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Microwave processing of capsule-less powdered beverages

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Abstract:

Microwave rapid and selective heating is successfully applied to produce freestanding capsule-less doses of powdered beans or leaves for hot beverages preparation. 1 or 3-person doses, suitable for use in conventional hot beverage preparation machines are obtained in less than 5 seconds, without any additives except for water. Microwaves at 2.45 GHz are applied to allow shape retention and surface hardening of the pressed powders, thanks to the rapid steam generation. Load is contained inside a PTFE-lined applicator presenting micro-holes on two sides, to control vapor outlet. The use of rapidly generated steam, preferentially on the outer layers of the load, leads to weak bonding of the powders, without affecting the final taste of the brewed beverage. Modeling of the temperature- and moisture-dependent dielectric properties is used to optimize the applicator geometry, so that the outer layers of the pressed powders are preferentially heated, thus creating a rigid “shell” hosting the remaining pressed powders.

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Contents

Download PDF	I. Introduction State of the art brewing machines use polymeric or polymeric-metallic capsules to host loose or mildly pressed powders (coffee, tea, barley...), ready to use. The outstanding taste achievable by this technology has its counterpart in the higher cost per brewed cup, but more importantly, in the generation of large quantities of waste (spent capsules), not recyclable if not by a prior separation stage which is anti-economical [1]. On the other side, the capsules make cleaning of the brewing machine extremely rapid, on the contrary of what happened before, with loose powders or bags. It is estimated that the capsule market for espresso is of billions of doses per year in Italy alone. Hence, a technique which would allow to retain the benefits of capsule-like systems, with the capability of retrofitting existing brewing machines, but which would avoid the use of the polymeric capsule is more than welcomed. Read document Authors References Keywords Related Articles Disclaimer	
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