Microwave Hydrodiffusion and Gravity (MHG): A Solvent free extraction of essential oils

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A recent patent describes a new and green technique for the extraction of essential oils from different kinds of aromatic plants. The microwave hydrodiffusion and gravity (MHG) system is an original combination of microwave heating and earth gravity at atmospheric pressure. Based on a relatively simple principle, this method involved placing plant material in a microwave reactor, without adding any solvent or water.

The internal heating of the \textit{in-situ} water within the plant material distends the plant cells and leads to the rupture of glands and oleiferous receptacles.

The physical phenomenon, known as hydrodiffusion, allows the extract (water and essential oil) diffused outside the plant material, to drop by earth gravity out of microwave reactor and fall through a perforated Pyrex disc.

A cooling system outside the microwave oven cools the extract continuously. Water and essential oil are collected and separated in a vessel traditionally called the “Florentine flask”.

This green method allows the extract essential oils without distillation and evaporation which are the most energy consuming between the unit operations.