

Area 2.2.3 Food Processing

Title: New generation of coffee maker machines, integrating a number of innovative developments to produce a totally new device for the scope

Project abstract: Saeco SpA is a leader in brewing machine productions, design and development, especially in the field of coffee maker machines.

The proposed project is the design and construction of a new generation of coffee maker machines, integrating a number of innovative developments to produce a totally new device. Aims of the projects are:

- A - Improve taste properties of the food (coffee)
- B - Improve the food safety related to consumer health
- C - Reduce the energetic and materials consumption by the machine

The work packages include the following items:

1 - Design and construction of a coffee making machine hosting a device for fast heating of water boiler, including a subsequent heat/energy recovery from the waste heat of the machine.

2 - Design and construction of a built in machine with a device producing a flow of N₂ (nitrogen minimum purity of 95% vol.) from air in order to preserve the 'aroma' (flavour & taste) of stored coffee grains, as suggested from main coffee producers.

3 - Built in device for preventing /avoiding/ reducing deposition of calcium /magnesium carbonate salts from hot water in critical zone of the coffee maker. Such a device will be based on the use of appropriate application of magnetic fields. Avoiding deposition will result in saving costs of maintenance, chemicals use, energy; in advance the absence of incrustations will reduce the opportunity for microbial and fungi to contaminate the machine and the related food.

4 - Design and installation of a sanitization device, based on use of UV light, Ag ions, Oxygen enriched air (byproduct of the item n°2), or a combination thereof, to eliminate bacteria and fungi from coffee maker critical points, especially in those working with milk ('cappuccino' makers), so improving consumer's health safety.

5 - revolver system of coffee infusion in order to optimise time and quality of coffee deliveries , in varying operating conditions, saving energy and improving customer's satisfaction.

Activities are planned to last 24 months.

Expertise Required: An organisation which owns the culture and the available structure necessary to develop, as partner, an activity concerning organisation and management of agreements on the individual property between partners and on the Consortium Agreement that will be developed for the entire project life-cycle by a specialist organisation in direct contact with the internal structure at the coordinator's disposal.

We ask for an intervention to develop:

MOLECULAR SIEVES: In an espresso coffee machine, studying and developing the possibility to heat water with molecular sieves, such as zeolite, by using the properties of these materials which can produce thermal energy after hydration with vapour or water. The production of thermal energy can be stopped by dehydrating the molecular sieves. The molecular sieves' dehydration can be done by producing heat and, if possible, by partially recovering the excess of the previously developed heat by means of a heat pump. Otherwise, are can be removed (thereby creating void) from the molecular sieves' container. If it is not possible to reach a hot enough temperature for the coffee to be brewed using the molecular sieves, this method can be used as a support for the traditional heating system (with electrical resistor). An electrical energy saving would be yet possible.

Objectives: energy saving, quick heating and therefore a better comfort for the user.

MICROWAVE SYSTEM Water's heating through a microwave system: inside the coffee machine we would like to realize a container in which water is heated, for the infusion coffee, by a microwave system, for time and energy saving in comparison to the traditional system. The water container must have realized in dielectric material, unassailable by the chlorine components contained in the water, resistant to temperature of over 100°C and pressures around the 20 bar. The container will have to be of easy manufacture and assemblage and realized in inexpensive material.

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