



**INTERMEDIATE  
MOISTURE FOODS  
DRYING**



## Intermediate Moisture Foods

These are semi-moist with about 25% (15-30%) moisture but with some of the water bound (and so unavailable to micro-organisms) by the addition of glycerol, sorbitol, salt or organic acids, so preventing the growth of micro-organism.

# \* Preparation

- Adding an edible humectant to conventionally prepared food formulations in an amount of from about 3-8% by weight of the final product
- Adding an effective level of an antimycotic to prevent mould growth
- Cooking the formulated product
- Vacuum drying the cooked product to reduce the available water to a desired intermediate moisture level from about .80 to about .85

# \* 1a -- Controlling Water Activity

## \* Water activity ( $A_w$ )

The availability of water for spore germination and microbial growth is closely related to its relative vapor pressure, commonly designated as water activity of  $A_w$ .

Water activity  $A_w$  is defined as the ratio of vapor pressure ( $P$ ) of water in the food to the vapor pressure of pure water ( $P_0$ ) at the same temperature, that is,  $A_w = P/P_0$ . Within the range favorable to the growth of mesophilic microorganisms,  $A_w$  is practically independent of temperature.



# \*Water activity and foods

Above 0.85	Moist foods	Refrigeration or another barrier to control pathogen growth
0.60 and 0.85	Intermediate moisture foods	No refrigeration, short shelf-life because spoilage by yeast and mold
Below 0.60	Low moisture foods	Extended shelf-life without refrigeration

# \* DRYING METHOD

- Vacuum drying





**Oven drying and heat evaporation in a steam kettle at atmospheric pressure both resulted in surface hardening and very tough products even at high intermediate moisture levels (50% of original solution)**

# \* VACCUM DRYING

- Vacuum drying resulted in achieving the most desired intermediate moisture levels and resulting product.**
- This was achieved by using a shelf dryer with heated platens of Vacuum in the drying chamber was controlled to a pressure just above the freezing point of the product, usually 3 mm absolute pressure**
- Heat**  
**was applied during drying as radiant heat from the platens with the product trays being suspended above the heated**

**Temperatures of the platens evaluated have been from room temperature (25°C) up to 65°C.**

**❑ Temperatures below 38 °C were required to prevent case hardening and severe toughening of products dried to the lower internal solution levels**

**❑ Even with reduced temperatures many Products dried to 10% of the original internal solution levels were found to be tough or hard**

**❑ The partially dried products are sealed in non-hermetic packaging materials such as cellophane pouches for storage**

# \* IM Foods

- Shelf stable pet foods
- Foods for armed forces
- Foods for space travel.



**THANK YOU**