

UDC 633.3:658.562

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POST-HARVEST TECHNOLOGY LINE STEVIA (*STEVIA REBAUDIANA* BERTONI)

*On the basis of earlier studies of the kinetics drying stevia under different temperature conditions and the results of the study storage of received post-harvest production line developed stevia (*Stevia rebaudiana* Bertoni). The production line is fully automated, which invited convective drying national production. The results of evaluating the quality of the products indicate a production according to customer demand guaranteed quality.*

Keywords: technology, stevia, raw materials, quality products.

Introduction. The issue of the day is providing of population ecologically by net products and increase of their competitiveness through introduction of scientific and technical achievements. The not last role in the decision of this problem belongs natural to the sugar substitutes of got from stevia, quality of which depends on quality of leaves stevia (*Stevia rebaudiana* Bertoni) as raw material. In the world a work - load of modern processing enterprises is from the leaves stevia makes 35-45% [1]. About of 60% of leaves stevia are made in of China, which mainly has not high quality [2, p.41]. Producer concentrates from stevia in of Ukraine of today not provided in a complete measure domestic raw material and buy in imported, which mainly has high maintenance of stem, particles of soil, and others like that. Low of quality stevia as raw material results in complications in the technological process of its processing and to worsening of quality of the prepared products [3].

Post-harvest treatment includes the row of successive technological processes: cutting away, drying and storage. At cut away stevia in a rain period of leaves acquires a brown color which considerably worsens them commodity quality. Problem aspects під time of the post-harvest providing of optimum terms is for the decline of mass particle moisture in vegetable which raw material of the proper quality [4, p. 185; 5; 6, p.203; 7, p. 238; 8, p.5] will be got for. Quality in same queue is provided not only original appearance of leaves stevia, which must remain a not variable during great while but also on before the maintenance of physical and chemical indexes.

Taking into account that drying in hothouse terms is the protracted process which provides the proper quality of leaves stevia not always, scientists studied possibility of application of dryers. Application of IR-dryer abbreviates duration of drying, however through the point drying a ray is not provide the receipts of leaves the assured quality. The culd drying is a high-cost and on high-quality indexes limits the use of product in food retail industry. More advantageous is the convected drying which considerably abbreviates duration of process and provides the production of raw material of the assured quality [7; 9].

Taking into account досвіт of the world scientists and own researches in relation to the конвективного drying the purpose of work there is development of technological line from the production of competitive leaves stevia (*Stevia rebaudiana* Bertoni) dried.

Materials and methods. Reared on an area by an area 0,12 hectares it was mowed stevia in Agrofirmi «Veselinovka» (Kiev. area) on September, 9-12 in 2013, purged from admixtures and dried in the convected dryer of TSU at the temperature of 100/60°C for the rates of movement of air 2-2,5 m/s. After drying dissociated leaves from stems. Sampling was carried out in obedience to the General pharmacopeya article of GF the XI (V.1, p.267). On accordance the estimations of quality of sheets stevia (*Stevia rebaudiana* Bertoni) were carried out in obedience to the Methodical rekomendeshin with criteria the indexes of quality dried as raw material for the subsequent use in food retail industry [10].

Results and discussion. Stevia (*Stevia rebaudiana Bertoni*) it is a plant, what «sensible» to the terms of post-harvest treatment. In a period growth the accumulation of matters of diterpen glicosid is carried out in a plant to beginning of its flaver, where upon their maintenance diminishes in sheets.

On the basis of the conducted researches in relation to kinetics of the convected drying of leaves stevia [9], analysis of existing in Ukraine researches from the production of powders [11, 12] and storage of products [13] we are offer a technological line from the production of leaves stevia of the assured quality and powder from him different dispersion which consists in the next sequence of technological processes (rice. 1). Stevia in fresh to collect or the under languid state enters receiving shopfloor (1). Before drying of stevia weigh on weightometers (2) and clear from admixtures conveyer belt of TSI (3) in a convected dryer carried out. Process of drying due to the point of management (4), on which speed of receipt of air, his temperature and «entrance-output» of raw material, is regulated on the basis of change humidity raw material. Steviy with band a conveyer (3) given in a light cart (5) which enters working area of dryer (6). Providing of serve of warm air is carried out due to gas thermal generator (8) and ventilators (9). Drying in the dryer convected of TSU takes a place for temperatures 100/60 °C before achievement of maximum maintenance of moisture in leaves stevia 6-10%. Cooling of stevia is carried out in the area of cooling (7). General duration of drying made 48 kg of stevia 78 minutes. Charges which necessary for drying 1 kg of stevia in the dryer convected of TSU make 1,04 grn.

Steviya after drying a conveyer belt (10) given on separate of leaves from a stem (11). A stem hatches from the workshop of sent on the subsequent redoing. Leaves enter apartment for dividing and direction into storage concordantly of demand of user.

Large whole leaves are packed in packages from 5 to a 10 gramme on setting (15) or in cardboard boxes with paper and sent in composition (16) for storage.

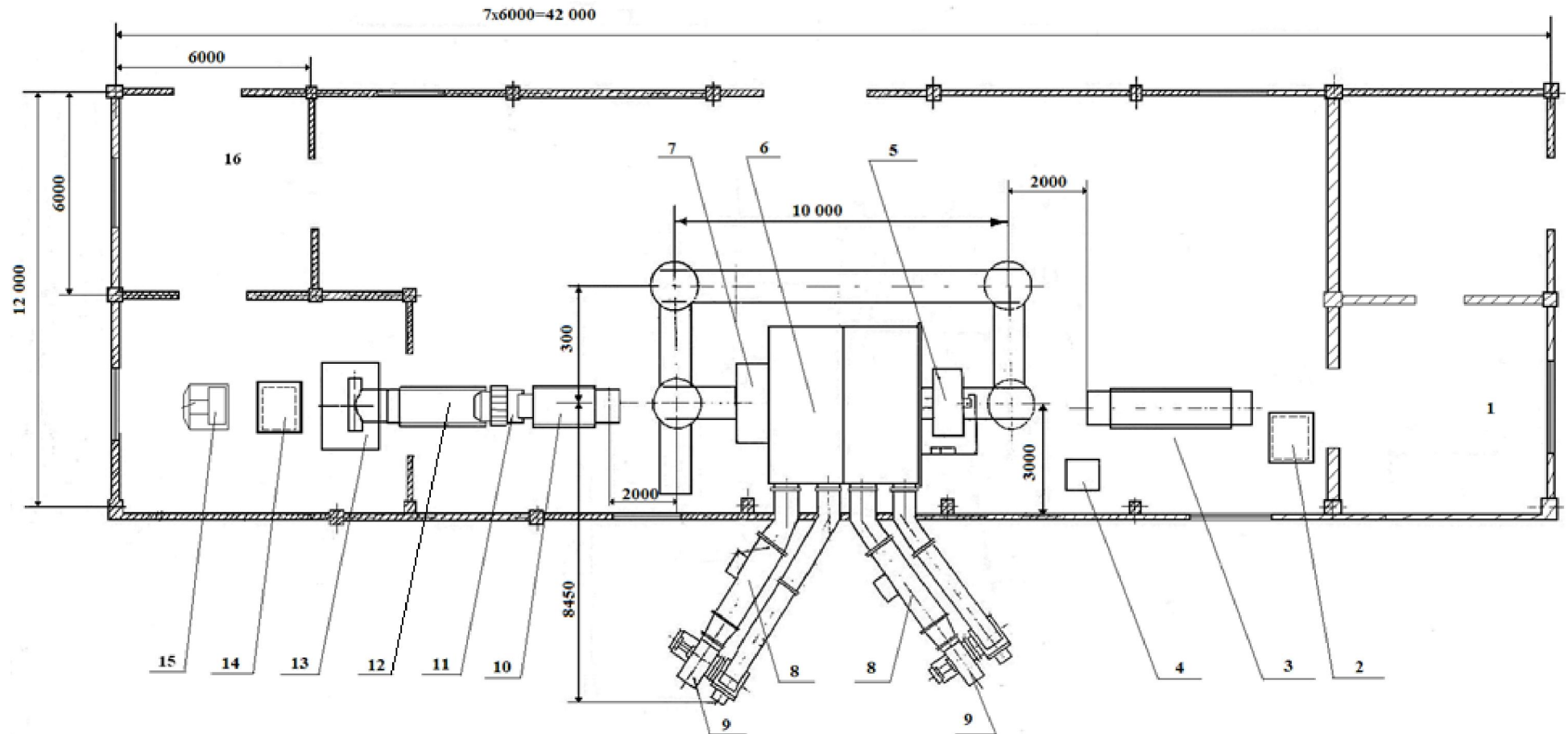
Technology of production of powder includes the followings stages: sorting, cleaning is from admixtures, grinding down and packing. After sorting on a conveyer (12) took away tailings of stem, where upon maintenance of admixtures was 0,13%. Grindings down of leaves stevia (*Stevia rebaudiana Bertoni*) carried out dried on a bullet mill (13). Less than 0,1 mm got faction the size of particles Losses of leaves are 1,55% from general mass. Powder is got after sifting on vibrator is a sieve (14) packed in paper packages for 3-5 grammes on setting (15) and made in the corrugated cardboard boxes for storage. In an apartment in which kept the packaged leaves unit and powders supported a temperature (not more than 16 °C) at permanent level, carried out periodic aeration.

On the indexes of quality the got products have technological description presented in a table 1.

Table 1

Description of products got from leaves stevia (*Stevia rebaudiana Bertoni*)

name	index		
	normative	whole	powder
Admixtures, %	not more than 7	2,3±0,1	0,13±0,2
Color	from light to green	Lightgreen - green	Lightgreen - green
Smell	peculiar стевії, without a stranger	peculiar stevia, without a stranger	peculiar stevia, without a stranger
Taste	sweetish, peculiar stevia	sweetish, peculiar stevia	sweetish, peculiar stevia
Humidity, %	not more than 10	7,1±0,18	7,1±0,18



Rice. 1. 1 - receiving apartment; 2 - scales; 3 - conveyer belt of TSI; 4 - management point; 5 - light cart; 6 - dryer; 7 - cooling area; 8 – gas thermal generator (two); 9 - ventilator (two); 10, 12 - conveyer belt of TSI; 11 - separate of leaves from a stem; 13 - mill for the receipt of powder; 14 - vibrator is a sieve; 15 - pack setting; 16 - composition of the prepared products.

On accordance on physical and chemical indexes (tabl. 2) it was set the indexes of quality in the specialized laboratory (Kyiv).

Table 2

Physical and chemical indexes of quality leaves stevia (*Stevia rebaudiana Bertoni*) dried

Name	index		
	normative	unit	powder
Glikozid, %	not less than 10	10,82±0,08	10,78±0,15
flavanoid, mg/l	not less than 400	568±0,1	564±0,1
Protein, %	not more than 16	7,9±0,02	7,9±0,02
Ash % (550 °C)	not more than 8,5	8,21±0,06	8,21±0,06

After the got results a test is set that the leaves stevia (*Stevia rebaudiana Bertoni*) are got the dried unit and sprinkles of snow correspond to the domestic requirements of quality and can be utilized in the production of fitotea, concentrates and other products. On the presented technological line Technological instruction of TI 10.62.13-90.00:2014 «Leaves stevia (*Stevia rebaudiana Bertoni*) dried».

Conclusion. On the organoleptic and physical and chemical indexes of quality the got products (leaves stevia are whole dried and powders) answer the set normatively technical indexes. On the basis of conducted researches from kinetics of drying the technological line of post-harvest treatment stevia (*Stevia rebaudiana Bertoni*) is developed, which is effective and automated and provides the production of goods of the assured quality.

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Анотація

Кузнецова І.В.

Технологічна лінія післязбиральної обробки стевії (*Stevia rebaudiana* Bertoni)

*На основі проведених раніше досліджень з кінетики сушіння стевії за різних температурних умов та відповідно результатів вивчення зберігання отриманої продукції розроблено технологічну лінію післязбиральної обробки стевії (*Stevia rebaudiana* Bertoni). Представлена технологічна лінія є повністю автоматизованою, в основі якої запропоновано конвективну сушарку вітчизняного виробництва. Результати оцінки якості отриманих продуктів свідчать про виробництво продукції згідно попиту споживача гарантованої якості.*

Ключові слова: технологія, стевія, сировина, якість, продукція

Аннотация

Кузнецова И.В.

Технологическая линия послеуборочной обработки стевии (*Stevia rebaudiana* Bertoni)

*На основе проведённых ранее исследований кинетики сушки стевии при различных температурных условиях и результатов изучения хранения полученной продукции, разработана технологическую линию послеуборочной обработки стевии (*Stevia rebaudiana* Bertoni). Представленная технологическая линия полностью автоматизирована, в основе которой предложено конвективную сушилку отечественного производства. Результаты оценки качества полученных продуктов свидетельствуют о производстве продукции гарантированного качества согласно спросу потребителей.*

Ключевые слова: технология, стевия, сырьё, качество, продукция