RESEARCH DRYING EQUIPMENT

Norkulova K.T.[1], Iskandarov Z.S.[2], Jumayev B.M.[3] (Rebuplic of Uzbekistan)
Email: Norkulova326@scientifictext.ru

[1]Norkulova Karima Tuxtabayevna – Doctor of Technical Sciences, Professor,
DEPARTMENT OF AGRICULTURAL MACHINERY, FACULTY OF ENGINEERING TECHNOLOGY, TASHKENT STATE TECHNICAL UNIVERSITY;
[2]Iskandarov Zafar Samandarovich - Doctor of Technical Sciences, Professor, Vice-Rector,
TASHKENT STATE AGRARIAN UNIVERSITY;
[3]Jumayev Botir Melibayevich – senior Research Associate,
DEPARTMENT OF AGRICULTURE OF THE COMPETITOR TECHNOLOGY, FACULTY OF ENGINEERING TECHNOLOGY,
TASHKENT STATE TECHNICAL UNIVERSITY,
TASHKENT, REPUBLIC OF UZBEKISTAN

Abstract: *the paper presents the results of studies to evaluate the effect of thermal and hydrodynamic parameters of the drying agent on the heat output of solar-fuel dryers of cradle-type conveyor heated by direct solar radiation entering and additional source of heat (infrared lamp). To reflect the infrared radiation emitted by the lamps, reflectors are installed. For the drying of heat-sensitive materials, it can be applied a method of combined radiation and convection drying or drying intermittent mode. Convective dryers equipped with an IR emitter can be used for quick removal of moisture from the surface layer to material during the initial stage of drying, then intermittent mode convection drying at other stages of the drying process.*
Keywords: *drying equipment, process, IR lamps, fruit, vegetables.*

ИССЛЕДОВАНИЕ СУШИЛЬНОЙ УСТАНОВКИ

Норкулова К.Т.[1], Искандаров З.С.[2], Жумаев Б.М.[3] (Республика Узбекистан)

[1]Норкулова Карима Тухтабаевна – доктор технических наук, профессор,
кафедра техники сельского хозяйства, факультет машиностроительных технологий,
Ташкентский государственный технический университет;
[2]Искандаров Зафар Самандарович - доктор технических наук, профессор, проректор,
Ташкентский государственный аграрный университет;
[3]Жумаев Ботир Мелибаевич – старший научный сотрудник, соискатель,
кафедра техники сельского хозяйства, факультет машиностроительных технологий,
Ташкентский государственный технический университет
г. Ташкент, Республика Узбекистан

Аннотация*: в работе представлены результаты исследований для оценки влияния теплотехнических и гидродинамических параметров сушильного агента на тепловую мощность солнечно-топливной сушилки люлечно-конвейерного типа, нагреваемой прямым поступлением солнечного излучения и дополнительным источником тепла (ИК-лампы). Для сушки термочувствительных материалов может быть применен метод комбинированной радиационно-конвективной сушки или прерывистый режим сушки. Конвективная сушилка, оснащенная ИК-излучателем, может быть использована для быстрого удаления влаги с поверхностного слоя материла, в течение начального этапа сушки, затем, прерывистым режимом конвективной сушки на остальных этапах процесса сушки.*
Ключевые слова: *сушильная установка, процесс, ИК-лампы, фрукты, овощей.*

One of the main ways of processing of agricultural products is drying. Production of this type of dried product, compared with fruit canned fruits and vegetables requires relatively little capital investment, but it is considered to be energy-intensive process, which requires the development of resource-saving technologies. Thus, to obtain 1 kg of dry product must be removed from 4.0 to 11 kg of water. The share of energy consumption is between 18 and 27 thousand. KJ/kg, or from 0.62 to 0.94 kg of fuel. Operating experience shows that the existing equipment for artificial drying is very expensive, energy-intensive and inefficient for the fruits and vegetables grown in Uzbekistan, which have a high sugar content and dry matter. To obtain a quality product they need to adjust the power of the heat source in order to maintain optimum parameters of drying agent.

For the drying of heat-sensitive materials, it can be applied a method of combined radiation and convection drying or drying intermittent mode. Convective dryers equipped with an IR emitter can be used for quick removal of moisture from the surface layer to material during the initial stage of drying, then intermittent mode convection drying at other stages of the drying process. This drying mode provides fast initial drying intensity, with intermittent moderate heat the support to provide a reduction in drying time and minimum product

degeneration. According to [4] increases the drying efficiency of the use of intermittent exposure and the method of combined radiation and convection drying.

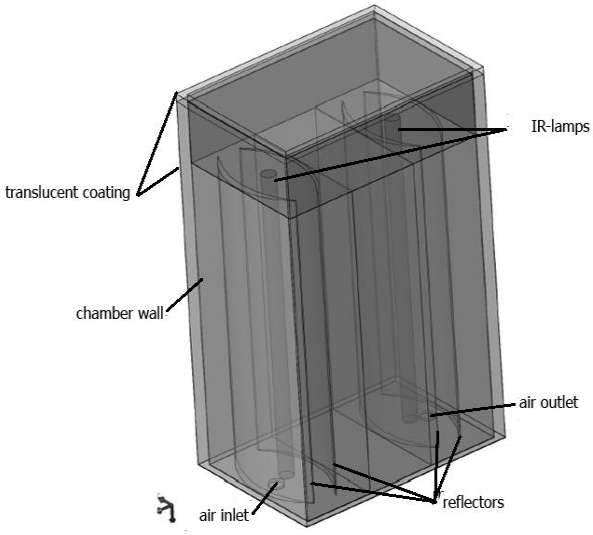

Fig.1. Schematic diagram of the considered dryer

In contrast to previous work in this paper investigated and the effect of power infrared lamp considered the thermal performance of the dryer. Installation description is given in Figure 1. Two IR Lama capacity of 2000 W installed vertically. To reflect the infrared radiation emitted by the lamps, reflectors are installed (Figure 1).

Thermal performance of this solar-fuel dryer under the same flow of solar radiation and ambient temperatures at the inlet and the drying agent was increased 5-fold, when the volumetric flow of drying agent was increased by 12 times. According to the main growth to increase the heat output of the received data, ie, optimal thermal performance was observed in the 700 and 800 m^3/h intervals volumetric flow of the drying agent in the above-mentioned values of environmental parameters.

References / Список литературы

1. *Ginzburg A.S.* Application of Infrared Radiation in Food Processing (first ed). London: Leonard Hill Books, Pp. 174–254.
2. *Norkulova K.T., Iskandarov Z.S., Halimov A., Safarov J.E., Boltaev B., Ergashev B.* Thermal efficiency of a combined cradle-conveyer type of solar-fuel drying installation. // Journal of the Technical University of Gabrovo. Bulgariya. Volume 53, 2016. Pp. 6-8.
3. *Norkulova K., Iskandarov Z., Safarov J., Jumayev B.* Research dryer for drying agricultural products. // Journal of Food & Industrial Microbiology. USA, 2016. Vol. 2. Issue 1. P. 1-3.