Moisture Measurement Method

There are two methods of moisture measurement

1.Direct methods:-

Direct Method can be classified into 3 method of moisture measurement.

(I) Oven Method of moisture measurement

(II) Brown duvel Fractional disttilation method of moisture measurement

(III) Infra red method of moisture measurement

(I)Oven Method of moisture measurement :

Oven method is also have 3 Types

(A) Air oven method of moisture measurement

(B) Vacuum oven method of moisture measurement

(C) Water oven method of moisture measurement

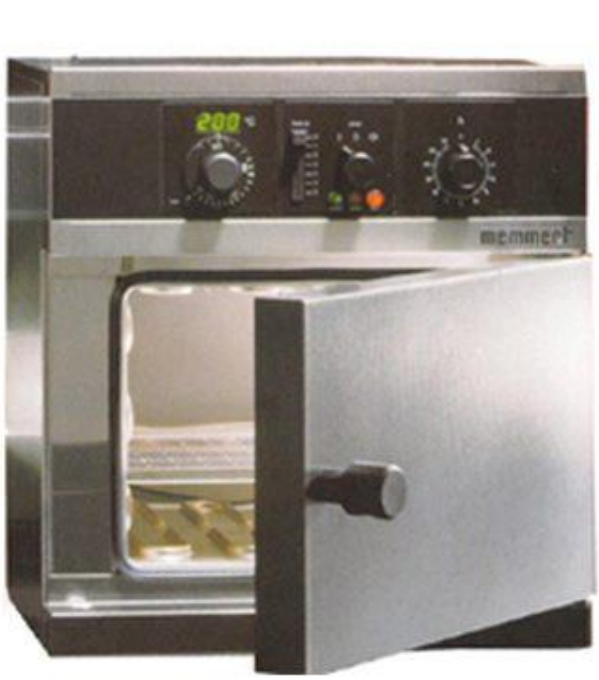
(A) Air oven method of moisture measurement:

(a) One stage method of moisture measurement: It is used for grains under 13% moisture content.

Procedure-

- Take a representative sample of 2-3 grammes of ground grain.

- For a period of one to two hours, bake this sample in an air oven at 130°C.
- The sample is then removed and placed in desiccators to cool.
- The decrease in grain weight is quantified.
- The difference between the starting weight and final weight of grains is the basis for determining the moisture content of a substance.



(b) Two stage method of moisture measurement: it is used for grains abobe 13% moisture content.

Procedure-

- Take a sample of 25–30 grammes of whole grains.
- Put this sample in a 100°C oven for 72 to 96 hours.

- The sample should be removed from the oven and placed in desiccators to cool.
- The decrease in grain weight is quantified.
- The difference between the starting weight and final weight of grains is the basis for determining the moisture content of a substance.

(B)Vacuum oven method of moisture measurement:

It is used for fruits and vegetables

Procedure-

In this approach, a typical sample of ground material weighing 2-3 grammes is placed in a vacuum oven (25 mm vacumm) and heated to 100 °C for 72 to 96 hours. The grain's weight loss is calculated using its beginning weights.

(C)Water oven method of moisture measurement:

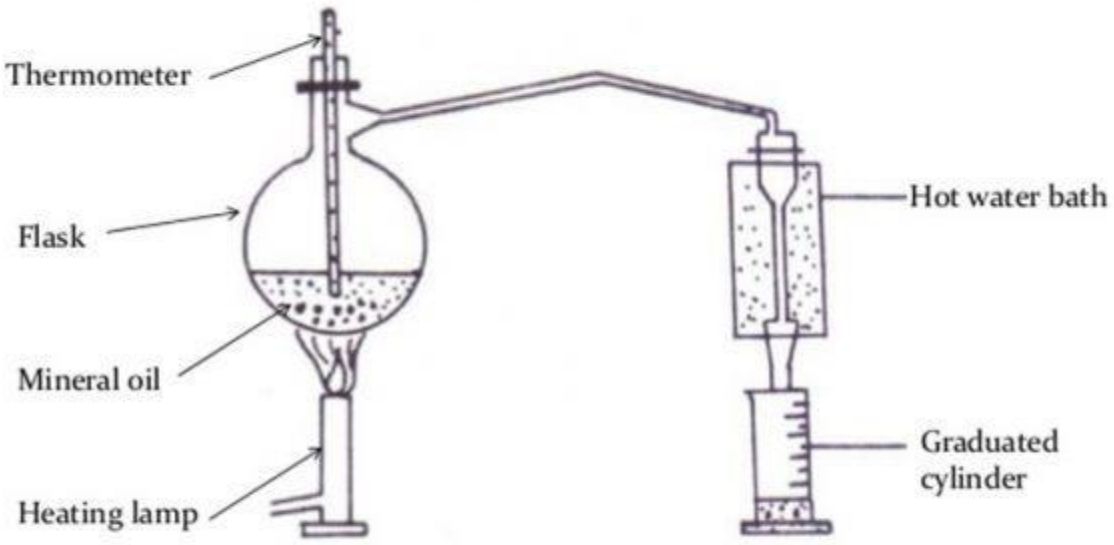
when the oven is heated using warm or hot water (approximately 100°C) pumped around the walls. Compared to the air-oevn approach, this one maintains temperature more consistently.

Procedure-

Place a sample of 25–30 grammes in an oven set to 100°C for 72–96 hours.
Calculate the weight loss. The difference between the starting weight and final weight of sample is the basis for determining the moisture content of a substance.

(II) Brown duvel Fractional disttilation method of moisture measurement:

By heating the grains in oil and measuring the volume or weight of water removed from the grain as condensed vapour or by the loss of weight of the sample, moisture is eliminated using this method.



Brown- Duvel Fractional Distillation Apparatus

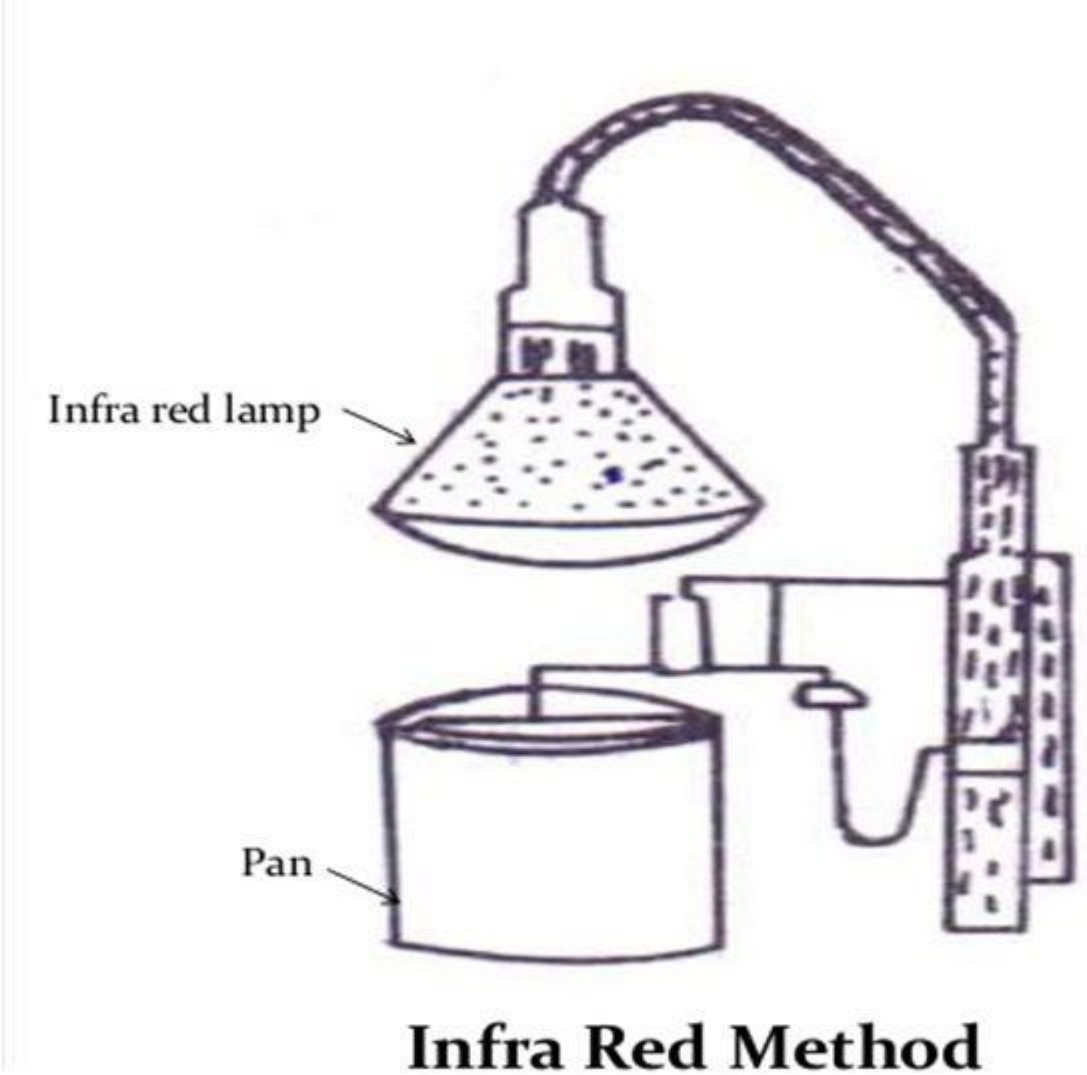
Procedure-

- Put 100 grammes of a sample of whole grains and 150 ml of mineral oil in a flask.

- Boil the sample to release its moisture, then collect it and condense in a graduated cylinder.
- The milimeter of moisture that was collected reveals the moisture content %.
- The moisture content that was determined is on a wet basis.
- The mineral oil in the flask should reach 200°C using this procedure in 26 minutes.
- About 30 minutes are needed for the moisture determination process.
- The determination of the moisture content is judged to be reasonably accurate if the temperature of the mineral oil reaches the desired degree in a timely manner.

(III) Infra red method of moisture measurement:

By evaporating water from a sample of grain using an infrared heating light, this approach directly measures the moisture content of the grain. It is also possible to buy a commercial infrared moisture metre.



Infra Red Method

Procedure-

- Required a device consists of a balance, a pan counter balanced by a fixed weight, and a chain for weighing that can be adjusted in length.
- Over the pan, an infrared lamp that may be adjusted in height is positioned on an arm.

- The instrument's stem has a scale that represents the percentage moisture content.
- A direct reading of the moisture content is received after the test, when the balance is reset to zero.
- The time it takes for the water to evaporate is shortened when using a ground grain sample, even if the sample of grains is unground.

2.Indirect Methods of moisture Measurement:-

There are 3 types of indirect method

(I) Electrical Resistance method of moisture measurement

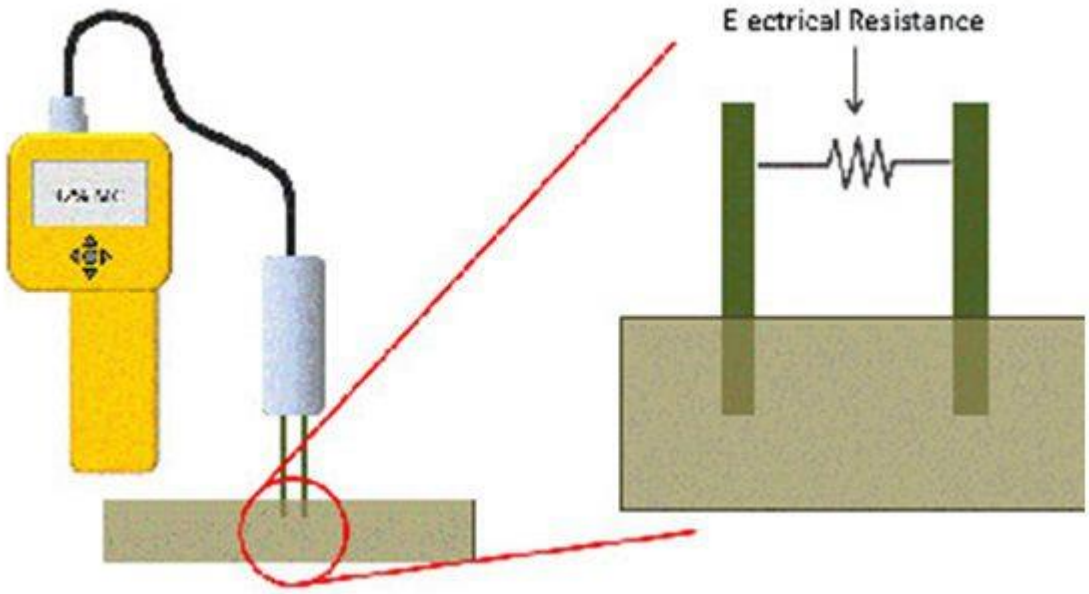
(II) Dielectric Method of moisture measurement

(III) Chemical method of moisture measurement

(I)Electrical Resistance method of moisture measurement:-

A product's moisture content affects its electrical conductivity or resistance. Electrical resistance measures how much a material restricts the flow of electric current through it. Devices for measuring resistance operate on this concept. The moisture metre measures the material's electrical resistance and is calibrated using an oven or other principal method for determining moisture content. The reading of the moisture

content on a wet basis provided by the universal moisture metre is generally accurate.



moisture meter

(II) Dielectric Method of moisture measurement:-

These instruments calculate the dielectric constant of grains. A substance's capacity to store electrical energy in an electric field is measured by a property called the dielectric constant. In the chamber, grains are filled. A condenser's plates, between which a high frequency current is carried to measure the sample's capacitance, serve as the sidewalls of the chamber. According to the amount of water in the sample, the degree of compaction, and grain temperature, the capacitance fluctuates.

moisture meter

(III) Chemical method of moisture measurement:-

This technique involves introducing a chemical that breaks down or reacts with water to eliminate the water. A gas that can be measured in volume or that reduces the original weight of the sample is created by the chemical reaction. This technique involves shaking an excess of calcium carbide with 30 grammes of material to ascertain the moisture content of forages and cereals. It takes between 10 and 25 minutes to react.