



McHugh, D.J., G. Hernández Carmona, D.L. Arvizu Higuera & Y.E. Rodríguez Montesinos (2001). Pilot plant scale extraction of alginates from *Macrocystis pyrifera*. 3. Precipitation, bleaching and conversion of calcium alginate to alginic acid. Journal of Applied Phycology, 13(6): 471-479. DOI: 10.1023/A:1012532706235

Pilot plant scale extraction of alginates from *Macrocystis pyrifera*. 3. Precipitation, bleaching and conversion of calcium alginate to alginic acid

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Three steps of the alginate production process were studied at pilot plant level. The effect of the amount of calcium chloride used during the precipitation was measured in terms of filtration time of the precipitated calcium alginate. Three different proportions of calcium chloride per gram of alginate were tested. The best proportion used was 2.2 parts of calcium chloride per one part of alginate, yielding a filtration rate of 97.9 L min⁻¹ on a screen area of 1.32 m². The method of adding the solutions and the degree of mixing are discussed as other factors affecting the precipitation step. The effect of bleaching the calcium alginate with sodium hypochlorite (5%) was studied. Seven proportions, ranging from 0 to 0.77 mL of sodium hypochlorite per gram of sodium alginate were tested. The effect of hypochlorite was compared for alginates with three different viscosities. Using alginates with medium viscosity (300–500 mPa s), the best proportion was 0.4 mL hypochlorite per gram of alginate, yielding an alginate of light cream color with 20% less viscosity than the control. Alginates with lower viscosity showed a smaller loss of viscosity. The effect of pH during conversion of calcium alginate to alginic acid was determined using four combinations of pH, ranging from 2.2 to 1.6, in three acid washings. The extent of conversion was determined by measuring the percent reduction of the alginate viscosity (RV) in 1% solution before and after adding a sequestrant of calcium. When a pH 1.8 or 1.6 was used for each washing, only two washings were necessary to produce a RV lower than 40% (maximum recommended). The use of pH 2 required three acid washings to produce the same effect. The pH 2.2 did not remove enough calcium, even with three washings, the RV of the resulting sodium alginate being greater than 40%. The results of these experiments provide the information that producers need when deciding the best parameters to obtain a product with the desired characteristics.

Palabras clave: alginate, Alginic acid, pilot plant process, precipitation, bleaching

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