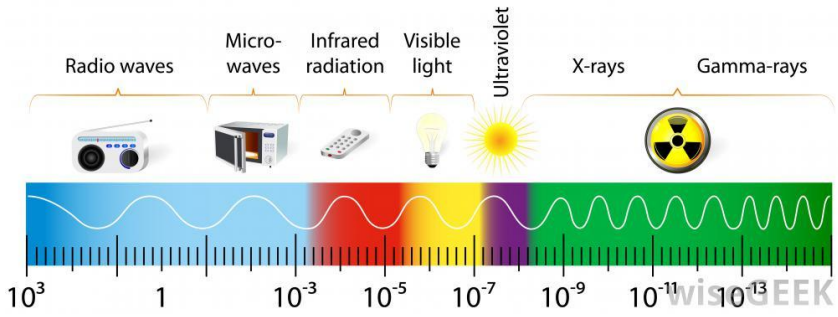
Microwave

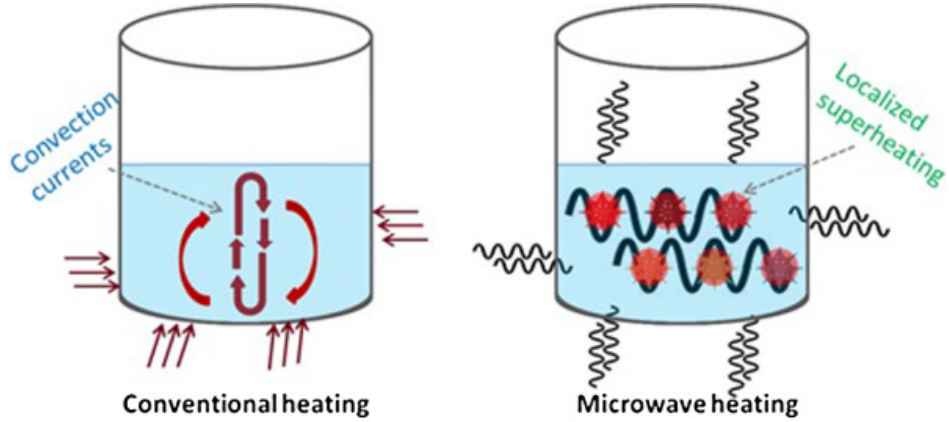
What is microwave?

Microwaves are a form of electromagnetic radiation with wavelengths ranging from as long as one meter to as short as one millimeter; with frequencies between 300 MHz (0.3 GHz) and 300 GHz.

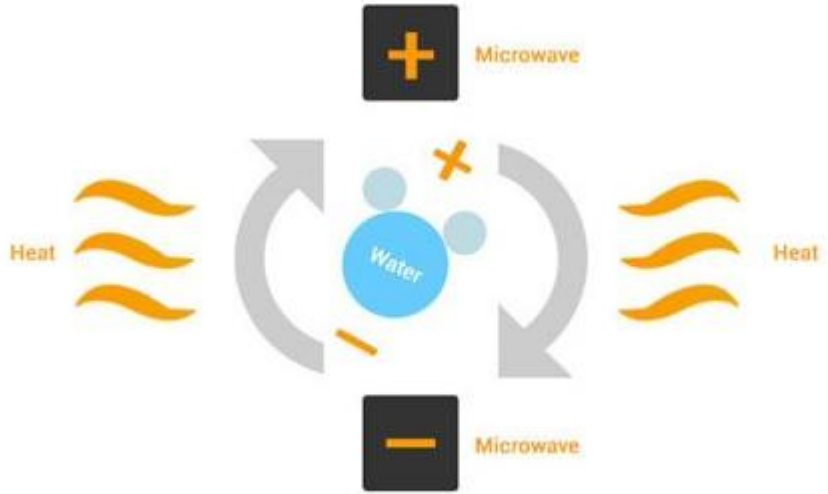
Microwave uses : Communication , Radar , Heating and power application



Principle



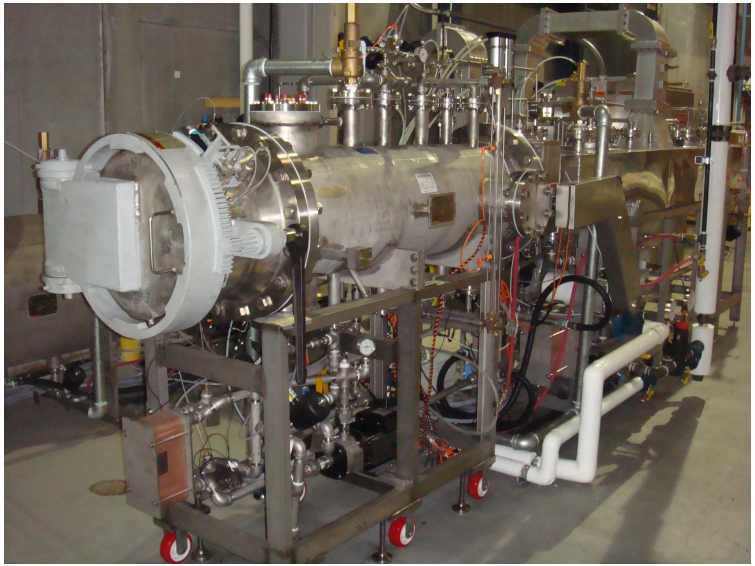
Microwave heating in foods occurs due to coupling of electrical energy from an electromagnetic field in a microwave cavity with the food and its subsequent dissipation within food product.



This results in a sharp increase in temperature within the product. Microwave energy is delivered at a molecular level through the molecular interaction with the electromagnetic field, in particular, through molecular friction resulting from dipole rotation of polar solvents and from the conductive migration of dissolved ions.

Microwave in food industry

Pasteurization



Sterilization

Advantages of Microwave

Microwave pasteurization vs. Pasteurization

	Microwave Pasteurization	Pasteurization (Conventional treatment)
Sensory&Quality	same	same
Shelf-life	longer	shorter
Taste&Odour	same	same

PS. Microwave heating in continuous flow seems to be a good alternative to traditional pasteurisation methods.

Advantages

Microwave heating vs. Conventional heating

Microwave heating	Conventional heating
Penetrate into the interior of food	Heat transfer into the exterior only
Faster	Slower
More efficient	Less efficient

Cooking fat food, fat vegetable by microwave heating just similar to frying one since it results in local free radical formation.

Microwave sterilization vs. sterilization

	Sterilization	Microwave
Processing time	Slower	Faster
Freshness	Normal	Better
Retention of nutrients	Normal	Better

- Instantaneous turn-on and turn-off.
- The use of post packaging processing could benefit manufactures in reducing spoilage, eliminating refrigeration costs, and provide safe foods for consumers.

Microwave drying vs. Drying

	Drying	Microwave
Time	Slower	Faster 49-80%
Shirinkag	Lower	Higher
Rehydration	Higher	Lower
Absortion	Slower	Faster

Thus, hot air microwave (moderated way between drying & Microwave drying) finnish drying can be used for prevention of high quality products.

Application

- Heating in food process
- Destroy microorganism in food products
- Thawing frozen food for ready to eat
- Increase food quality

Thawing


DIGIORNO
RISING CRUST PIZZA
Totino's
Pizza Rolls
pepperoni
Don't forget the Heinz Ketchup!
Ore-Ida
Valley Fresh
Steamers
EDWARDS
Banquet
lean cuisine
glazed chicken
CHEF'S PICK
Banquet
Chicken Pot Pie
HOT POCKETS
PHILLY STEAK & CHEESE


wikiHow

Product


Chef Minute Meals
self heating meal
A freshly cooked
The complete take-out meal!
Oven included!
BEEF STEW


WISE COMPANY
NOODLES AND BEEF IN SAVORY MUSHROOM SAUCE
NET WT. 5 OZ (142g)


WISE COMPANY
CHILI MAC WITH BEEF
NET WT. 5 OZ (142g)


apple & mango juice
apple, pineapple & lemon grass juice
apple & boysenberry juice
English apple & William pear juice
Sainsbury's


WISE COMPANY
CHEESY LASAGNA
NET WT. 5 OZ (142g)


WISE COMPANY
PASTA ALFREDO WITH CHICKEN
NET WT. 5 OZ (142g)

Credit

http://microwaveheating.wsu.edu/factsheet/MicrowavetechnologyFActSheetWSUNCSU08.pdf

http://disciplinas.stoa.usp.br/pluginfile.php/128445/mod_resource/content/1/C28.microwave.pdf

http://microwaveheating.wsu.edu/factsheet/index.html