УДК 631.56:633.15

REVISED AND STORAGE CORN-FORAGE FOOD AND INDUSTRIAL PRODUCTS

***G. I Podpryatov*, N. O Yashchuk, V. I Rozhko, V. A Nasikovskyy**

We have been analyzed scientific publications domestic and foreign scholars on effective economically advantageous post harvest handling and storage of grain corn. The main factors to consider during post harvest handling and storage of grain in order to obtain high-quality environmentally friendly products corn. A study of generalization and systematization of the material.

Corn, grain, post harvest handling, storage, quality and environmental friendliness.

Corn - the universal culture, which is widely used for fodder purposes, food and technical needs - the production of cereals and flour, starch and oil, dextrin and ethanol. Therefore, this culture is one of the most used in the world that is on the leading position in world production and trade in grain production, occupying more than a third of its overall structure. Also in Ukraine over the last decade dynamics of acreage and production indicators corn has a positive trend, allowing our country to occupy a niche in the global market.

Many farms and grain enterprises annually accumulate large masses of corn on the cob and grain seed and food-feed purposes. Therefore there is a need to organize the post harvest handling and storage of corn on a scientific basis, using the following methods and modes of data storage and processing, which would take into account the physical and biological characteristics of beginnings and grains, as well as their purpose and requirements of certain sectors of the food industry [1, 7, 8, 12, 13].

The aim of our research - to conduct an analytical review of world excellence post harvest handling and storage of grain corn.

Material and methods research. To achieve this goal were analyzed scientific publications in domestic and foreign scholars on effective post harvest handling and storage of grain corn and conducted generalization and systematization of the material using a general scientific methods.

Results. Party Food and feed corn coming from manufacturers in grain and food processors are divided into types, depending on the color, texture, grain shape, whether or not vdavlenosti on its top. These features are important for industrial use of corn for the organization and storage. Mix different types of corn unacceptable [1, 2, 10, 12, 13].

Post-harvest handling of maize held to bring corn to the condition that the industry will ensure the supply of good-quality raw materials. Corn is dispensed to consumers in the form of grains with humidity no higher than 15%, the presence of foreign material impurities not more than 1.5% and not more grain 3-15% depending on the use of [1, 10, 11, 12].

On Cereal can be used three lines of principle current circuit for receiving and processing corn.The most common first circuit. The gist is that corn comes at the start of the humidity to 30%. The process of processing corn threshing thus provides its raw state and drying in shaft kilns. The second scheme involves the reception and processing of corn grain with humidity above 30%. In this case starts dried to dryness, then dried to thresh or intermediate humidity (18-25%) and then threshed and finally dried grain at fixed or mobile grain dryers.

The third scheme provides income to the company threshed maize [1, 4, 11, 13].

Food, fodder and technical purposes maize harvested and almost completely cut in the grain, with the exception of silage conservation principles. Pick corn for grain moisture less than 30-35%, starts - 40-45% Corn processing technology involves pre-treatment of major contaminants in mine drying, drum

and bunker dryer, cleaning of grain impurities and foreign material separator. Profiles drying and cleaning set depending on the purpose and quality of the final product [1, 2, 6, 7, 10, 12].

In the grain mass maize that came off as Woroch, under normal grain threshing main crop humidity 18-19%. Treated grain mass separators for lots cleaners and CSM-50 CSM-100, AP-50 and others. The resulting fraction general grain dried in the dryer shaft type, and then produce grain impurities and broken grains, giving a large flow of air separators (12-15 ths. M3 / h) at a speed of 9.8 m / s. For the first separator cleaning set sorting sieve size openings 12-14 mm, the second - 10-12 mm (according suspended mesh size sieves 2 and 4.5 - 5 mm), so that the second pass select the larger grains removing small whereas in the first purification only impurities are removed [1, 10, 11, 12, 13].

Corn grain compared to other cereals is lower volohoviddachu that must be considered when it is dry. There is not the same intensity of moisture grain of different varieties of corn, because it depends on the size of grains, their shape, physical structure and chemical composition. The lower surface and a dense shell corn complicates the process of evaporation. The moisture penetrates the grain mainly because the embryo is distributed evenly to all parts of grains. Because of this, during drying having unequal internal tension, which in turn lead to different shrinkage of tissue in the endosperm and the formation of internal cracks that do not violate the integrity of membranes [1, 3, 9, 10, 14, 15].

Cobs are usually dried in a fixed bed. Mound of ears, peeled wrappers, has good porosity that facilitates the circulation of air that is fed under pressure or due to supply and exhaust natural ventilation - drafts. Therefore, there are many ways to dry corn on the cob: a chamber dryer factory type in the bins at platforms, under the eaves, active ventilation in sapetkah.

Rods corn ears always wetter than corn, but when they dry grain compared with intensive moisture evaporated. Therefore, after drying fork for

some time left in the cell where the redistribution of moisture and humidity equalization entire mass [1,2,4,8,10,11,13].

During drying controlled thermal damage and fractures grain. To prevent their occurrence corn treated for soft modes and volume of water no more than 4-5% per pass in the shaft kilns. Due to the fact that the cracks appear in the final stage, drying is best done in two stages. In the first stage the grain is dried by thermal means to humidity 16-18%, and then gradually it finally dried in the mode of ventilation and cooling. For a technology better suited hopper dryers, storage, hardware means of ventilation. Particular attention should be dried grain, which is planned for export, due to the fact that foreign standards are strict limits on overheating and thermal damage, as well as grain additive [1,5,6,7].

For more rigid regimes dried grain food corn using a shaft dryer type DSP-32, that is, where it is possible to maintain a certain mode: heating the grain is not higher than 50 0C, coolant temperature not higher than 130o C and 110o C during drying corn, respectively, for processing and storage. For corn moisture content above 22% is used dvohstupinchastyy drying treatment (Table. 1) [1,10,11,13].

Also, food processing, feed corn can be made to the universal mechanized lines used for seed. It grains are high quality, environmentally friendly manufacturing of food and nutritious food. Also, the use of equipment for seed treatment for corn increases its workload and efficiency, while reducing production costs.

So be separately placed dry corn (14%), medium dry (to 15.5%), moisture (15,6-17%) and crude (17% more). For dry corn height of the embankment in the storage is not limited only to the average grain dry in warm weather (temperatures above 10o C) it must not exceed 2-2.5 m. Given the long-term storage of grain corn in grain elevators required cooled to ambient temperature and laying with humidity no higher than 14%.

Grain and corn starts with high humidity can be kept in well-ventilated areas equipped for active ventilation installations or on-site, with the gradual use of feed. Grain storage under these conditions is 20-30% higher nutritional value and digestibility compared to corn, which passed termosushinnya [1, 2, 6, 10, 11, 12, 13].

Findings

Post harvest handling 1. Food and feed corn and maintenance should be required to carry out with the peculiarities of the culture and purpose of production.

2. Keep track of corn into account the type, condition and quality category, especially moisture and debris.

3. For clean grain processing high quality food, feed corn should be on universal mechanized lines, which will also reduce the cost of production.

LIST OF REFERENCES

1. Голик М. Г. Хранение и обработка початков и зерна кукурузы / М. Г. Голик. – М.: "Колос", 1968. – 335 с.

2. Жемела Г. П. Технологія зберігання і переробки продукції рослинництва. Підруч. / Г. П. Жемела, В. І. Шемавньов, О. М. Олексюк. – Полтава: РВВ "TERRA", 2003. – 420 с.

3. Казаков Е. Д. Биохимия зерна и хлебопродуктов / Е. Д. Казаков, Г. П. Карпиленко. – СПб.: ГИОРД, 2005. – 512 с.

4. Карпов Б. А. Технология послеуборочной обработки и хранения зерна / Б. А. Карпов. – М.: Агропромиздат, 1987. – 288 с.

5. Кирпа М. Я. Збирання і збереження зерна / М. Я. Кирпа // Хранение и переработка зерна. – 2001. – № 7 (25). – С. 26–29.

6. Кирпа Н. Я. Особенности первичной обработки и хранение зерна / Н. Я. Кирпа // Хранение и переработка зерна. – 2003. – №7. – С. 38–40.

7. Кирпа Н. Я. Состояние и особености технологий послеуборочной обработки кукурузы / Н. Я. Кирпа // АПК-Информ. – 2001. – С. 12–15.

8. Лихочвор В. В. Рослинництво: навчальний посібник / В. В. Лихочвор. – К.: Центр навчальної літератури, 2004. – 816 с.

9. Панфилов А.Э. Предуборочная и послеуборочная динамика влажности зерна кукурузы в связи с десикацией посевов / А.Э. Панфилов, Е.С. Иванова // Кукуруза и сорго.– 2007. – № 5. – С.10–14.

10. Подпрятов Г. І. Технологія зберігання і переробки продукції рослинництва: Навч. Посібник / Г. І. Подпрятов, Л. Ф. Скалецька, А. М. Сеньков. – К.: ЦП Компринт, 2010. – 495 с.

11. Подпрятов Г. І. Післязбиральна доробка та зберігання продукції рослинництва: Навчальний посібник / Г.І. Подпрятов, Л.Ф. Скалецька, А. В. Бобер. – К.: Центр інформаційних технологій, 2009. – 296 с.

12. Шпаар Дитер. Кукуруза: выращивание, уборка, хранение и использование / Дитер Шпаар – К.: ИД «Зерно», 2012. – 462 с.

13. Яковенко В.А. Прием, хранение и обработка кукурудзы / В. А. Яковенко. – М.: Колос, 1972. – 103 с.

14. Pahl H. Maisanbau 98. Top-Sorten bringen Bares / H. Pahl // DLZ-Agrarmagazin. – 1997. – № 12. – S.21–22.

15. Vitazek I. Sorbition isotherms of maize grains / I. Vitazek, J. Havelka, M. Pirsel // Agriculture. – 2003. – Vol. 49, № 3. – S.137–142.