

FOOD FOAMING



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Curriculum: Ingegneria dei Materiali e delle Strutture

When talking about leavened foods (or food foams), we refer to all those foods prepared with a leavening or rising agent; this is a substance that causes the dough to expand by releasing gas once mixed with liquid, acid or heat; it gives baked goods optimal volume, texture and crumb and can include baking soda, baking powder, whipped egg whites or cream, active or instant dry yeast, and even steam. The aim of my work is to find an alternate process to prepare these foods without including the chemical leavening agent, thus eliminating the health problems that might come after its ingestion and the long wait that the leavening process generally requires, cutting down the costs. To reach this goal, we treat the dough (mostly pizza dough, but this could as well be applied to bread, cakes, pancakes and more) as a polymer, taking the idea of the gas foaming process, that is hereby developed and perfected, from the traditional polyurethan foaming process: the yeast-free dough is put inside a batch reactor at high temperature and then air is used to impose a pressure history: first the pressure rises up to 5-10 bar, than it is kept constant and finally a pressure quench is used to nucleate and grow bubbles. More research is required to reach the desired morphology and the most appealing and tasty result to satisfy even the most demanding pizza enthusiast.

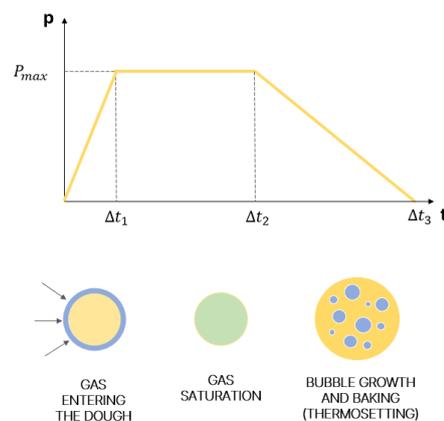


Figure 1: schematical representation of the baking and foaming process.

Opportunity is taken to dive into the world of aerated foods, nowadays found in confectionery, dairy products, egg foams, baked products, breakfast cereals and beverages, being the result of both technological and culinary experimentation. Aeration itself is currently exploited in a large variety of industrial fields and it is constantly gaining importance in food processing for its overall positive benefits, in terms of density, texture, visual appeal and flavour delivery. Also, particular stress is given to food foams stability, since this still proves to be a very active area of investigation, with many of the principals governing foam stability still awaiting complete elucidation. The problem of the surface-active species present in food foams (proteins, protein nanoparticles and non-protein nanoparticles, etc.) and of their synergical or competing interaction towards determining food stability is addressed. Its comprehension and optimisation is to be studied.

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