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Regards,

Lu Ren

March 10, 2009

Production of Alginate Beads

**A project report presented in partial fulfillment of the
requirements for the degree of Master in Food Technology at
Massey University, Auckland, New Zealand**

Lu Ren

2008

ABSTRACT

This paper was to improve the production of calcium-induced alginate gels manufactured by a company in Auckland. Problems encountered included yield and syneresis of the beads post-gelation. Essentially the alginate, sugars and other ingredients were dissolved in water at 80°C. The pH of the solution was adjusted and the alginate beads were extruded into a 5% CaCl₂ bath before being drained and dried.

The chemical reaction between sodium alginate and calcium ions is dependent upon the solubility and availability of calcium ions. Some calcium salts (e.g., CaCl₂, calcium lactate) were readily soluble and fully dissociated in water and resulted in an immediate gelation of the alginate. Dicalcium phosphate (DCP) was sparingly soluble at pH 7 and calcium ions were not released significantly until the pH reached about pH 4.2. Sodium hexametaphosphate (SHMP) is a chelating agent and this was used to soak up small quantities of Ca⁺² to ensure no gelation occurred while the alginate was being mixed. The optimum quantities of alginate, DCP and SHMP were defined in the laboratory trials.

The use of SHMP, maltodextrin, and gums significantly affected the hardness and stickiness of gel beads. It was found that the combination of xanthan and alginate Protanal LF 120 gave the best results in terms of minimal stickiness and maximum yield after drying.

Key words: alginate gel beads, syneresis, formula, pH, citric acid, gelation time, SHMP, setting time, yield rate, drying, hardness, stickiness, maltodextrin, xanthan gum, guar gum, stickiness by touching, leakage, apparent viscosity.

ACKNOWLEDGMENTS

I would like to heartily thank my supervisor Professor Ray Winger, without whom this project would not have been possibly completed. Especially, recognition must be given for offering me with guidance and assistance during the research, more importantly for providing me the scientific expertise to do the experiments, giving me a chance to learn how to think and solve problems, and broadening my vision in study.

Also, I would like to acknowledge Dr. Marie Wong and Ms. Helen Matthews for providing the technical training, and their help in the lab. And thank Ms. Sue Pearce for organizing my study time and providing a lot of assistance. To Dr. Sung Je Lee who gave me some suggestions. To the staff at Massey University who assisted me to go through my study.

And I would like to thank Mr. Grant Woods, CEO of Carroll Industries Ltd, for providing the ingredients for the project as well as offering an opportunity to do a real production in his factory.

Again, I would like to thank my parents and sister for their endless love and uncountable help.

In addition, I would like to thank my friends Yang Liu, Qi Ge (Richelle), Zhang Jian (John), Zheng Shixiang (Jack) for their support when I am studying in New Zealand.

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ATTACHMENT

Solubility of sodium and potassium iodates in saturated salt solutions

(published in *Food Chemistry*, 2008; journal homepage:
www.elsevier.com/locate/foodchem)

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