ISTITUTO COMPRENSIVO TRENTO 5

Scuola secondaria di primo grado "G. Bresadola"

a. s. 2015/2016

Is the microwave dangerous?

progetto realizzato da

Ylias Lorenzo Cocco e Lapo Alvise Detassis

classe 2^ bilingue

Open day scienze – 16 dicembre 2015

Introduction

We want to see if the microwave affects the growth of the plants.

Our question

Does the electromagnetic waves affect the water give it at the plants?

Hypothesis

The plants will not change giving them microwaved water.

Materials we used

Water,4 fern plants, microwave, tap,2 glasses.

Procedure

Take 2 fern plants and put in a sunny place, at one of the plants give tap water and at the other the same quantity of water boiled in the microwave and give it to the plant when arrive at environment temperature. Repeat this thing for at least 3 weeks.

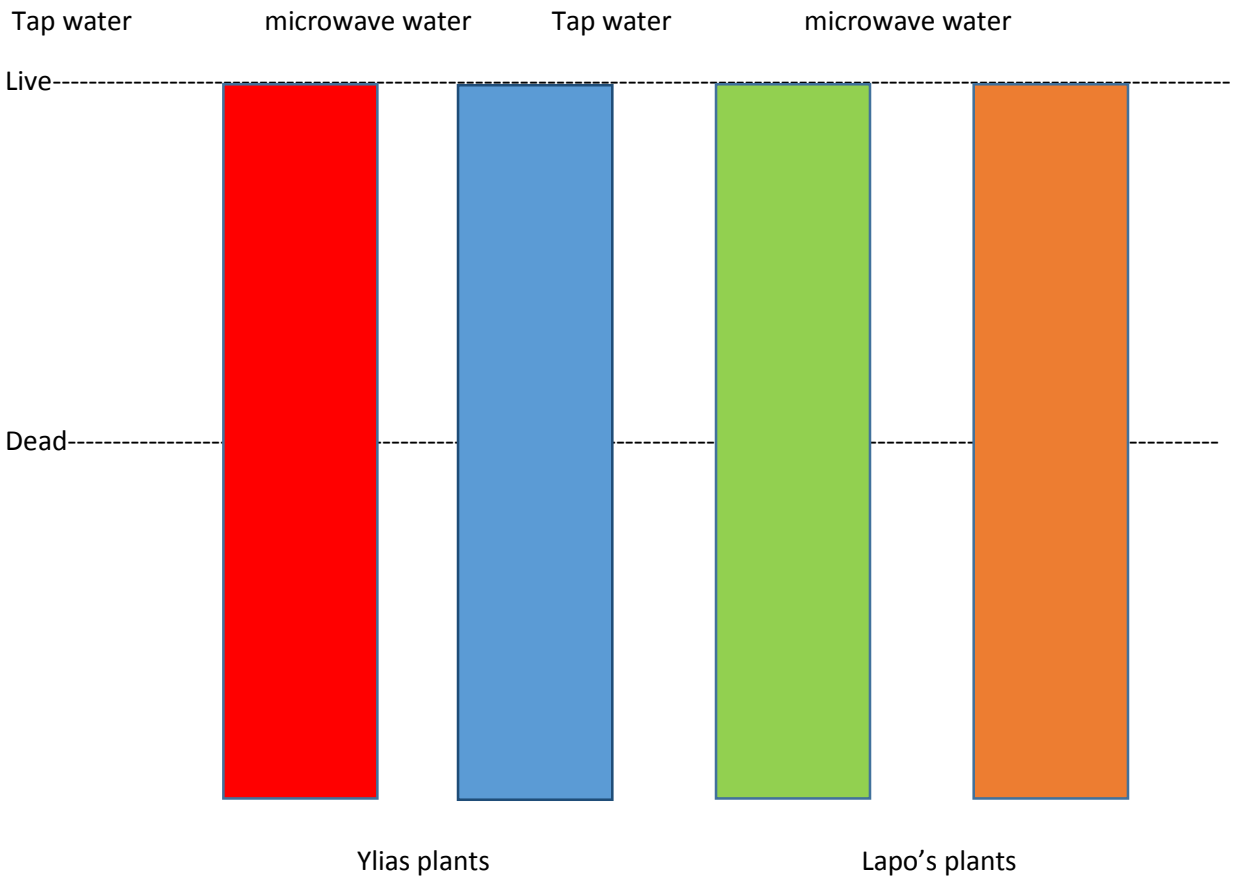
Data

Lapo's plants	Ylias plants
Grow with microwave water: alive	Grow with microwave water: alive
Grow with tap water: alive	Grow with tap water: alive

Conclusion

The microwave does not affect the growth of the plants. So our hypothesis was correct because the electromagnetic waves does not change the biological structure of the water.

3d week



Principle

Materials which are weak conductors of electricity, e.g. water and many other components of food, absorb microwave energy. Absorption takes place when energy is transferred to electrically charged particles (ions) and dipoles. Dipoles are particles which have one positively and one negatively charged end, which means that their electrical charge is unevenly distributed. The dipoles most commonly found in food are water molecules.

All the dipoles and ions in a food product are in constant motion.

If a food is additionally exposed to an electrical field, the dipoles attempt to align themselves with this field according to their charge.

The electrical field (radiation) of a microwave oven changes direction extremely rapidly (five billion times per second). The ions and dipoles attempt to align themselves with this alternating field. This intensifies their movements even further, leading to a rise in the temperature of the food.

This type of heating is the absolute opposite of the conventional way of heating food, in which heat energy is applied to the surface of the food and transferred to the inside of the product by conduction.

How it works

In a microwave oven, the microwave radiation is produced by a high-frequency generator known as a magnetron. A transformer generates the high voltage needed to power the magnetron. The magnetron is switched on and off 50 times a second, producing pulses of microwave radiation. A pulse typically lasts 10 milliseconds. The radiation is introduced into the cooking area of the oven by the magnetron.

The metal walls of the case and metal-wire screen in the door ensure that the radiation is reflected and stays inside the oven. Opening the door switches off the radiation source immediately, and the oven becomes radiation-free within 10 μs (microseconds).

Some of the microwaves reflected from the walls are superimposed on each other, producing a greater or lower intensity of radiation in certain places. This phenomenon, known as interference effects, means that food will cook faster in some parts of the oven than in others. A stirrer can distribute the radiation more equally or a turntable in the oven can ensure that food is heated more evenly in spite of the irregular distribution of the radiation

Heating liquids

There is a danger that liquids may be heated beyond their boiling point in a microwave oven without evaporating or forming bubbles.