TOPIC 10. ACTIVITY OF MICROORGANISMS IN THE GRAIN HEAP AND THEIR INFLUENCE.

PLAN:

1. The origin of the microflora of the grain mass.
2. Classification and description of the microflora of the grain mass.

GLOSSARY (ГЛОССАРИЙ)

Uzbek	Russian	English	Content
Mikroorganizmlar	Микроорганизмы	Microorganisms	Don uyumida yashashi va rivojlanishi mumkin bo‘lgan bakteriyalar, achitqilar va mikroskopik zamburug‘lar guruhi.
Don uyumi	Куча зерна	Grain heap	Saqlash jarayonida ma’lum hajmda bir joyga joylashtirilgan don massasining majmuasi.
Mikroflora	Микрофлора	Microflora	Don yuzasi va uning tarkibida mavjud bo‘lgan mikroorganizmlar majmuasi.
Mikroskopik zamburug‘lar	Микроскопические грибы	Microscopic fungi	Donning namligi yuqori bo‘lganda rivojlanib, mog‘orlanish va sifatning pasayishiga sabab bo‘luvchi mikroorganizmlar.
Bakteriyalar	Бактерии	Bacteria	Don uyumida biologik jarayonlarni kuchaytirishi va ayrim hollarda donning buzilishiga olib kelishi mumkin bo‘lgan mikroorganizmlar.

Description and classification of grain microflora.

The microflora of the grain heap consists of a group of microorganisms, such as various bacteria and mold fungi. Primarily, most samples contain actinomycetes and related organisms, as well as yeast.

Various microorganisms found in the grain mass can be divided into three groups according to their lifestyle and activity: saprophytes, phytopathogens, and microorganisms pathogenic to animals and humans. Saprophytes include various bacteria, yeast, mold fungi, and actinomycetes.

Bacteria. It is found in almost all grain masses, especially in freshly harvested grain. One of the main bacteria is the genus Psedomonas.Vast.herbicola auzeum is one of the main representatives of this species, a small, mobile, non-spore-forming rod-shaped microorganism 1-3 μm in size.Sometimes another representative of this genus, Vast hericola zubzum, is also found in grain.Vast herbicola microorganisms make up 92-95% of the bacteria found in grain.Another genus of bacteria, Vast fluozcens, is found in grain. Bacteria belonging to this genus also do not form spores like the ones mentioned above. Not all of the bacteria listed above cause grain spoilage, but the respiration of a large number of active bacteria can release heat and initiate spontaneous heating of the grain. Spore-forming rhizophore bacteria (Vas. mesentericu) Bac sublilis Bac mycoides (and others) are found in the green part and seeds of the plant. These microorganisms are also found in freshly harvested and stored grain. These microorganisms multiply rapidly in heavily pollinated and heated grains. When these microorganisms are present in flour, they multiply rapidly in the dough and reduce the quality of the bread made from it.

Yeast. Along with bacteria, yeast fungi are also found on the surface of the grain. In the hard layers of the grain, these fungi develop and form colonies with a paste-like consistency. Yeast are single-celled representatives of the fungal kingdom and do not affect the shelf life and quality of the grain. However, in some cases, they cause an increase in temperature in the grain mass and, according to experts, are a source of a specific "warehouse" odor. Mold fungi. Freshly harvested grain mass always contains a certain number of mold fungi. Their number often ranges from several dozen to hundreds, sometimes up to a thousand per 1 g of grain, and they also account for 1-2% of the total number of microorganisms present in the grain mass. As soon as favorable conditions arise (high grain moisture, increased grain mass temperature, etc.), mold fungi multiply rapidly and form mycelium and fruit organs. As a result, fungal colonies visible to the naked eye are formed in the grain. This phenomenon is observed during grain harvesting in adverse weather conditions, during temporary storage of grain, during its

transportation by water or rail, etc. The intensive development of mold fungi leads to a significant loss of dry matter in the grain mass, a decrease in grain quality, or complete spoilage. Grain infected with mold fungi develops an unpleasant odor, as well as changes in taste and color.

The species of mold fungi found in grain masses are diverse, and more than 60 of them have been identified to date. Among them, the main ones that spoil grain quality are fungi of the Aspergillus and Penicillium species. In addition, Cladosporium. Microorganisms of the species Denatium, Trichothecium, and others are frequently found in the grain composition. Microorganisms belonging to this group are called phytopathogens because they cause specific diseases in plants. Plants infected with these microorganisms either perish or yield a small amount or low-quality harvest. Here are some examples. Bact.translucens causes burns in wheat, rye, barley, and corn, withering in rice and corn, and staining in corn, rice, and barley. Bact. trafaciens and other microorganisms cause the grain to become empty. Also, phytopathogenic microorganisms cause rot, wilting and many other diseases in plants. These microorganisms in grain also affect the quality of the products they produce. Microorganisms that are pathogenic to humans and animals. This group of microorganisms can accidentally get into the grain. They do not affect the quality and shelf life of the grain. However, considering the danger to the body, great attention should be paid to this when storing grain, as it passes through the soil, sick animals, and other infection carriers.

Microorganisms found in the grain mass include the causative agents of anthrax, anthrax, brucellosis, tuberculosis, and other diseases. It is difficult to identify pathogenic microorganisms in the grain mass. Therefore, quarantine measures are carried out in places where these microorganisms are distributed. Special quarantine instructions are also used when processing grain obtained from these lands.

Key phrases. *microorganisms, microflora, bacteria, microscopic fungi, yeast, aerobic microorganisms.*

CONTROL QUESTIONS

1. Explain the concept of microorganisms?
2. Explain the origin of the microflora of the grain mass?
3. Explain the classification of grain mass microflora?
4. Describe saprophytic microorganisms?

MAIN CONCLUSIONS:

1. The activity of microorganisms in a grain heap is directly dependent on the moisture content, temperature, oxygen content, and storage conditions of the grain.

2. Increasing the moisture and temperature of the grain can accelerate the development of microorganisms and lead to molding and spoilage of the grain.

3. As a result of the activity of microorganisms, heat and carbon dioxide are formed in the grain pile, which intensifies the self-heating process.

4. Under the influence of microorganisms, the color, smell, taste, nutritional value, and technological properties of the grain may deteriorate.

Independent work topics

1. Theoretical foundations of grain separation using airflow.

2. Movement of the product on the surface of a flat sieve.

3. Mixing machines that differ in width and thickness from the main type of grain.

Information and methodological support:

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3. Mukimov Z.M. "Grain Storage and Processing Technology" Textbook, Tashkent "Innovative Development Publishing and Printing House" 2021. p. 334.

4. K.K. Sattarov, G.K. Tukhtamishova, A.O. Uzaydullaev, S.K. Kuzibekov, A.M. Jankorazov, "Technology for Storing Grain and Grain Products." Educational manual "Ziyo nashriyot" LLC Gulistan 2024.

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SELF-CONTROL TESTS:

Test samples

1. What is one of the factors that has the greatest impact on the development of microorganisms in the grain heap?

A. Grain moisture

V. Grain color

B. Grain shape

G. Mass of grain

2. What process can occur in a grain pile as a result of the activity of microorganisms?

A. Self-heating

V. Freezing of grain

B. Discoloration of the grain

G. Mechanical grinding of grain

3. Which microorganisms are primarily responsible for grain mold formation?

A. Microscopic fungi

V. Insects

B. Rodents

G . Viruses

4. What measures are taken to reduce excess heat and moisture in the grain heap?

A. Ventilation

V. Grinding

B. Packaging

G. Not sorted

5. What is the most effective way to protect grain from the effects of microorganisms?

A. Drying and cooling

V. Embankment compaction

B. Increasing humidity

G. Embankment compaction