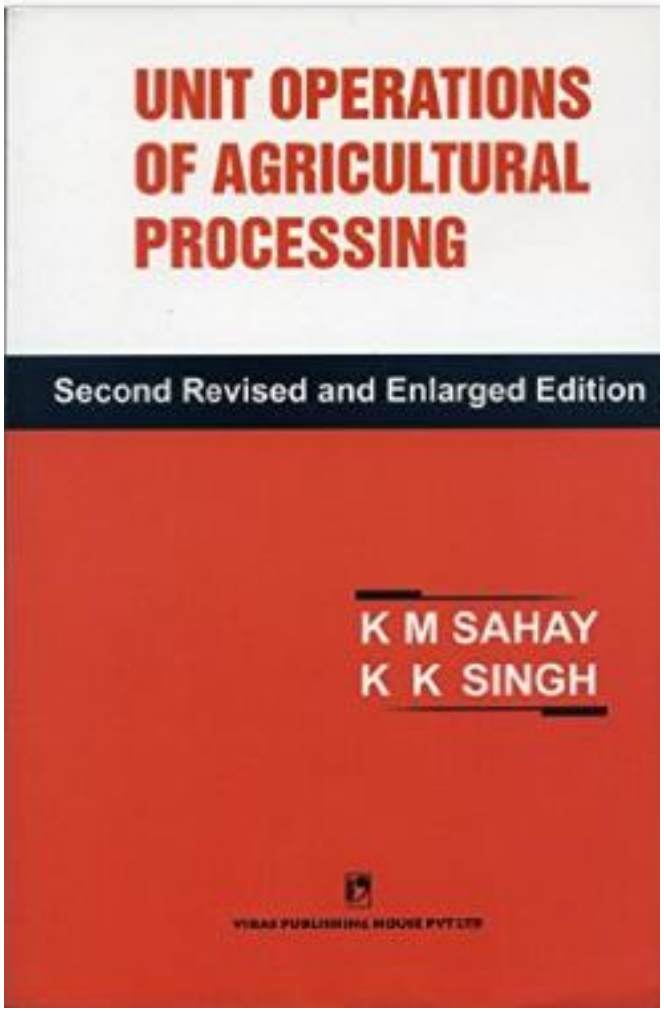
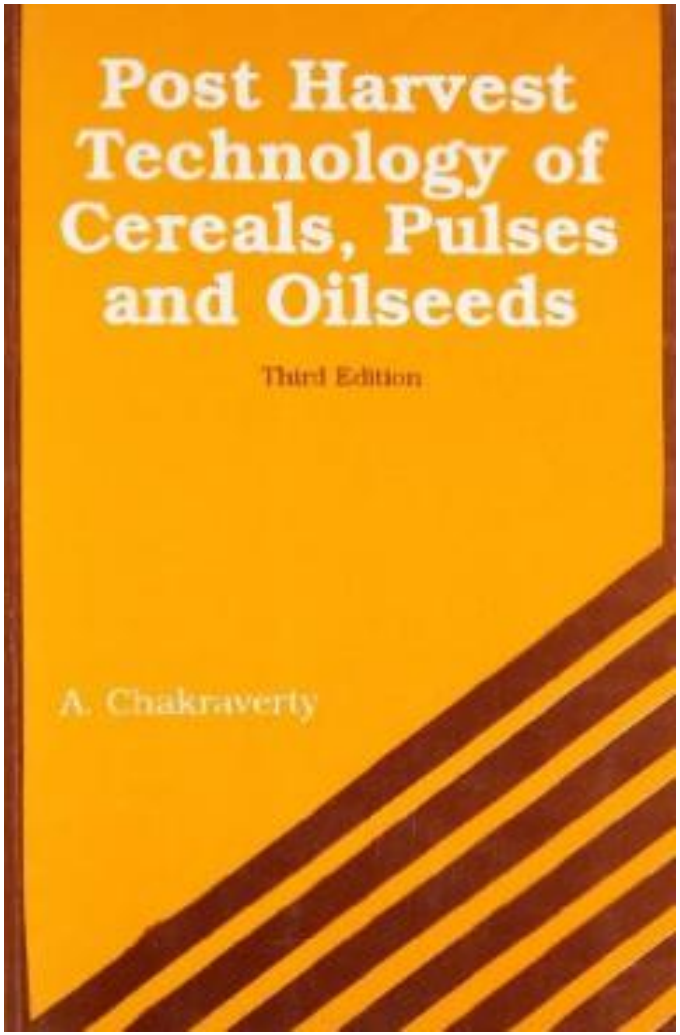
Drying & Storage Engineering (PFE-304)

Lecture 01

Suggested text books





Drying

- Drying food is one of humanity's oldest ways of preserving food, because it is simple, low-tech and offers an excellent way to put aside the bounty of summer for the winter.
- Drying refers to removal of moisture from grains or other products to a predetermined level.
- Dehydration refers to removal of moisture to very low levels usually to bone dry condition

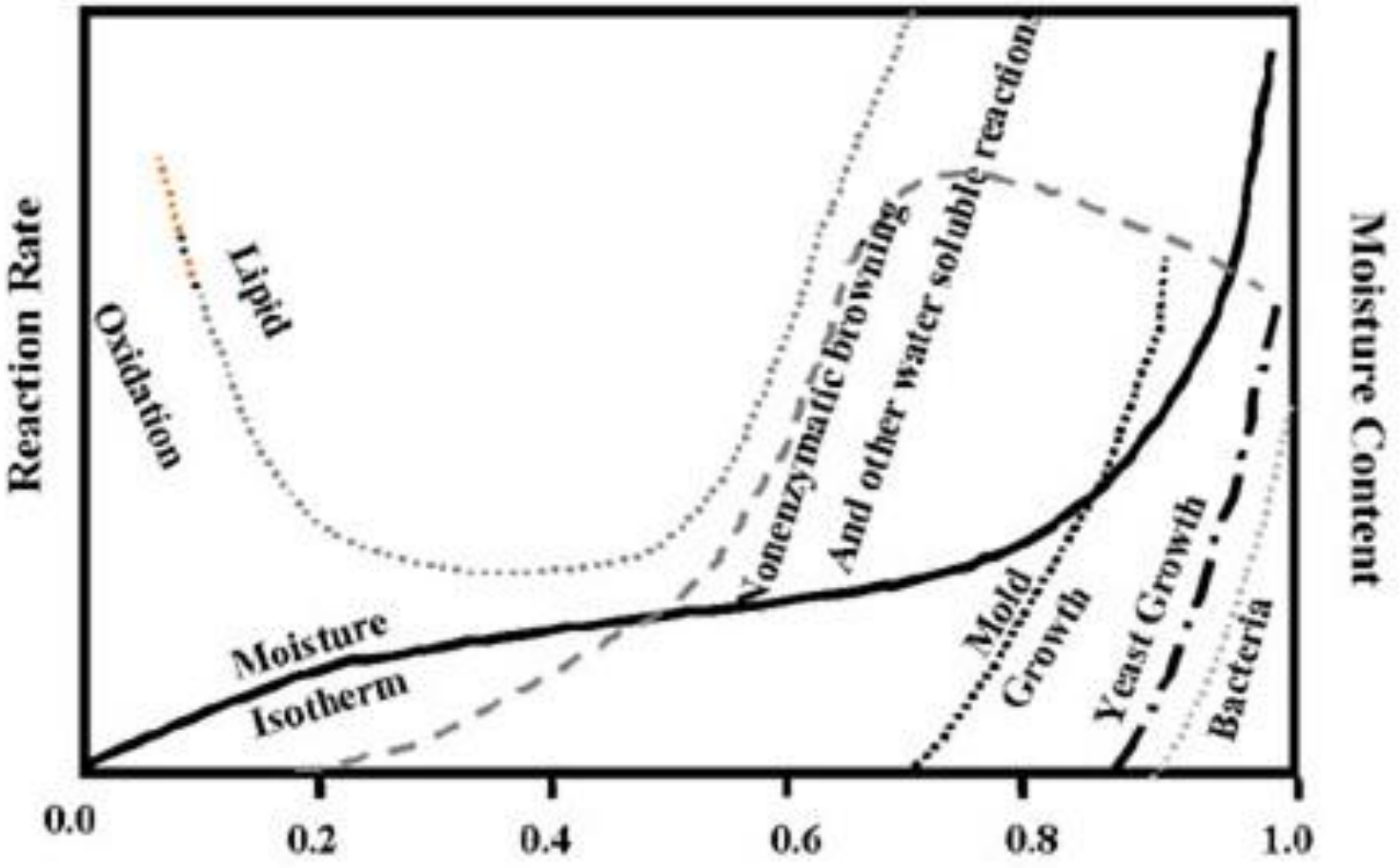
Importance of drying

- Drying permits early harvest of crops
- It helps in proper planning of harvesting season
- Drying of agricultural products to optimum moisture content results in safe storage.
- Dried products could be made available by storing the product
- Heat of respiration during storage can be controlled by drying or aeration.
- Agricultural byproducts and waste could be converted in to useful products.

Requirements for moisture content determination

- Legal and labeling requirements
- Economically important requirements
- Shelf life of the food or food products
- Food quality measurements
- Food processing operations

Effect of moisture content & water activity



1- Moisture is a quality factor in the preservation of some products and affects stability in

a. Dehydrated vegetables and fruits
b. Dried milks
c. Powdered eggs
d. Dehydrated potatoes
e. Spices and herbs

2- Moisture is used as a quality factor for

a. Jams and jellies, to prevent sugar crystallization
b. Sugar syrups
c. Prepared cereals conventional,4-8%; puffed, 7-8%

Food Item	*Moisture content (%, wb)*
White bread, enriched	13.4
Corn flakes cereal	3.0
Milk, whole, fluid, 3.3% fat	88.0
Ice cream, vanilla	61.0
Margarine, regular, hard, corn	16.7
Oil	0
Oranges, raw	86.8
Apples, raw, with skin	83.9
Beef, ground, extra lean, raw	63.2
Egg, whole, raw, fresh	75.3
Peanuts, all types, dry roasted with salt	1.6
Sugar, granulated	0
Sugar, brown	1.6
Cucumbers, with peel, raw	96.0

- Moisture content representation:

The amount of moisture in a product is given on the basis of the weight of water present in the product and is usually expressed in percent.

- Moisture content is designated by two methods,

(1) Wet basis (wb) and
(2) Dry basis (db).

Moisture content

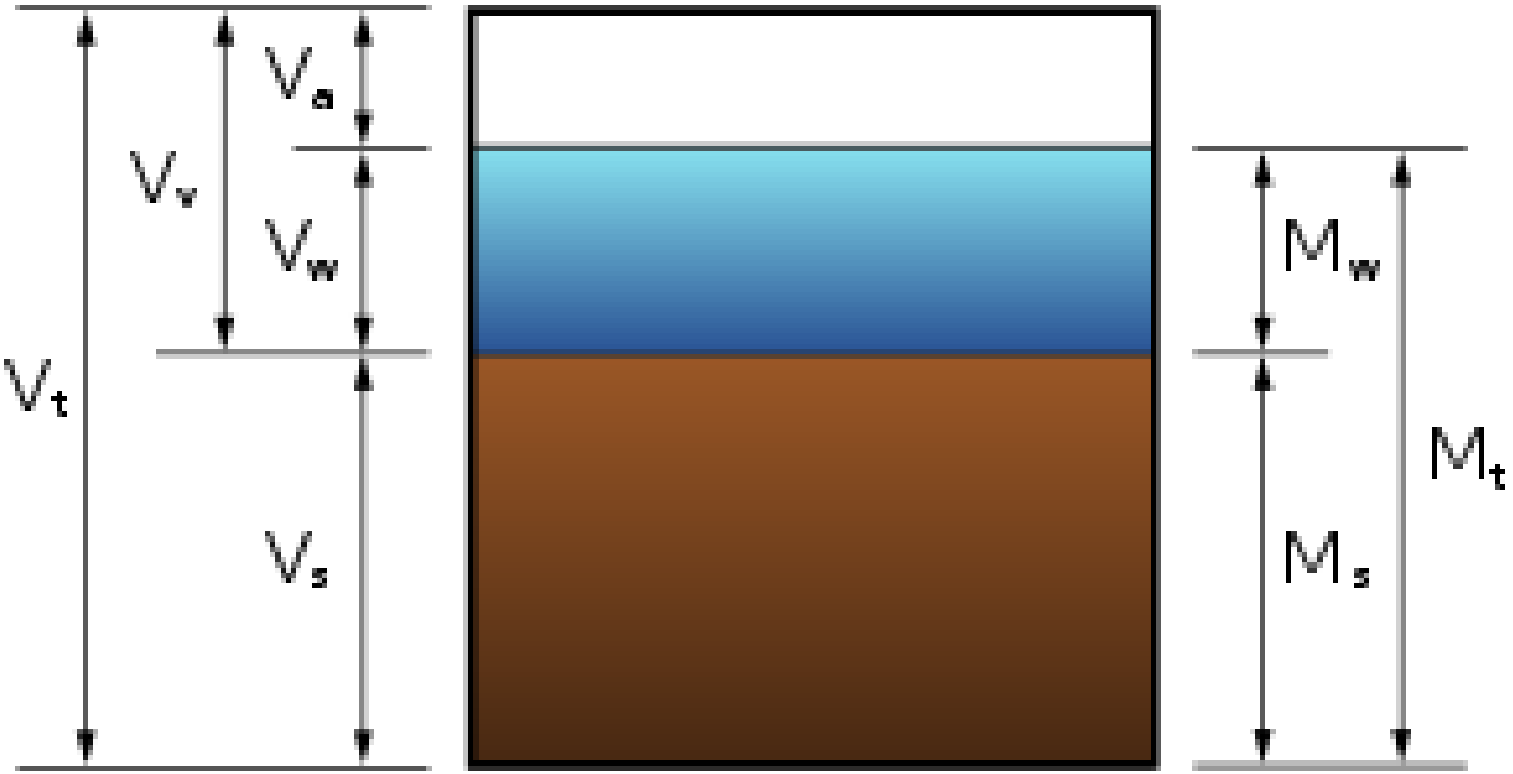
Moisture content (Dry basis)

moisture content is the ratio of the mass of water in a sample to the mass of solids in the sample, expressed as a percentage.

Moisture content (Wet basis)

moisture content is the ratio of the mass of water in a sample to the mass of the sample, expressed as a percentage.

Moisture content



MOISTURE CONTENT

- **Wet basis :**

The moisture content in this method is represented by the following expression,

$$\textbf{\% Moisture content} = \frac{\text{Mass of water in sample}}{\text{Mass of product sample}} \times 100$$

$$= (Mw/Mt) \times 100$$

MOISTURE CONTENT

- Dry basis:

The moisture content in this method is represented by the following expression,

% Moisture content (wt/wt)= $\frac{\text{Mass of water in sample}}{\text{Weight of dry matter product sample}}$ X100

= (Mw/Ms) x 100

Thanks