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Study on the Correlation between Huiguo Technology and Sensory Quality of Hakka Fried Green Tea

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Abstract: Hakka roasted green tea is a characteristic product of Hakka region in Guangdong Province, but the research on the key technology of traditional Hakka green tea has not been in-depth. This study systematically studied the temperature and time of the pot in the pot process, and conducted experiments through the national standard sensory evaluation method. The pot time of 5h, 3H and 1H was set for different experimental groups at 100 ℃, 80 ℃, 60 ℃ and 40 ℃, respectively, to study the effect of the pot process on the sensory quality of Hakka green tea, strive to improve the aroma quality of Hakka green tea and directional control provides reference data.

1. Introduction

1.1 Brief overview of Hakka fried green tea

Hakka stir fried green tea is one of the traditional tea varieties in Guangdong. It is mainly distributed in Meizhou, Heyuan, Jieyang, Shanwei, Huizhou, Shaoguan and other places in Guangdong. It is locally known as "Hakka stir fried green tea", "Hakka stir fried tea", and "stir fried baby". The main cultivated varieties are Meizhan, Jinxuan, Huang Guanyin, and Jin Guanyin, mainly with medium and small leaves. The traditional technology of Hakka stir fried green tea mainly includes fresh leaves, withering, killing, rolling, drying Huiguo, etc., of which Huiguo technology determines the rate of moisture loss of tea, and also affects the thermophysical and chemical changes inside the tea, so it has an impact on the quality of Hakka fried green tea. Therefore, it plays a key role in the formation of special "fried rice flavor", "high fire flavor", "fried chestnut flavor", "high fire sweet flavor" and other aroma and gray green appearance quality characteristics in the quality of traditional fried green tea.

1.2 Research on the technology of Hakka fried green tea Zhonghui pot

At present, the research on the process of frying green tea in the frying pan mainly focuses on the process flow of the frying pan, the temperature of the frying pan and the time of the frying pan. For example, zhongxiaobing and other researchers proposed that the fried green tea under the combined drying and frying process has strong flavor and rich fried rice flavor, and the quality is due to the traditional Hakka fried green tea [1]; It is pointed out in the research on the influence of pot temperature on the aroma of roasted green tea that there is no final conclusion on the optimal

temperature of pot temperature at present. The general temperature is 100-110 ℃ at high temperature, 70-100 ℃ at medium temperature, and 40-70 ℃ at low temperature [2]; At the same time, some researchers have studied the influence of different growth time on the quality of fried green tea at high temperature, such as 1H, 2h, 4h, 6h, and so on. It is concluded that four different flavor types of fried green tea can be prepared by high temperature long-time glow pot, mainly including honey flavor with fragrance, chestnut flavor with fragrance, honey flavor and honey chestnut flavor [3]. However, there is no research on the relationship between the cooking pot process and the sensory quality of Hakka roasted green tea in the previous research. This research will focus on the research on the cooking pot temperature and time in the key process of roasting green tea, and comprehensively and systematically study the sensory quality of Hakka roasted green tea treated by different cooking pot processes, so as to provide reference for the quality oriented control of Hakka roasted green tea.

2. Materials and experiments

2.1 Experimental method

In this experiment, the control variable method was used to set up two groups of experimental samples with different cooking temperature and cooking time for a total of 12 comparative experiments.

2.2 Experimental design

Table 1: Table of the experimental design of the production process of the glow pot

Test No	Fresh leaves	Kill green	Rolling	desiccation	Bright pot
CK	Standard fresh leaves with one bud and three leaves	The 60 type drum cleaner is used, with a capacity of 10kg, a pot temperature of about 170 ℃ and a duration of 6-7min	The 55 type tea rolling machine is used to roll the tea according to the principle of "light heavy light". The time is 45min, and the strip forming rate is about 85%	It is dried in two stages, with a pot mouth of 80cm and a leaf turning speed of 20r/min. The first stage is fried at 90 ℃ for 30min, and the second stage is fried at 80 ℃ for 40min	Temperature 60 ℃, time 3H
Sample 1					Temperature 100 ℃, time 5h
Sample 2					Temperature 100 ℃, time 3H
Sample 3					Temperature 100 ℃, time 1H
Sample 4					Temperature 80 ℃, time 5h
Sample 5					Temperature 80 ℃, time 3H
Sample 6					Temperature 80 ℃, time 1H
Sample 7					Temperature 60 ℃, time 5h
Sample 8					Temperature 60 ℃, time 1H
Sample 9					Temperature 40 ℃, time 5h
Sample 10					Temperature 40 ℃, time 3H
Sample 11					Temperature 40 ℃, time 1H

In this group of experiments, the Hakka fried green tea operated by the conventional Hakka fried green tea pot was used as a reference. In the experiment, a total of 12 experiments were set, including the pot temperature of 100 ℃, 80 ℃, 60 ℃, 40 ℃, and the pot time of 5h, 3h, 1H. Among them, the samples with the frying temperature of 60 ℃ and the frying time of 3H were taken as the CK group. The experimental design is shown in Table 1 table of the experimental design of the glow pot process, and each treatment is repeated for 3 times.

2.3 Experimental materials

2.3.1 Sample raw materials

Raw material production area: Qingliangshan tea production area, Meijiang district, Meizhou City, Guangdong Province, with an altitude of 500 meters, an average annual sunshine duration of 2009.9 hours, a spring temperature of 12 ℃ -23 ℃, and an average annual rainfall of 1479.9 mm.

Fresh leaves: at the same time, they were harvested in the Qingliang mountain of Meizhou in spring, and the tea varieties were local Meizhan varieties.

Picking standard: one bud and three leaves.

Picking time: mid April.

Picking weather: sunny day, around 9 a.m., temperature 17-25 ℃, humidity 56%.

2.3.2 Main experimental instruments and equipment

Model 60 drum green killing machine, Model 55 tea rolling machine, dryer, hygrometer, thermometer, 150ml evaluation cup, 200ml evaluation bowl, evaluation disc, tray balance, etc.

2.4 Sensory quality test method

GB/T 23776-2018 tea sensory evaluation method national standard method was used to evaluate the five evaluation factors of sample tea, namely, the five factors of appearance (strip, color, uniformity, cleanliness), soup color, aroma, taste and leaf bottom.

Evaluation method: take 3g representative tea samples, place them in 150ml evaluation cup after warm scalding, fill it with boiling water, soak it for 4min, and evaluate the appearance, soup color, aroma, taste and leaf bottom with the percentage evaluation method according to the factor score coefficient of 25%, 10%, 25%, 30% and 10% respectively.

3. Results and analysis

According to the national standard method for the evaluation of Hakka fried green tea processed by different pot treatments, the results are shown in Table 2 table of sensory quality results of Hakka fried green tea processed by different pot treatments.

The Hakka fried green tea processed in different saucepans was evaluated by the percentile tea evaluation method. See Table 3 for the results of the percentile tea evaluation method of Hakka fried green tea processed in different saucepans.

According to the sensory evaluation results of Hakka fried green tea with different pot processes, only the comprehensive evaluation of samples 6, 10 and 11 was lower than that of the control group, and the other treatment effects were higher than that of the control group, of which samples 1, 2, 4 and 7 were significantly higher than that of the control group. The experimental data showed that the temperature (40-60 ℃) or short-term (1h-3h) boiling temperature and boiling time were not conducive to the aroma and taste of Hakka green tea, while the aroma and taste of high temperature (100 ℃) and long-term (5H) were significantly higher than those of the control group, mainly manifested as "fried rice flavor", "high fire flavor" and "fried chestnut flavor", and the taste was thick and mellow. The comprehensive results showed that the comprehensive performance of 100 ℃ experimental group was better than that of 80 ℃, The 80 ℃ experimental group was slightly better than the 60 ℃ experimental group, and the comprehensive performance of the 40 ℃ experimental group was poor.

Table 2: Sensory quality results of Hakka roasted green tea treated with different saucepans

sample	appearance	colour of tea	aroma	taste	Leaf base
CK	The rope is tight and curly, green and moist, and relatively neat	Lushangming	The aroma is high, with chestnut aroma and lasting	Shangchun	Soft, even and bright green
Sample 1	The strip is curly, gray green and oily, relatively uniform and clean	Yellow green bright	Rich fried rice flavor	Concentrated alcohol sweetening	Soft and green
Sample 2	The cords are curly, gray green, moist and even	Yellow belt green, Shangming	With fried rice flavor and lasting	Mellow and sweet	Soft and green
Sample 3	The string is still curly, yellow green with gray	Huang Shangming	pure	More alcohol	Soft yet even
Sample 4	The rope is relatively curly, dark green with gray, uniform and clean	Huang lvming	High fire aroma	Concentrated alcohol	Softer and brighter than yellow and green
Sample 5	The rope is curled, green and gray, relatively uniform and clean	Huang Ming	With high fire aroma, it is durable	Mellow	Soft and green
Sample 6	The rope is tight and curly, green and moist, and even	Green band yellow is brighter	The fragrance is high and sweet with honey, lasting	Mellow and astringent	Soft and green
Sample 7	The rope is tight, green and gray, even and clean	Green belt, yellow and clear	Fried chestnut with rich flavor	Concentrated alcohol	Soft, green and bright
Sample 8	The rope is tight, green and yellow, and even	Luming	Pure and lasting	Mellow and green	Soft, yellow and bright green
Sample 9	Tight, green and clean	Lushangming	Fragrance, lasting	More mellow and sweet	Soft and soft, yellow and green are even and bright
Sample 10	Tight, green and even	Green and bright	Pure and lasting	Mellow and sweet	Soft, green and bright
Sample 11	Tight and green	Luming	Shang Chun	Mellow and stuffy	Soft and green

Table 3: Results of Hakka roasted green tea percentage evaluation method with different pot treatments

sample	appearance	colour of tea	aroma	taste	Leaf base	Total score
	(25%)	(10%)	(25%)	(30%)	(10%)	
CK	21.50	8.50	22.00	25.50	8.90	86.45
Sample 1	23.00	9.30	23.25	27.90	9.00	92.45
Sample 2	22.50	8.50	22.50	27.30	9.10	89.90
Sample 3	22.00	8.80	21.00	26.10	8.80	86.70
Sample 4	22.75	8.70	23.00	26.40	9.20	90.05
Sample 5	22.25	8.40	22.50	25.80	8.90	87.85
Sample 6	21.75	8.60	22.25	24.90	8.85	86.35
Sample 7	21.88	8.70	22.75	27.00	8.70	89.03
Sample 8	21.63	9.00	21.75	25.20	8.90	86.48
Sample 9	21.25	8.90	21.50	26.70	8.80	87.25
Sample 10	21.00	8.60	21.25	25.80	8.60	85.25
Sample 11	20.75	8.90	20.75	24.90	8.50	83.80

4. Results and discussion

4.1 Effect of different cooking processes on the quality of Hakka fried green tea

At present, some studies have shown that the processing technology is the key factor for the formation of different aroma types of green tea. The appropriate cooking temperature and time are conducive to the formation of the quality of Hakka roasted green tea. Through the high-temperature and long-time cooking process, tea polyphenols are further oxidized, polysaccharides are further decomposed, the phenol ammonia ratio is reduced, and the bitter taste is reduced. At the same time, it is conducive to the formation of volatile organic compounds, including aldehydes, hydrocarbons, ketones, alcohols. The lipid content was significantly improved [4]. At the same time, in the high-temperature and long-term cooking process, the aroma was concentrated and the taste was thick and mellow. In the high-temperature and long-term cooking process, researchers such as Hu Die pointed out that the formation and content of 17 key aroma types in the cooking process were significantly affected by temperature factors, time factors and temperature time interaction factors, among which the formation and content of fried rice flavor α- Limonene and δ- The content of dusonene was significantly affected by time and temperature time interaction factors, forming high fire aroma α- The content of cyclamene is significantly affected only by temperature [5].

The results of this study showed that different cooking processes had significant effects on Hakka fried green tea. After high temperature and long-term cooking process, the tea polyphenols in tea were effectively removed, the aroma of traditional Hakka fried green tea was promoted, and the alcohol concentration of tea soup was improved. At the same time, with the reduction of cooking temperature and time, the aroma showed a change trend of "fried rice aroma - high fire aroma - fried chestnut aroma - fragrance", which was roughly consistent with the previous research results.

4.2 Next improvement measures

This experiment explored the effects of different cooking processes on the sensory quality of Hakka fried green tea. The experimental materials were all spring tea raw materials. In order to further systematically and deeply study the relevant change laws in different seasons and regions, the next stage of research will select Hakka fried green tea raw materials in different seasons and regions for further research, and increase the dimension of different tenderness, Further enrich and improve the comprehensiveness of the research, and increase the research on the content and aroma components. The research on the content and aroma formation mechanism of Huiguo technology is also the focus of the next step.

4.3 Conclusion

The experimental results showed that no matter which treatment method of the Huiguo process experimental group, it had a positive significance for the improvement of the quality of Hakka roasted green tea, especially for the formation of high aroma. To a certain extent, the Huiguo process reduced the bitter taste of green tea, and improved the concentration of taste and aroma components.

Among them, the treatment method of 100 ℃ and 5 hours was the best. The comprehensive evaluation score was 92.45 points, which was significantly higher than that of CK group. The treatment effect of shape and 80 ℃ on the bottom of leaves and 5 hours on the bottom of leaves was the best. The overall performance was more curly, dark green with gray, uniform and clean, and the bottom of leaves was softer and brighter than yellow green; The color, aroma and taste of the soup were the best when the cooking temperature was 100 ℃ and the cooking time was 5h, which showed that it was yellow green and bright, the aroma of fried rice was rich, and the taste was thick,

mellow and sweet. Therefore, high temperature for a long time is conducive to improving the quality of Hakka fried green tea.

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