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Microwave Heating in Food Processing

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(MHZ)

(Frequency)

(ITU)

(GHZ)

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(Magnetron)

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(High Voltage Transformer)

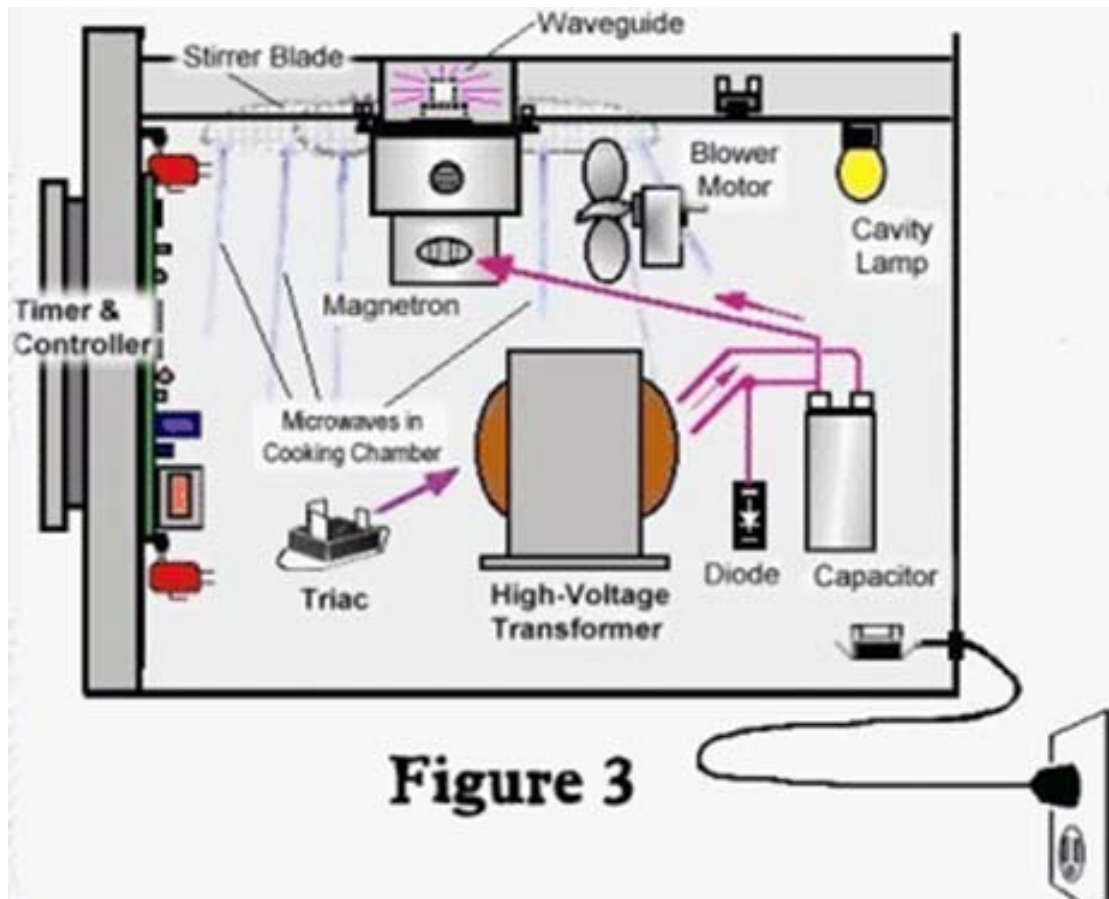
(Magnetron)

(Cavity Lamp) (Diode) ()

(Capacitor)

(Timer and Controller)

(Blower)



()

**

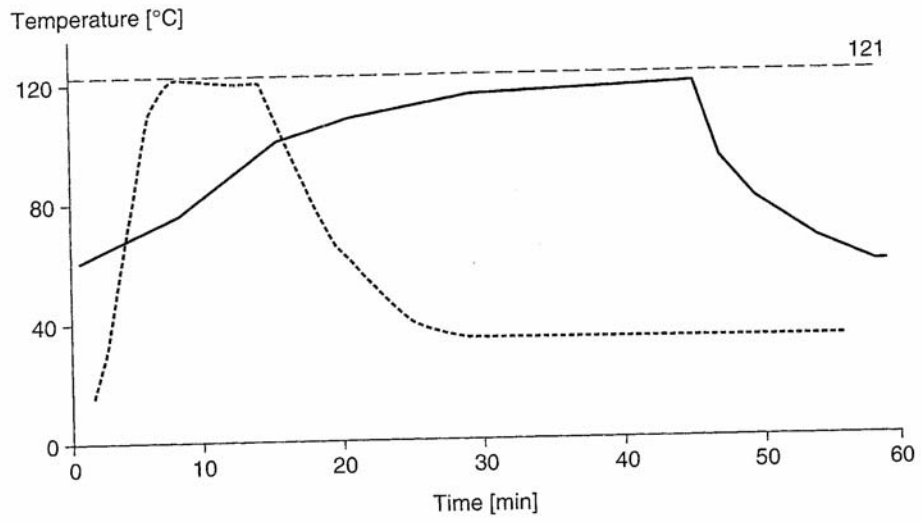
(Quanta)

(Photons)

()

()

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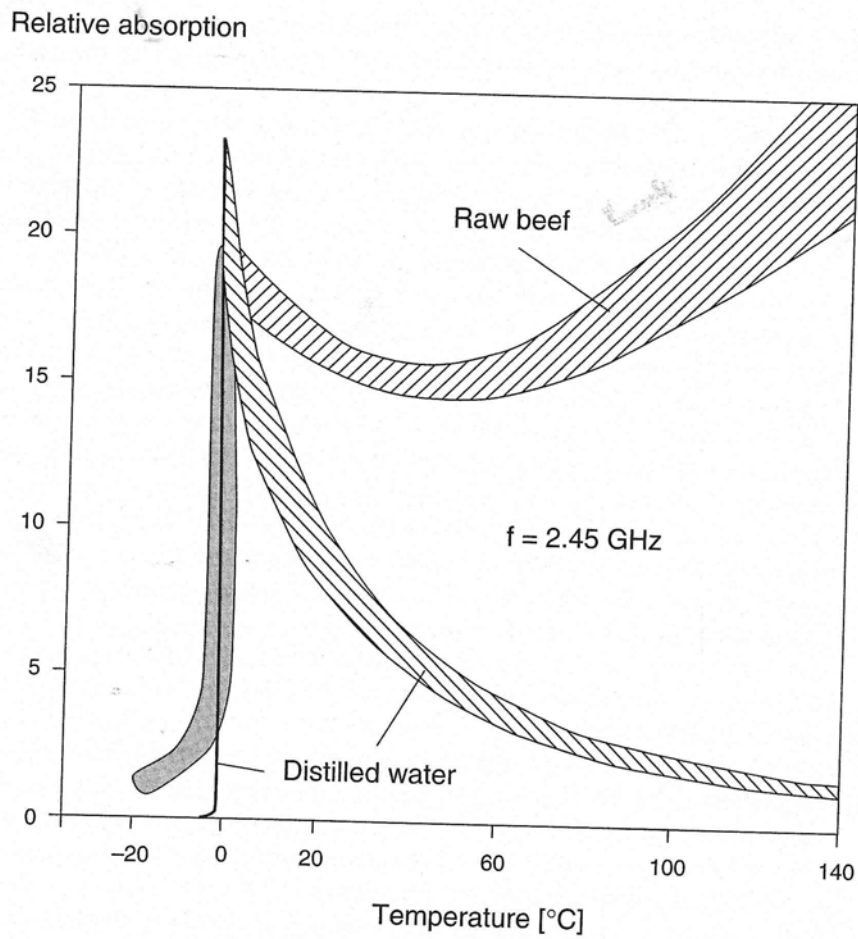


Fig 18.4 Energy absorption characteristics of raw beef and distilled water at 2.45 GHz

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(Dielectric Constant)

(Dielectric loss factor)

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-

()

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-

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• **

:

(Tempering) ()

.() - -
(Food Drying) ()

(Cooking) ()

(Enzyme Inactivation) ()

(Baking) ()

(Pasturization and Sterilization) ()

()



(.)

()

Ohmic Heating

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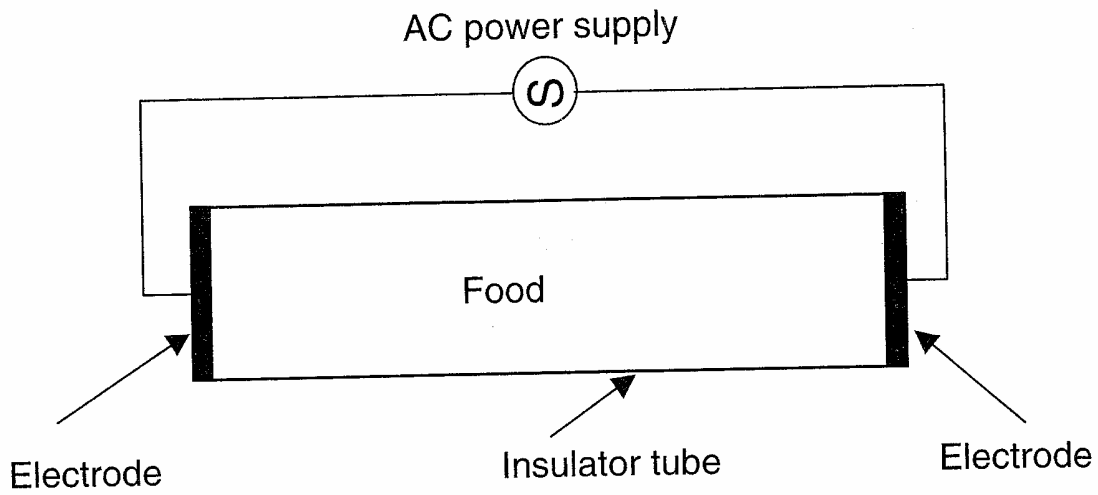


FIG. 10.1. A schematic diagram of an ohmic heating device.

(AC power - ()
 - (Insulator tube) - (Electrode) () - supply)
 . (Food) (

(pH<4.5)

() -

.()

(pH>4.5)

()

(pH)

(Lethality F0= 3 min)

. (12D colony reduction)

)

(

()

%

(HTST)

()

.()

(Heating Inversion)

**

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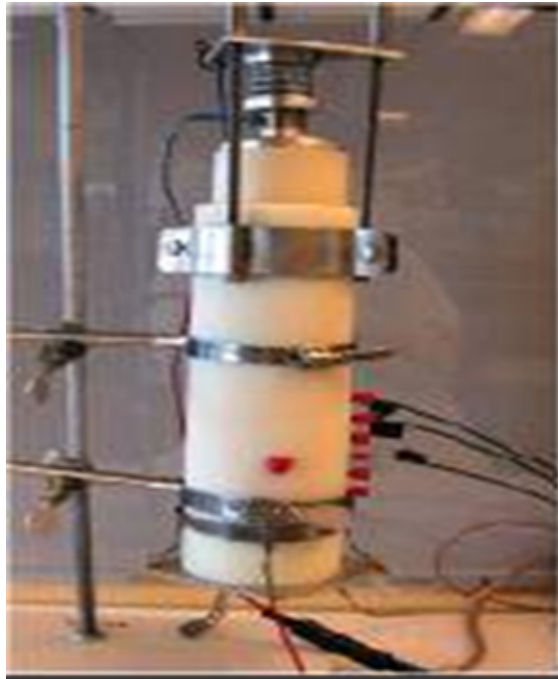
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Continuous-Flow Heat Processing

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(Thermal Heat-Hold-Cool

()

. Process)

)

(()

(HTST)

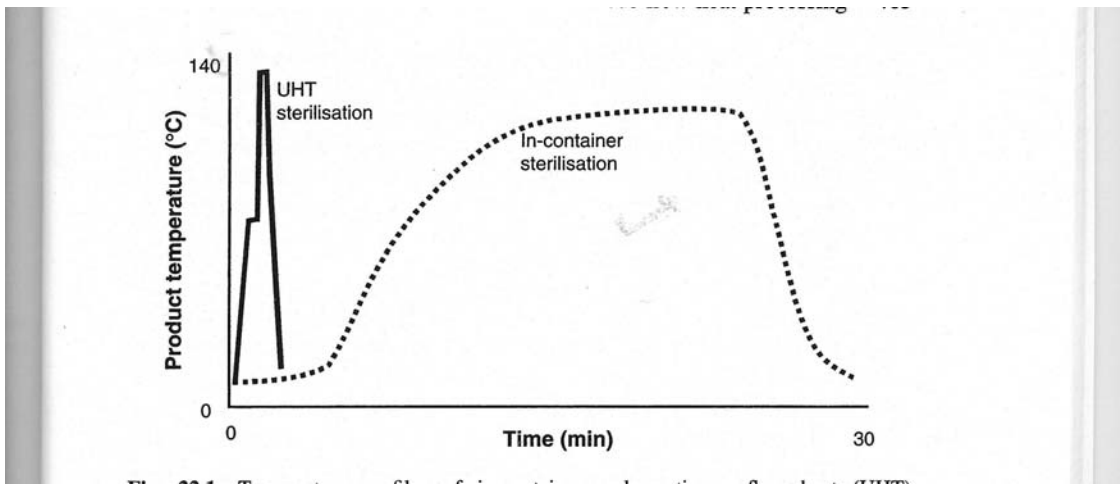
(UHT)

()

()

()

()



)

.()

(

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:

()

$$-\frac{dN}{dt} = kN$$

$$() \quad -\frac{dC}{dt} = kC$$

- :
- N
- C
- t
- k

: () ()

$$() \quad \frac{N}{N_0} = 10^{-t/D}$$

$$() \quad \frac{C}{C_0} = 10^{-t/D}$$

- :
- N
- C
- N₀
- C₀
- D

t
t
t = 0
t = 0

D

.()

D

D

[Z] ()

. (Arrhenius Model)

:

Z

$$() \quad \frac{D_1}{D_2} = 10^{(E_1 - E_2)/Z}$$

:

- D_1

- D_2

- Z

.

D

θ_1

θ_2

Z

:

()

$$k = Ae^{-E_a/R\theta_k}$$

:

- k

- A

- E_a

- R

- θ_k

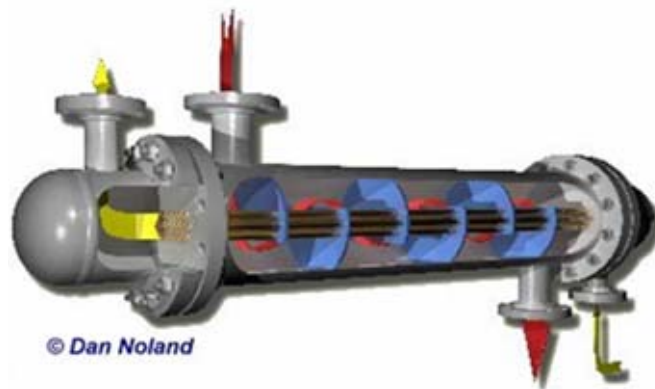
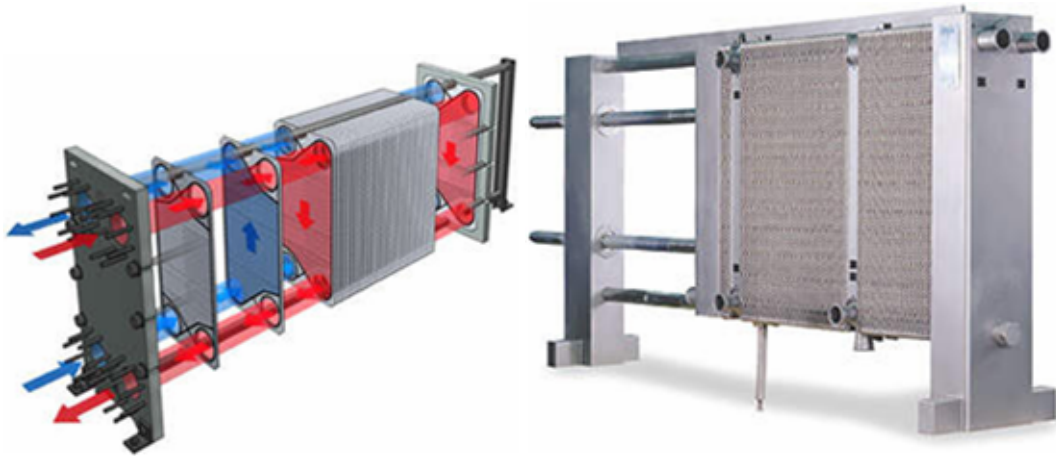
Z

D

A E_a k

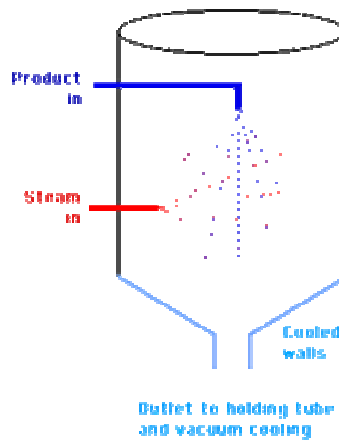
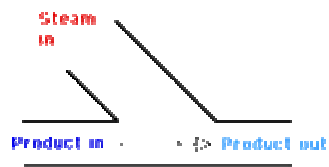
Z

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INJECTION VALVE

INFUSION CHAMBER



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