

Revolutions in the Cooking Process with Technological Advances in Microwave Heating

Summary

Concepts of microwave heating device have undergone many changes during the last two decades. Microwaves cause food molecules to vibrate, creating friction that heats and cooks food.

In early stages manual controls were used but present microwave ovens have electronic controls with Pre-Set Programming technology. Advanced technology with concave reflectors and dual wave emissions help faster and even cooking.

“Microwave Bank” with a microprocessor with a specially-designed web browser for internet access, devices with voice-recognition technology and e-mail facilities is the latest advances of microwave technological developments in the 21st century.

History of microwave oven

The first microwave oven was developed during late 1950' by Dr Spencer. Main concept of his design was to prevent the microwave energy, entering a box from escaping, thereby creating a higher density electromagnetic field. When food was placed inside and microwave energy fed in, the temperature of the food rose rapidly. There was a magnetron tube that had to be water-cooled; so plumbing was also required. These primitive units were gigantic and expensive.

Concept of this device has undergone many changes during the last two decades and has come a long way since then.

How it works and gradual development

A microwave oven uses microwaves causing food molecules to vibrate, creating friction that heats and cooks the food. Non-metal containers are used in these ovens because microwaves pass through them (Figure 1), thereby cooking the food from all angles.

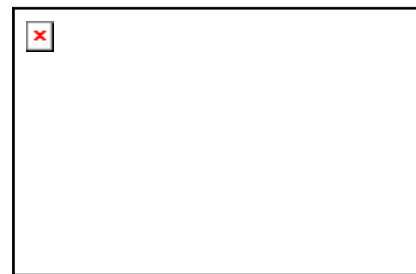


Figure 1 - microwave radiation bounce off the walls and pass through food molecules

The control section of a microwave oven consists of a timer, various interlock and protection devices. The high-voltage section step up the house voltage to high voltage, which is then

converted into microwave energy (Figure 2). However these sections were not found until late 1970's.

At early stages rotary dial manual controls were used but most of the present microwave ovens have touch sensitive and/or electronic controls (Figure 3). This, called 'Pre-Set Programming' was introduced in 1990's allowed the user to pre-program sequence of operations.



Figure 3 – A microwave oven with touch sensitive and electronic controls

More technological advances took place in late 1990's offered new cooking methods enabling cooking multitude of fine foods, allowing thawing, savouring the advantages of traditional grilling and convention cooking with browning.

Advanced technology, also helped in proper distribution of microwave energy helping faster and even cooking and was superior to ordinary microwave cooking. The **concave reflectors** are located inside the cavity on the left hand side (Figure 5) and at the back to concentrate microwave energy on the food.

Dual wave emission helped even distribution of microwaves. This new technology minimised dead space where conventional microwaves couldn't reach, leading to faster, uniform cooking.

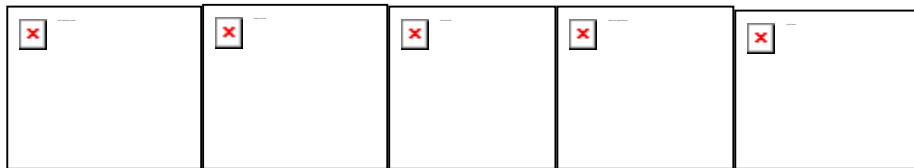


Figure 5 – Dual wave emission system

Sensors were introduced to prevent undercooking or overcooking of food. Thorough measures such as gauging the release of steam, as food heats, sensors detect the degree to which food has cooked and adjusts heating time or power accordingly.

Recently, food scientists have created smart microwave ovens that recognise food to be prepared and offer advice on recipes and nutrition with following features.

- **Microprocessors** - "brains" of the high tech oven - control the ovens' electronics

eg. Turning the unit on for correct length of time at proper power setting.

- **Bar codes and scanners** - used as tools for transferring product information into the microwave's brain.

Recent developments

The latest of microwave ovens is the **Microwave Bank** (Figure 6) with a microprocessor, a specially-designed web browser and a front door that acts as a touch screen. The device also supports voice-recognition technology so that users can speak commands into microwave, such as "send e-mail," followed by a dictation of the contents of the message. Internet-based services include online banking, shopping, e-mail, information services, and even access to TV via the microwave screen.

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