

# Crop quality

## Lecture-2

## Crop Quality

- It means the determining value of crops for specific uses. Crops fiber for cloth, wheat for bread and pasta have been evaluated and sold on the basis of quality characteristics.
- In contrast, the nutritive value of food and feed grains have generally received little consideration until the last several years.
- Forage quality has received even less attention than in other crops until recent years.
- Too often, crop production has been concerned with yield alone rather than yield of a high quality product

## Crop quality is dependent on many factors

- The end use of crop.
- Level of economic of crop.
- Human and animal preferences.
- Governmental and economic policies of the country.
- The climate in which the crop is located grown and stored.

# **quality determinates**

**Determining the quality as a crop of grain, fodder, and fiber, you determine it on the basis of quality and not quantity as in the past. There are many qualitative determinants of cereal crops in particular and of other crops in general.**

- **1- Free from weeds seeds and other crops.**
- **2- Uniform in shape and size.**
- **3- Contains a small percentage of physical damage.**
- **4- It has high viability.**
- **5- Not contaminated with insects and rodents.**
- **6- Free from impurities, gravel, mud, straw and others.**
- **7- Free from toxic pesticides or other chemicals.**
- **8- Free of toxic substances resulting from bacteria and micro-moulds.**

➤ **Some producers determine the quality by other factors:**

➤ **1- Color.**

➤ **weight.**

➤ **size.**

➤ **bulk density (weight per unit volume of seeds).**

➤ **sometimes smell, and sometimes moisture content.**

**On the basis of these factors, there is a classification of qualitative indicators:**

# Direct seeds quality indexes

## 1-Moisture:

- ❖ One of the important factors to determine the quality and on the basis of the moisture content is stored.
- ❖ The amount of seeds retaining their viability depends on the amount of their moisture content.

❖ It is desirable to estimate the moisture content of the seeds in order to be properly stored in appropriate conditions, not for the purpose of preserving their viability, but to preserve their physiological performance so that they can germinate, emerge in the field and produce a high yield.

❖ The moisture of the seeds at harvest is high to the point that leads to the growth of fungi, and the moisture must be reduced before storing it by drying it by air and the sun.

❖ Thus, low moisture leads to reduced infection with insects and fungi.



# Safe storage

- The storage process is safe and successful by maintaining the level of viability and an appropriate level of moisture when storing.
- **Sometimes a non-homogeneous moisture distribution of the seeds occurs during storage for several reasons, including:**
  - A. Different sources of seeds from the same region or from several regions.
  - B. The time of sampling determines the level of moisture, as in the morning it is higher than at afternoon.
  - C. As a result of the inaccuracy of the drying process from one area to another.

**The moisture content of the seeds determines the price and the degree of seeds. Each crop has a specific moisture content.**

**Soybean crop in the USA is considered to have a moisture content of**

**13% Grade 1**

**14% Grade 2**

**16% Grade 3**

**If the moisture content of a water of 14.3% falls within G3 and reduces the price.**

- **2- Bulk density (Test weight)**
- **Weight volume of seeds or hectoliters**
- **weight determination automatically within the instrument, but usually test weight is determined manually.**
- **Test weight is a general indicator of grain quality and higher test weight normally means higher quality grain.**
- **Grain test weight in units of pounds per bushel But it depends on measuring the volume, not the weight, and the process of buying grains by weight, not volume.**
- **It does not depend because it is a volumetric measurement. They are important in seed evaluation and commercial grading.**

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**Table 1.****Test weight minimums for U.S. grain grades<sup>a</sup>**

<b>U.S. Grade</b>	<b>Corn (pounds/ bushel)</b>	<b>Hard Red Spring Wheat (pounds/bushel)</b>
U.S. No. 1	56	58
U.S. No. 2	54 <sup>b</sup>	57
U.S. No. 3	52	55
U.S. No. 4	49	53
U.S. No. 5	46	50

# Indirect quality Indexes

## 1-Sensor Judgment

**It is a measure given that the grains are shiny and full, i.e. the external appearance is free from mold and is judged by the external appearance and smell. For example, industrial drying of sorghum gives matte grains compared to natural.**



## • **2- Seeds Viability**

- Seed viability is a measure of the number of seeds that are still alive to produce plants.
- Some seeds stay viable for many years, while others might only last a short time.
- **How should viability be determined?**
- **The most accurate test of viability is the germination test .**
- **The germination test is made under controlled conditions to find out how many seeds will germinate and produce normal seedlings which could develop into normal reproductively plants.**

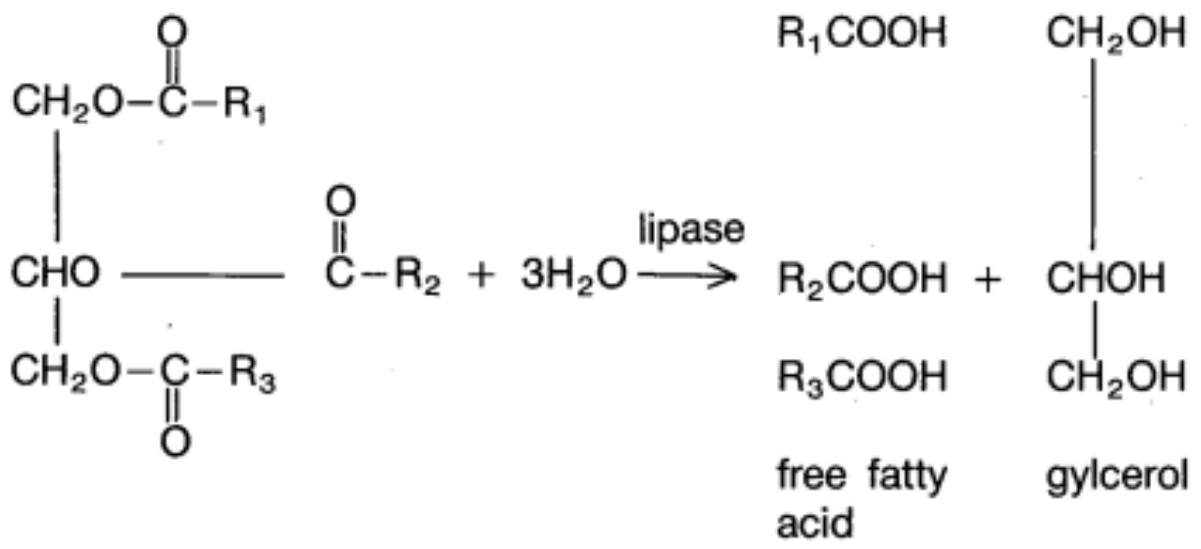


### **3- Fat acid value (FAV):**

**Defined** : It is defined as the weight of KOH in mg needed to neutralize the organic acids present in 1g of fat and it is a measure of the free fatty acids (FFA) present in the fat or oil. It is a relative measure of rancidity as free fatty acids are normally formed during decomposition of triglycerides.

➤ There are good quality seeds, but the value of (FAV) is high due to damage to the seeds during storage. It was found that the value of FAV is related to the presence of fungi, as the fungus breaks down oil and produces free fatty crops that it uses as energy for breathing.

Such reaction occurs by the action of lipase enzyme and it is an indicator of inadequate processing and storage conditions (i.e., high temperature and relative humidity, tissue damage)

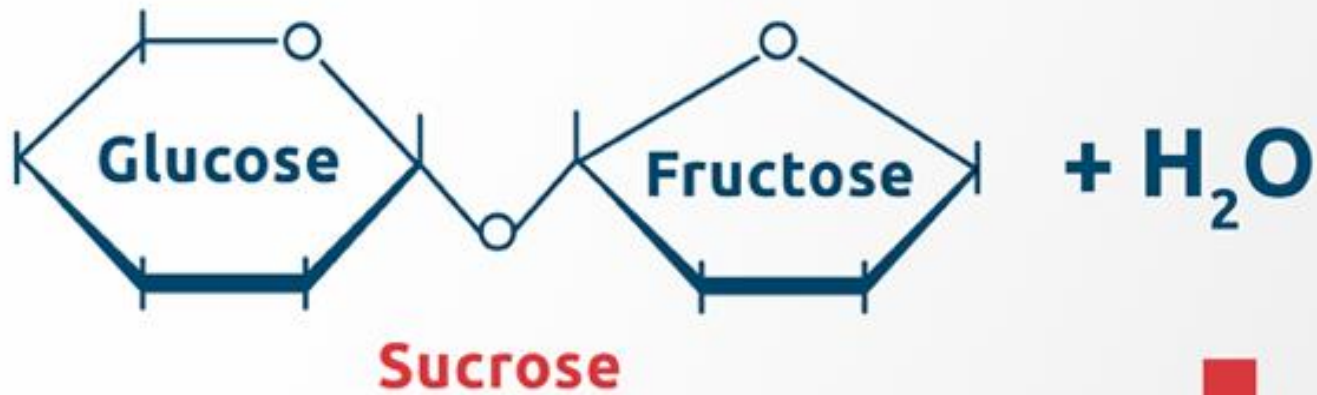


**The table below shows the acid value of some common oils**

<b>Oils and Fats</b>	<b>Acid value mg KOH/1 g oil</b>	<b>References</b>
Refined sunflower	0.2–0.5	[12,13]
Crude <i>Jatropha curcas</i>	15.6–43	[8,14]
Refined Safflower	0.35	[15]
Crude palm	6.9–50.8	[16,17]
Cottonseed	0.6–2.87	[18,19]
Corn	0.1–5.72	[20,21]
Coconut	1.99–12.8	[22,23]
Soybean	0.1–0.2	[24,25]
Animal fats	4.9–13.5	[26]
Canola	0.6–0.8	[27,28]
Waste cooking	0.67–3.64	[29]

## • **4- Sugar inversion**

- Sugar inversion is the chemical conversion of saccharose into glucose and fructose. This process is enhanced by acids and high temperatures.**
- The sucrose in the cane may be transformed into simple sugars by the action of the enzyme Invertase, and this affects the purity of the cane juice, as it leads to a decrease in the amount of sugar that can be extracted and processed. Studies indicate that the more mature the cane is at harvest, the higher the resistance to the transformation of sucrose during storage, and this resistance decreases. Increased temperature and humidity because the activity of the enzyme invertase increases with humidity and heat.**



Temperature

Catalyst





THANK

YOU