency

## **The Profile and Perspective of Taiwan Tea Industry**

Cheng-Nan Lai Iou-Zen Chen<sup>1,\*</sup>

There were seemed to be great crises in Taiwan tea industry go through internal and external impacts all the year around. Owing to its consumption habits of tea and more stable basis of tea industry, it just aims to the disadvantages of tea industry, goes to improve and conduct more vigorous practices, and then it could extricate itself from impacts, challenges and create more bright future.

**Key words:** Tea, Tea industry, Development

## **The Investigation of Drinking Safety of Pu-Erh Tea and Aged Tea**

Chih-Chun Kuo Kuo-Jen Chen<sup>1</sup>

Recently, Pu-Erh tea and aged tea are popular due to their collection value. However, the multifarious preservation ways cause the consumer concerns about the safety of drinking Pu-Erh tea and aged tea. Thus we collected different types of Pu-Erh tea, aged tea and Taiwan tea without aging, and compared the plate count of viable microbes. Results show that the total plate counts of Taiwan tea without aging,

sun-dried green tea, Pu-Erh raw tea and aged tea by boiling water brewing are in accordance with the Sanitation Standard for Beverage requirements. There is 10.34% of the Pu-Erh ripe tea beyond the standard requirements. Therefore, we recommend consumers should to choose the tea which is well-packaged and well-preserved.

**Key words:** Pu-Erh tea, Aged tea, Total plate count

### **Inhibitive Effect of Mating Disturbance Pheromones for Tea Tortrix**

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This study aims to understand the inhibition effects of smaller tea tortrix and tea tortrix with the different density (5m and 10m interval) of the carrier (TPE: DOP: Pheromone = 97.9: 1.6: 0.5) and synthetic sex pheromone ((Z)-9-tetradecenyl acetate: (Z)-11-tetradecenyl acetate: (E)-11-tetradecenyl acetate: 10-methyldodecyl acetate = 63: 31: 4: 2. Each mating disturbance pheromones is prepared with the total content of all pheromones to be 85 mg) placement in the fields (Taoyuan Yangmei and Hsingchu Guanxi). The results showed that the mating disturbance pheromones both effectively inhibited the growth of smaller tea tortrix and tea tortrix. However, the regression equation indicated that the inhibitive effect of high density placement of mating disturbance pheromones was better than that of the low density placement when there were less than 600 smaller tea tortrix in the field. The difference of inhibitive effect between high and low density placement would become insignificant with more than 600 tea tortrix. In addition, the high density placement of mating disturbance pheromones performed better on the inhibition of tea tortrix, but both the high and low density placement could effectively control tortrix number.

**Key words:** Tea, Sex pheromone, Mating disturbance pheromones, Smaller tea tortrix moth, Tea tortrix moth

### **The Selection of Repellent Plant on the Pest and Weed Controls in Tea Garden**

Shiou-Ruei Lin<sup>1</sup> Chui-Feng Chiu<sup>2</sup>

The purpose of this study was to select the repellent plants planting between tea lines to control tea pests. The testing repellent plants were Lemon grass, African Marigold, Pannyroyal, Corsican mint, pig thigh, bee balm, lavender, variegated Mexican mint, Asiatic wormwood, goldcrest, silver thyme, and rosemary. The growth of Lemon grass, African Marigold, Pannyroyal and bee balm were exuberant. Pannyroyal and bee balm could slightly inhibit the weeds growing especially. Bee balm could obviously repellent tea small green leafhopper, and Pannyroya could repellent tea mites. In this study, it recommended the repellent plants Bee balm and Pannyroya to plant in tea garden.

**Key words:** Repellent plants, Bee balm, Pennyroyal, Tea small green leafhopper, Tea mites