

DRYING

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▶ **Definition:**

Drying is the process of removal of small amount of liquid(water/volatile liq./moisture) by application of heat to obtain dry solid or solid product.

- ▶ In general drying process involves two operations; 1) Heat transfer 2) Mass transfer
- ▶ Drying and Evaporation are relatively same term but are distinguish in terms of removal of water. Here are some differences between drying and evaporation;

	Drying	Evaporation
1.	In drying processes, the main operation usually carried out on solid materials, e.g. powders, or products	In evaporation processes, the main operation usually carried out on liquid materials, e.g. solution, or products
2.	Drying in most of the cases means the removal of relatively small amounts of water from solids.	Evaporation include the removal of large amounts of water from solutions.
3.	Drying involves the removal of water at temperatures below its boiling point.	Evaporation involves the removal of water by boiling a solution.
4.	In drying , water is usually removed by circulating air over the material in order to carry away the water vapour	While in evaporation , water is removed from the material as pure water vapour mixed with other gases.

Objectives

1. It decreases food decomposition caused by moisture present.
 2. It prevents decomposition by microbes.
 3. It prevents bacterial and mould growth, so increase product stability.
 4. It is used in granule formulation.
 5. Size reduction is more efficient in dry state.
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List of equipments used for drying:

- ▶ Drum dryer,
- ▶ Spray dryer,
- ▶ Fluidised bed dryer,
- ▶ Tray dryer,
- ▶ Tunnel dryer,
- ▶ Vacuum dryer,
- ▶ Microwave,
- ▶ Radiant heat dryer (infra red)
- ▶ Rotary dryer
- ▶ Freeze dryer

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