

SALT-HYDROGEL MARBLES AND HOLLOW-SHELL MICROCAPSULES FOR REDUCED SALT INTAKE

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We designed a new method for preparation of liquid marbles by using hydrophilic particles [1] (Fig.1). Salt-hydrogel marbles were prepared by atomising droplets of hydrogel solution in a cold air column followed by rolling of the collected hydrogel microbeads in a bed of micrometre size salt particles. Evaporation of the water from the resulting salt marbles with a hydrogel core yielded hollow-shell salt microcapsules. The method is not limited to hydrophilic particles and could potentially be also applied to other materials, such as graphite, carbon, silica and others. The structure and morphology of the salt-hydrogel marbles were analysed with SEM and their particle size distributions were measured. We also tested the dissolution times of the dried salt marbles compared them to these for table salt samples at the same conditions. The high accessible surface area of the shell of salt microcrystals allows a faster initial release of salt from the hollow-shell salt capsules upon their dissolution in water than from the same amount of table salt. The results suggest that such hollow-shell particles could find applications as a table salt substitute in dry food products and salt seasoning formulations with reduced salt content without the loss of saltiness.

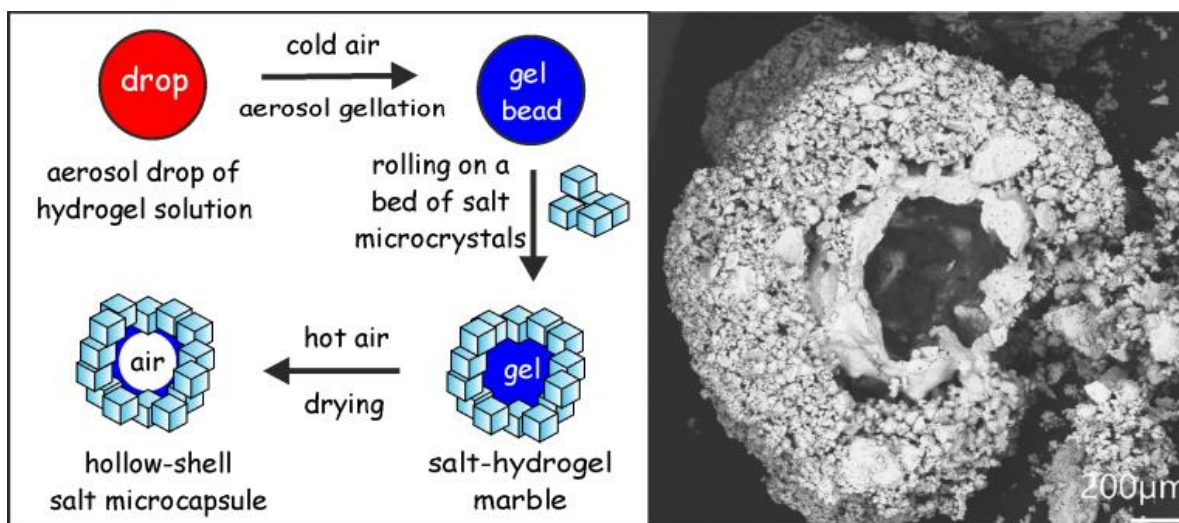


Fig. 1. Possible outcomes in the fabrication of salt marbles: Top mechanism shows production of the salt granules, where the liquid drop wets the hydrophilic salt particles to form salt granules. The bottom mechanism shows the preparation of the salt-hydrogel marbles, where a gel bead is formed before rolling onto the bed of salt microcrystals. Here, the salt crystals cannot penetrate into the hydrogel core and form a shell around it. Hollow-shell salt microcapsules are produced upon drying of the salt-hydrogel marbles.

References

Rutkevicius, M., Mehl, G.H. Petkov, J.T. Stoyanov, S.D. Paunov, V.N., Fabrication of salt-hydrogel marbles and hollow-shell microcapsules by an aerosol gelation technique, J. Mater. Chem. B, 3 (2015) 82-89.