New Cultivar of Black Tea-TTES No.21

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TTES No. 21 (strain code: FKK-22) is the twenty-second seed of FKK-1(female parent is Kyang from India, male parent is Kimen from Kimen) natural hybrids' collections. Following seed germination, TTES No.21 was cultured by testing and studying for more 40 years to become suitable for making the goodness variety of strongly aromatic black tea. This cultivar was adopted by the review in October 17, 2008, and is officially named " TTES No. 21."

The goal of selecting and breeding this cultivar of black tea from the Tea Research and Extension Station is to use the breeding procedure to select new hybrid cultivar s with the characteristics of Assam, the strong aroma of Kimen, and the high resistance to strong winds. Therefore, the Tea Research and Extension Station Yuchih Branch has been performing these breeding exercises since 1946. It has already selected and bred several excellent cultivar s of black tea, and FKK-22 is one of them.

TTES No. 21 is a small tree which is: upright in shape, strong growth potential, long oval leaves, middle sized leaves, green color, tip is bending down, long and narrow leaf base, leaf margin is microwave-like, wavy leaf shape, leaf with a small degree of folding, serrated leaf shape that is sharp and waxy, short petiole, tea buds that sprout early, short internode, low density of tea bud, fine hair is short and dense, bears fruit easily, with good resistance to wind and drought.

The quality of TTES No. 21 with the advantages of the parental species of Assam and Kimen is excellent. The tea soup is bright gold and red. It tastes sweet and fresh, and the aroma from the rich flower and fruit is excellent. The aroma is similar to the bloom of citrus flowering plants. Foreign and native reviewers of the tea industry have highly praised this new species of black tea with it excellent fragrance being heavily promoted.

Key words：Tea, Hybrid breeding, Black tea, TTES No. 21

Variations of Agronomic Characters and Histological Structure of Chin-Shin Oolong in Tea Plantations with Different Altitudes

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m), Shanpingding (534 m), Shrbi (1,275 m), Santsengping (1,560 m) and Wuling Farm (2,048 m). The autumn and winter season of 2006, and the spring and summer season of 2007 were selected as the test periods. The main focuses of investigation were the agricultural characteristics of the young tea shoots, the histological structure and the chemical composition of the tea leaf, and the quality of the tea leaf. Moreover, the relatively simple correlation coefficients among these characters were further clarified. The results are described as follows:

1. Agronomic characters of the young tea shoots

Jaujingshan: The first internode diameter, the second internode diameter, the first internode length, the second internode length, the second leaf thickness, the second petiole length, the third leaf length, the third leaf width, thickness, the third leaf area, and the third petiole length all displayed significant differences between these seasons. In comparison, in Shanpingding, only the first

internode diameter and the third leaf length/width did not show significant differences between the seasons. In Santsengping, both the second internode length and the second petiole length were not significantly different between all seasons. Finally, in Shrbi and Wuling Farm, the results show there were sixteen different agricultural characteristics of young tea shoots, pointing to the important differences between these seasons.

2. Histological structure of the tea leaf

Jaujingshan: Both the first and second palisade cell widths are at the maximum point in the winter tea. Shanpingding: the palisade tissue thickness and the first palisade cell length are at the maximum point in the winter tea. The first palisade cell width and spony tissue thickness are at the maximum point in the spring tea. Shrbi: Mesophyll thickness and the first palisade cell density are at the maximum point in the spring tea. The second palisade cell width is at the maximum point in the winter tea. Santsengping: the first palisade cell density, the second palisade cell density and Spongy cell density are at the maximum point in the spring tea. The spongy cell length, lower epidermis cell width and lower epidermis cell length are at the maximum point in the winter tea. The above-mentioned properties of the leaf histiocyte in the tea area are mostly shown in the summer and autumn tea. There are thirteen investigations showing the spring and winter tea present the maximum results. The winter tea has largest palisade tissue in every tea area.

Key words：Tea, Agronomic characters, Histological structure, Altitude

Effects of Shoot Retention Period on the Yield and Quality of Tea Trees in Summer Season

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This experiment was conducted to establish a suitable summer shoot retention period and healthy shoot cultivation techniques, to improve whole year tea shoot yield and quality. The experiment was performed from 2003 to 2007 in Lungteng, Luyeh district, Taitung, with TTES No.12. The shoot retention period treatments included (A) 120, (B) 105, (C) 90, (D) 75 days and (E) no retention (CK), respectively. The results of the experiment showed plant height, plant width, shoot length, shoot diameter and leaf thickness of shoot retention treatment were higher than with no retention treatment. But the shoot number showed a contrary trend. After pruning, the shoot density was clearly different among retention treatments at the beginning of the tea season, and showed a gradually decreasing trend with an increased retention period. As the pruning number was increased, the shoot density of the retention period treatments did not display a clearly significant difference. The change in the other yield characteristics was smaller than that of shoot density. The first tea season after pruning showed a retention benefit for tea trees of middle vigor. The second tea season displayed a clear retention benefit for tea trees of stronger vigor. Regardless of the tree vigor, a retention of 90 and 105 days showed higher tea shoot yield. The quality of made tea was not very stable which conducted retention treatment in the early tea seasons after pruning. The trend is that the tea quality had slightly decreased with longer retention period. But tea quality had become better through tea seasons increased gradually.

Key words：Tea tree, Shoot, Retention period, Yield, Quality

Estimating the Feasibility of Element Analysis for Certificating Production Origin of Taiwan Teas

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In this research, the feasibility of certificating the production origin of Taiwan tea was studied by comparing the differences in the element composition between Taiwan and imported tea. We used ICP-OES to analyze 9 elements in 97 Taiwan tea samples from different tea production areas and 28 tea samples from Vietnam, China and Japan. According to the results of principal component analysis, the distribution of Vietnam tea samples was more concentrated than others. However, the Vietnam tea samples couldn't be effectively separated from the Taiwan tea samples. The result of principal component analysis showed the 32 high-mountain tea samples from Taiwan could be separated from the 12 Taiwan-style Oolong tea samples imported from Vietnam by ICP-OES. The above results indicated element analysis by ICP-OES could roughly separate the tea samples from some specific areas, but was not sufficient direct proof of the production origin of Taiwan tea. To certificate the production origin of Taiwan tea, we need to develop more sensitive and stable methods of element analysis, for example ICP-MS or isotope analysis. As well as element analysis, chromatography and DNA analysis can also be used for certificating the production origin of Taiwan tea.

Key words：Taiwan Tea, Geographical origin, Micro elements, Trace elements, Geographical indications

Study on the Qualitative Analysis of Free Amino Acids in Tea with DABS-Cl Derivatives and High-performance Liquid Chromatography

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The aim of this study was to analyze the free amino acids in tea with DABS-Cl derivatives and reversed-phase high- performance liquid chromatography. The results showed in the visible region (436 nm), twenty amino acids and γ-aminobutyric acid labeled with dimethylaminoazobenzenesulphonyl chloride in sodium acetate buffer system can be well separated. However, although the main free amino acids in tea, theanin, and threonine were overlapping and couldn't be properly separated, a lower pH buffer system (pH 4.13) could effectively separate both of the above. In conclusion, the method can effectively separate free amino acids in tea.

Key words：DABS-Cl derivative, HPLC, Free amino acid, Theanine, γ-Aminobutyric acid

Effects of Different Processing Methods on the Quality of Panning Green Tea

Jen-Feng Haung Shang-Shung Wu

This study aimed to clarify the effects of green tea materials and their processing on the quality of panning green tea. The effect on the quality of panning green tea was examined after the tea plant materials were subjected to a withering process (no withering and withering for 2, 4, and 6 hr) and a panning temperature (150, 200, 250 and 300oC). The panned green tea contained slightly less

chlorophyll a and b after being subjected to withering treatment, but its chemical composition and mineral content were not significantly affected. Its water color, aroma and taste were significantly better. This showed in processing green tea materials, the bitter, green taste of the materials was significantly improved after the materials were subjected to a slight withering treatment. The optimal duration for the withering treatment was 2-4 hr. The ideal panning temperature during the processing of green tea was 250oC, under which the green tea quality appeared to be better, its chlorophyll contents were not affected and its chemical components and mineral contents were not significantly altered.

Key words：Green tea, Withering, Agronomic characteristics

Exploration and Collection of Exobasidium Blister of Tea in Taiwan, 25th April-10th May 2005

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We surveyed Exobasidium blister of tea at 16 locations in Taipei, Yilan, Nantou and Chiayi Counties in Taiwan and collected 56 herbarium samples from 9 areas. We obtained 8 isolates of Exobasidium vexans. In Taipei and Yilan Counties, all tea cultivars infected by E. vexans were assigned to Oolong and Tonchang (Chinese tea). In Nantou and Chiayi Counties, cultivars infected by E. vexans were assigned to either Oolong or the hybrid with Camellia sinensis var. assamica and C. sinensis var. sinensis. In the germination tests, additional nutrients were required for germination in Difco Czapeck medium. There is a difference in the nutrient requirements for germination of basidiospores among the origin of isolations. Exobasidium spp. collected from Camellia and Rhododendron spp. are examined in ITS and L-rRNA (D1/D2) regions for homology searches. These isolates show 98-100% homology with Japanese isolates. Thirteen isolates of Exobasidium spp. collected in Taiwan were deposited for the first time in Genebank, NIAES as a result of this exploration. These were the collections of Dr. K. Sawada in Herbarium of National Taiwan University. Twenty-four herbarium specimens of E. vexans and E. reticulatum collected in Taiwan were observed.

Key words：Basidiospore, Camellia sinensis, Exobasidium vexans, Germination, Taiwan