

GRANULAR GREEN TEA

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Abstract

The research objective is the new technology of the granulated green tea with antioxidant properties and its solubility in boiled water. Object of research is served: fresh shoot of tea, steamed tea shoot (granules received from them). Quality of tea is defined by physical and chemical indicators of infusion: colour, transparency, aroma, taste, body. The technological scheme of granule processing is the following: steamed tea leaf, partial drying of steamed reception of granules and drying. Extraction of cellular juice, tea leaves; to achieve the result we used different sizes of a matrix for reception of granules. After the launching experiments, we established the optimum size of granules as following: matrix thickness (3, 5 and 10 mm) and the diameter of a pore (3, 5 and 7 mm). Four times drawing of granules in boiled water defined the physical and chemical indicators of received samples: definition of extractive substances is – tannin method of Vorontsov and catechins method of Bokuchava. As a results manufacturing method of the granulated green tea are yielded. The product is characterized by fast dissolution after drawing it to boiled water and this feature considerably surpasses usual tea. This product is rich with catechins which possess antioxidant characteristic and P vitamin activity. It is remarkable, that this method is simple enough. Farmers engaged in a small-scale tea business can use it. Our technology satisfies market requirements, and we consider sale possibility in those countries where products of green tea are traditionally popular.

Key words: *granular green tea, catechin, antioxidant, tannin.*

Introduction

China the homeland of tea offers the wide assortment of production of tea (Kalinin, 2002). In Georgia, manufacturing of black tea, green tea, green brick tea and black tiled tea are can be practiced (Majsuradze, 2010; Lazishvili, 2004).

Materials and Methods

Materials used: gentle shoots of tea, steamed flesh (granules received from them); installation for producing granules: inside of the case are placed rotating screw conveyer and the cutting tool consisting of motionless grids which have apertures of various sizes.

Influences are investigated: humidity of a material in formed profiled weights, the sizes of a main matrix, diameter in limits (3–10 mm) and the solubility feature by 4 times drawing in boiled water. In each extract the total amount of extract substances, phenol mixtures and catekhins were defined.

Solubility of granules obtained by us was compared to the Chinese granulated tea purchased in Batumi trading center.

Results and Discussion

The first debt represents considerable interest to establish at what humidity the profiled products are formed.

Experiences showed that optimal steaming of tea leaf is 5 minutes at temperature 95–100 °C. The best try was the 20% extraction of tea cellular juice from initial mass of tea leaf. Maximum amount of phenol mixtures and catekhins were retained both in cellular juice and granulated tea. This product is rich with catechins which possess antioxidant characteristic and P vitamin activity (Lazishvili and Kobakhidze, 2003). By our technology we made two products: liquid cellular juice which can be used for ice tea, lemonade (Seidishvili et al., 2004) and syrup production; the other is granulated green tea.

It is important to define at what humidity the profiled mass is formed. Experiments showed that it is reached at humidity of 56.1–60.7%. Diameter of matrix should be 5–10mm and the thickness of 3–5mm. However at smaller diameters, for example 3mm and at raised humidity of 60.7% profiled weight is not formed.

Solubility of tea production is one of the major indicators of quality of production. Tea granules received by our technology have appeared quick-dissolving while keeping in boiled water for 10 minutes. More than 85% of soluble substances pass in tincture after 4 multiple drowning in boiled water. For comparison the granulated Chinese green tea is taken. At different apertures of matrix diameter and thickness (d_3h_3 , d_5h_5 , $d_{10}h_5$) doesn't render essential influence on solubility of granules.

That's how granules received at d_3h_3 , d_5h_5 , $d_{10}h_5$ almost equally dissolved in hot water.

It is necessary to notice, that by solubility degree on total of soluble substances phenol connections (tannins), including (catekhins) surpass others. See table 1.

Table 1

Relative indicator of solubility on total extract substances and phenol connections, including catechins in granules and in the Chinese tea, at 4-times multiple drowning in boiled water with their definition in each infusion (100% the sum of all 4-times infusion is taken), %

Frequency rate of infusion	Granules d_5h_5			The Chinese tea "Elita izumrud"		
	Extract, %	Phenol, %	Catechin, %	Extract, %	Phenol, %	Catechin, %
I	85.8	74.3	68.5	77.5	73.1	66.1
II	10.5	17.1	22.1	19.3	19.2	23.4
I+II	96.3	91.4	90.6	96.8	92.3	89.5
III	2.3	5.7	5.3	1.8	5.8	6.1
I+II+III	98.6	97.1	95.9	98.6	98.1	95.6
IV	1.4	2.9	4.1	1.4	1.9	4.4
I+II+III+IV	100.0	100.0	100.0	100.0	100.0	100.0

In tea there are substances which possess ability to dissolve faster in hot water, for example: caffeine, amino acids, monosugar, etc.

It is remarkable, that granulated tea of a new kind offered by us it is also possible to name the granular or ball figurative tea radically differs from the granulated teas produced nowadays. Difference is both on quality and on technology.

Technologies of reception of small granules of tea directly from a fresh tea leaf as CTC (Chanturia, 2000) are known also.

For this purpose dried tea leaf is crushed to fine-dispersed conditions with the sizes of particles 0.8–1.1 mm and thus granules by a method of balling without preliminary consolidation turn out. These small granules are used for preparation of bags of disposable consumption.

The way developed by us does not demand preliminary crushing to such degree to receive fine-dispersed weight (0.8–2.6 mm), and also there is no necessity of balling in the special device. It is enough to press through the granule in apertures of a grid installation. Reception of granules is provided at the expense of properties of steamed tea leaves which arrive in screw of the chamber; they are exposed to intensive mechanical influence from the screw blade of screw conveyer, gradually are condensed and resulted in dense weight. This weight of tea is forced through apertures of a matrix and pressed in profiled continuous or partially continuous weight. Profiled weight remains even after drying.

There are many theories explaining receptions of the connected body from loose materials (pasta, granular forages, briquette of peat, etc.) for each method substance play a role which promote consolidation process. So, for example in macaroni manufacture is gluten, in peat humic acids and etc.

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Tea fleshes maintain considerable quantity of substances possessing colloid properties, such as pectin substances and hemicellulose which can give plasticity and viscosity properties to tea and finally, the connected body is formed.

All these substances in process of granulation are exposed to transformations. Most of all phenol connections, in particular catechines change. In formation of profiled weights of a granule, undoubtedly, pectin substances take part in the presence of sugars and acids.

Finishing article, we should state an estimation of this new production of tea at which it is necessary to consider, that in it all elements of flesh are put in pawn. Starting from the most gentle parts of flesh - the first sheet with a kidney, finishing by the coarsened third sheet. Talking about the success of product; the last words are on customer.

However we should give them organoleptical estimation. Experts have noticed that the presented samples on color of infusion, taste, aroma and on color of boiled leaves are quite comprehensible (Table 2).

Table 2

Organoleptical estimation of pre-production models of the granulated green tea
(Experts for organoleptical estimation – R.Tsintsabadze, A.Sardzhveladze, G.Malanija)

Manufacturing date	Diameter of granules, mm	Appearance	Color of infusion	Taste aroma in balls			Color boiled leaves
20.05.10	3	Has the form of granules	intensive a reddish shade	-	3.50	3.50	Wholeness of granules remain, color is homogeneous
	5	Has the form of granules	intensive a reddish shade	-	3.00	4.00	Wholeness of granules remain, color is homogeneous
	10	Has no form of granules	intensive a reddish shade	-	3.00	4.50	No wholeness of granules remain, color is homogeneous
20.07.10	3	Has no form of granules	intensive a reddish shade	-	4.00	3.50	Wholeness of granules remain, color is homogeneous
	5	Has no form of granules	intensive a reddish shade	-	3.75	4.00	Wholeness of granules remain, color is homogeneous
	10	Has no form of granules	intensive a reddish shade	-	3.75	3.25	No wholeness of granules remain, color is homogeneous

Manufacturing date	Diameter of granules, mm	Appearance	Color of infusion	Taste aroma in balls			Color boiled leaves
03.09.10	3	Has no form of granules	intensive a reddish shade	3.50	3.50	3.50	Wholeness of granules remain, color is homogeneous
	5	Has no form of granules	intensive a reddish shade	4.25	4.25	4.25	Wholeness of granules remain, color is homogeneous
	10	Has no form of granules	intensive a reddish shade	4.00	4.00	4.00	No wholeness of granules remain, color is homogeneous
29.09.10	3	Has no form of granules	intensive a reddish shade	4.50	4.50	4.50	Wholeness of granules remain, color is homogeneous
	5	Has no form of granules	intensive a reddish shade	3.50	3.50	3.50	Wholeness of granules remain, color is homogeneous

The technology offered by us has advantages before STS – technology. The matter is that the majority of its production of 60–70% so small, that demands packing in bags. It is connected with the big expense tare packing a material. And our production can be packed into cardboard boxes.

Conclusion

We consider, that the granulated tea received by us with the simplified technology to enrich assortment of tea production.

References

1. Kalinin C. // Fabrication stages of tea and tea auctions. 2002. Source: http://tandc.far.ru/tea/tp_tea.htm, resource used on 01.02.2011.
2. Majsradze, Z. *Bases of technology of the black granulated tea*. (2010) Ozurgeti,
3. Lazishvili, L., Kobakhidze M. (2003) Preventive cold green tea. *J. Kvali*, 4–5, pp. 20–21.
4. Seidishvili, N., Kobakhidze M., Lazishvili L. (2004) Cold green tea with vitamins P and C. *J. Beer and beverages*, 4, pp. 96–97.
5. Chanturija, O. (2000) Produce black, green, yellow and red tea. *J. Kofe and tea in Russia*, 2(13).
6. Lazishvili L. *Concept about rehabilitation and development of tea production in our country*, Batumi, booklet, 2004. pp. 6–7.