

EFFECTS OF KCl SUBSTITUTION LEVEL AND SPRAY DRYING CONDITIONS ON MORPHOLOGY AND SALTINESS INTENSITY OF KCl SUBSTITUTED SALT PARTICLES

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Abstract: Since excessive intake of sodium increases the risk of an array of diseases, much effort has been made to reduce the use of sodium in food. One option that can be implemented to reduce sodium in food is partial substitution of sodium with potassium. Another alternative is modification of physical properties of sodium-based salt to increase its saltiness intensity. In this study, combined use of potassium substitution and spray drying to modify the microstructure of salt particles is attempted. Sodium chloride (NaCl) in a salt solution is substituted with potassium chloride (KCl) at various levels, i.e., 0, 15 and 30%. Each solution was then spray dried at inlet air temperatures of 140 or 180 °C and sample feed flow rate of 3 and 9 mL/min. Moisture content, particle size, surface area, hygroscopicity and morphology of the salt particles were determined. Sensory evaluation was also performed to assess the saltiness intensity of salt particles prepared at various conditions. Higher KCl substitution level and feed flow rate resulted in a significantly larger particle size, but lower surface area of the salt particles. Particles with a smaller size and higher surface area exhibited significantly higher saltiness intensities, especially when compared with commercially available NaCl salt. Significantly higher saltiness intensity was also noted in cases of the particle prepared from the solution with KCl substitution due to the unique morphologies of the particles.

Keywords: Low-sodium salt, Particle size, Physicochemical properties, Microstructure, Sensory evaluation