PLOT NO. 1131 HARI ENCLAVE KIRARI SLEMAN NAGAR NEW DELHI-110086
2ND PLANT H-936 RIICO CHOPANKI INDUSTRIAL AREA ALWAR RAJSTHAN-301707

RESOTECH- FOOD DEHYDRATION

Professional Manufacturer of Test Equipment

MAKE :- RESOTECH

MODEL NO. :- RESOTECH DEHYDRATION-201

RESONANCE AUTOMATION AND MACHINES

MANUFACTURERS & SUPPLERS

SPECIAL PURPOSE MACHINE, MATERIAL TESTING MACHINE, LEAKAGE TESTING MACHINE, PACKIGING TESTING MACHINE, ENVIRONMENTAL TEST CHAMBER, ASSY.FOOD DEHYDRATION, LINE EQUIPMENT, SOLUTION FOR ELECTRONIC AUTOMATION AND PRODUCT DEVELOPMENT, COMPUTERIZED CONTROL MACHINE , PLC HMI SCADA VISUAL BASIC SOFTWARE DEVELOPMENT SOLUTION AND OTHER SERVICES.

DRYING (DEHYDRATION)

- One of the oldest methods of preserving food
- Removes moisture stops the growth of bacteria, yeasts & molds that normally spoil food
- Slows down but doesn't completely inactivate enzymes

DRYING TECHNIQUES

- Sun or solar drying
- Freeze drying
- Drum drying
- Spray drying
- Foam mat and vacuum belt
- Convection air & Superheated steam (tray, tunnel)
- Osmotic drying
- Microwave

- Combination of different techniques
- Vacuum- osmotic
- Osmotic – microwave
- Ultrasound pre-treatment followed by drying
- Fluidized bed
- Pulse combustion
- Jet zone or impingement

DRYING FOODS OUTDOORS

- Sun Drying

— Fruits safe to dry due to high acid and sugar content

— Vegetables should not be dried outside

- They need constant temperature & airflow

— Temperature of 30 C or higher for several days with humidity below 60%

— Cover to protect against insects/pests

- Solar Drying
  - Need to construct a dryer withpanel(s)
  - Need to stir and turn food severaltimes a day
  - Need several days of sun in a row

- Vine Drying
  – Beans & Lentils

ROOM TEMPERATURE DRYING

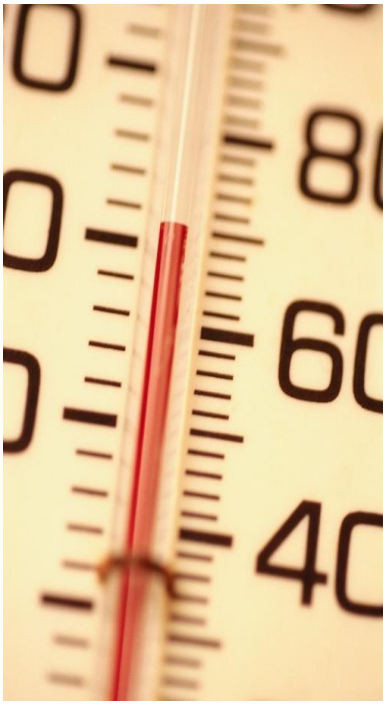
- Method used mainly for herbs & hot peppers

» Strung on string or tied in bundles and suspended from overhead racks in air until dryOR

»Enclosed in paper bags with openings for air circulation

»Herbs can also be dried in the microwave oven

TEMPERATURES FOR DRYING



- **The ideal temperature for dryingor dehydrating foods is 60-70 C**
  - **If higher temperatures are used, foodcooks instead of dries**
- **Avoid "case hardening"**
  - **– dried on outside but moisture trapped inside allowing mold growth**
- **Temperature close to glass transition gives better products**

➢ Drying Rates

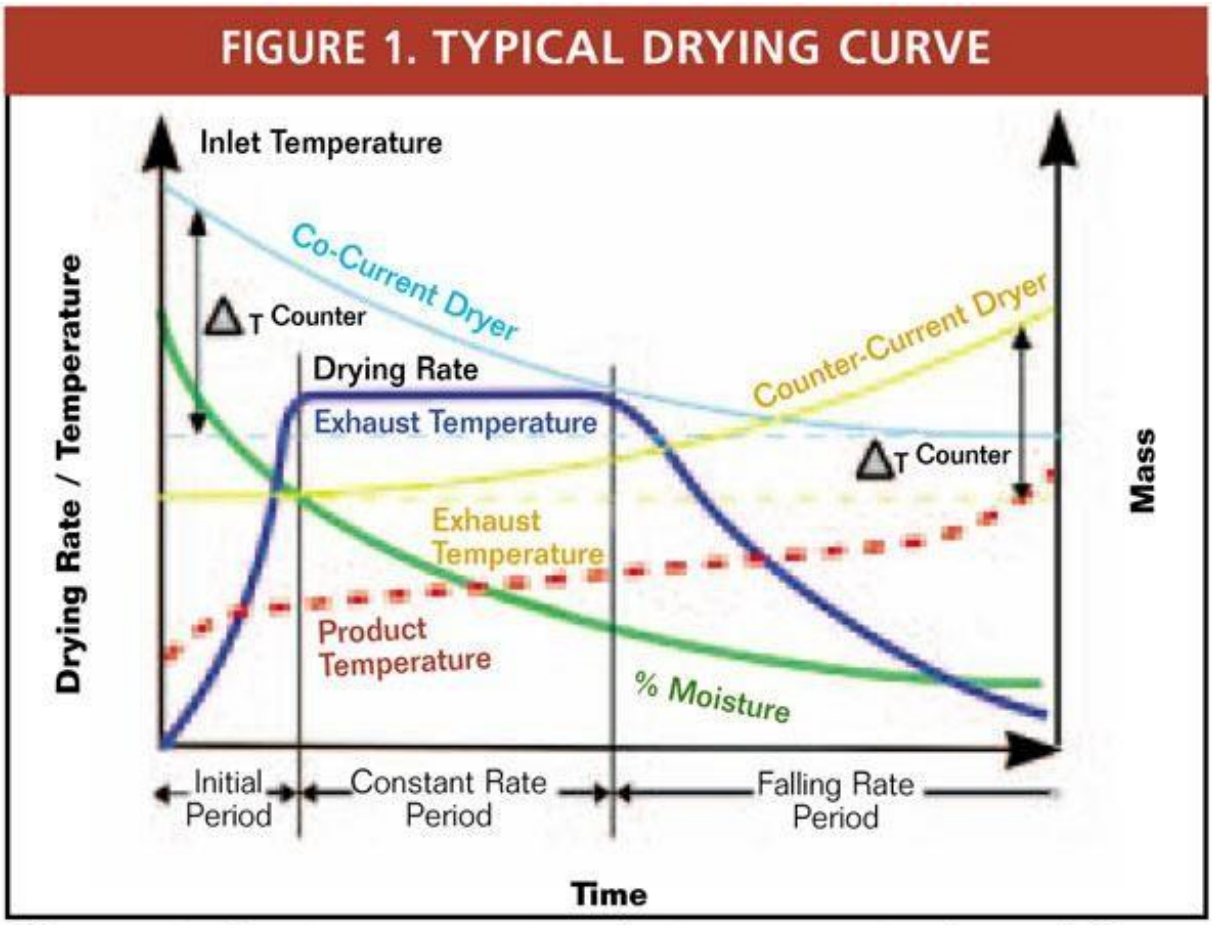


Figure 1. During processing, drying occurs in three different periods, or phases, which can be clearly defined.

TECHNICAL SPECIFICATION

Capacity	10-15 kg/hr
Initial moisture content	80-90%
Final moisture content	5-10%
Temperature	60^0C
Magnetron	Water cooled, Power : min 1.25 KW/2450+/- 50 MHZ-minimum 9 Nos.
Heating power	Microwave: min 10 KW IR : minimum 6 KW variable power option
Material of construction	SS304 for inner cabinets and MS for outer panels
Waveguides	Separate waveguides for each Magnetron to avoid interference
Type of conveyor	PPTFE belt conveyor Type: continuous floor conveyor
Conveyor speed	Variable speed-0.5 mpm to 1 mpm
Temperature sensors	Contact air sensors-min 2 Nos Non-contact IR sensors-min 3 Nos
Power controllers	Solid state power controller phase angle fired controller rating : 3KW-2 Nos.
Cabinet cooling	Sufficient cooling using fans
Exhaust	Centrifugal blower-min 0.5 HP
Water chiller	Refrigerated cooling system with circulation pump and PID controller
Safety features	Interlock system for conveyor drive and magnetron cooling with Emergency switch off
Warranty	1 year

FACTORS AFFECTING DRYING

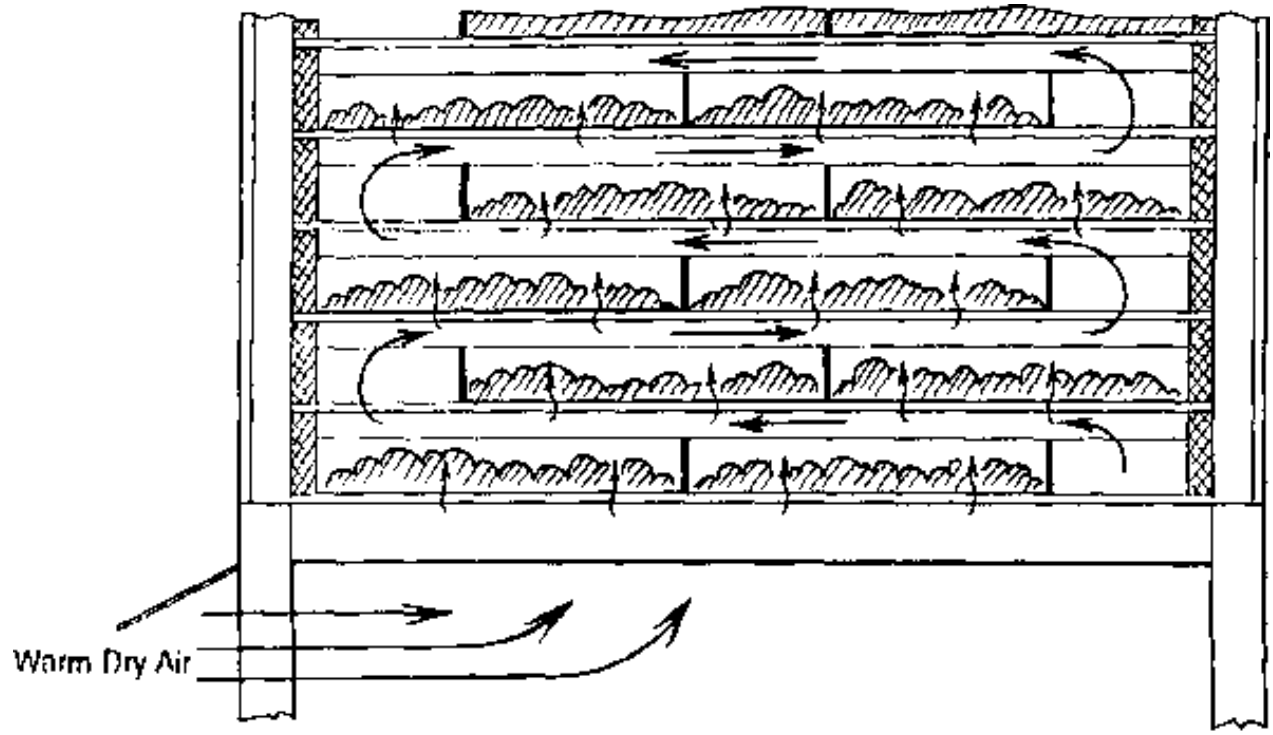
- Temperature
- Humidity
- Air velocity
- Direction of air flow
- Type of dryer
- Type and size of food

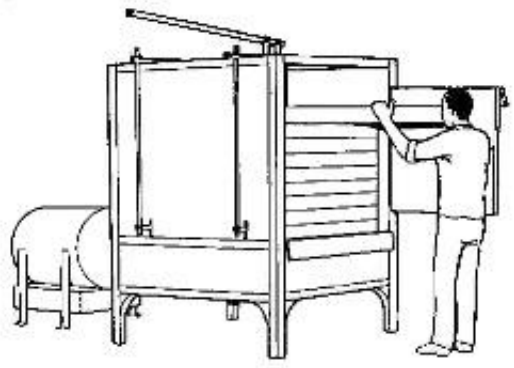
(very difficult to remove last 2% of moisture)

THE PROCESS

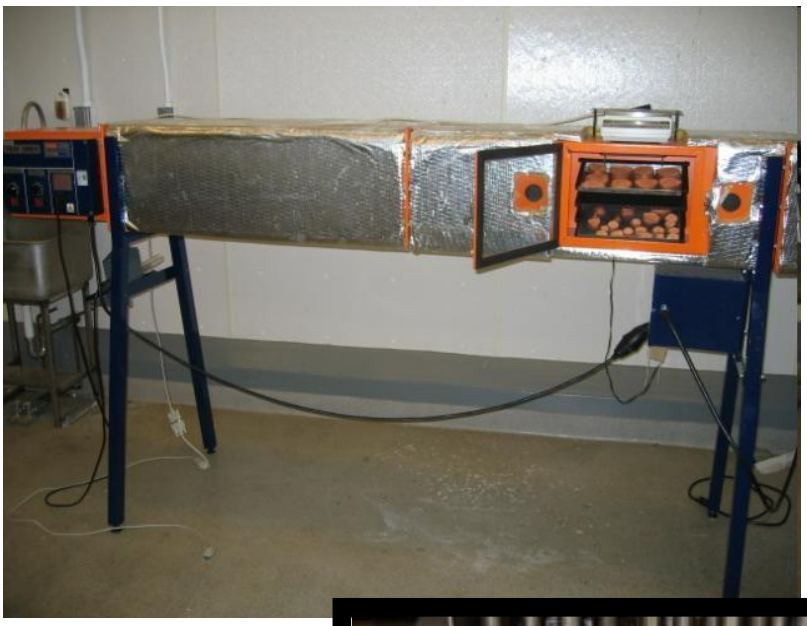
- Prepare the fruit: wash, core and peel ifdesired
- Fruits can be halved or sliced and some leftwhole
- Thin, uniform, peeled slices dry fastest
- If fruit is whole, “check” or crack the skinto speed drying

TUNNEL DRYER





HOT AIR DRYING



ARRANGING FRUIT FOR DRYING

- Do not over fill
  - Leave room for air circulation
- Lay as flat as possible
- Dry similar fruits together
  - Avoid mixing strong odors

DETERMINING DRYNESS OF FRUIT

- Drying fruit can take anywhere from 6 hoursfor thin or small pieces or 10-12 hours for larger juicy fruits such as peach or apricot halves
- Dried fruit will feel leathery; won't stick toitself
- Cut fruit should have no visible moistureinside though it may be soft

AFTER DRYING FRUIT

- Cool fruit 30-60 minutes before packaging
- Don't pack too soon or moisture buildup couldoccur
- Don't wait too long or the fruit could pick upmoisture from the air

CONDITIONING FRUIT

- Conditioning is used to equalize moisture
  - Pack cooled fruit in plastic bag or glass jar
  - Seal and let stand for 7-10 days
  - Shake jars daily to separate pieces and check formoisture (condensation on sides of bag/jar)
  - If there is condensation, return fruit to dehydratorfor more drying or place in freezer
- There is a chance mold will have already started growing in too-moist fruit; discard if you find mold

DRYING VEGETABLES

- Prepare the vegetables
  - Wash, trim, and peel
  - Cut uniform pieces or leave whole
  - Dry as soon as possible after harvesting

COOLING VEGETABLES

- Dip briefly in cold water only long enough to stop cooking
- Cool until they are only slightly hot to touch– about 120 F
- Wipe and spread vegetables out on racks for drying

DETERMINING DRYNESS OF VEGETABLES

- Dry vegetables until brittle or “crisp”
- Some vegetables shatter if hit hard
- Low moisture (10%)
- Cool, place in bags or jars and seal

– Should store up to 1 year if in a cool dark place injars with air-tight

NUTRITIONAL VALUE OF DRIED FOODS

Fresh produce provides calories, fiber, minerals and vitamins. Changes that can be expected in home-dried food are:

- Calories: No change
- Fiber: No change
- Minerals: Minimal loss
- Vitamins: Greater loss during dehydration process(more susceptible to heat, air and light)

YIELDS

- Because drying removes moisture, the food shrinks and decreases in size and weight
- When water is added to the dried product, it returns close to its original size

25 lbs. apples = 4 lbs. dried

25 lbs. onions = 3 lbs. dried

=

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RESONANCE AUTOMATION AND MACHINES

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