

3.4 Metabolic Activities

Respiration is a major metabolic activity that occurs in stored grains, and storage organisms (insect, micro-organisms and rodent) living on or in the stored grains respire. Heat, water and carbon-di-oxide are released during respiration. The heat thus generated is capable of increasing the temperature of the stored product leading to a hot spot. Hot spot damages the embryo and reduces viability of crop. A temperature of 15°C is therefore, recommended for stored product at 13 – 14% moisture content.

3.5 Environmental Factors

The environmental factors that mostly associated with stored products include:

- Temperature
- Relative humidity
- Equilibrium moisture content
- Pollution by chemicals and smoke

Moisture content, relative humidity and storage temperature are three major parameters that must be monitored and controlled during storage to ensure a safe storage otherwise storage losses would be excessive. Moisture content is the amount of water molecule contained in an agricultural material. It could be defined on wet basis (M.C_{wb}) or dry basis (M.C_{db}). It is expressed either as ratio or percentage.

$$M.C_{wb} = \frac{\text{weight of water}}{\text{weight of wet product}} \dots\dots\dots(1)$$

$$M.C_{db} = \frac{\text{weight of water}}{\text{weight of dry product}} \dots\dots\dots(2)$$

M.C_{wb} is used for commercial purpose while M.C_{db} is used for scientific purpose. The relationship between M.C_{wb} and M.C_{db} is given below:

$$M.C_{db} = \frac{M.C_{wb}}{1 - M.C_{wb}} \dots\dots\dots(3)$$

$$M.C_{wb} = \frac{M.C_{db}}{1 + M.C_{db}} \dots\dots\dots(4)$$

In storage, we are more concerned with the equilibrium moisture content. This is because the stored product interacts with its immediate environment since agricultural material is hygroscopic. When products are kept in an environment, there is a continuous interaction of moisture between the product and the environment. At a point the product attains equilibrium

with the environment and the moisture interaction ceases. This is called the Equilibrium Moisture Content (EMC). Table 1 shows the EMC of cereal for safe storage.

The EMC of any stored product is affected by climatic factors such as rainfall, relative humidity and temperature. Regions with high RH tend to keep stored crop at a high EMC and this is not safe for storage. Table 2 shows the EMC of various seed at various RH.