Lutfiana, Dina, 2019, Preparation and Characterization of Carrageenan-Alginate Copolymer with Sorbitol Plasticizer and CaCl₂ Crosslinker as Material of Drug Delivery System. This Thesis is under advisement of Siti Wafiroh S.Si., M.Si. and Dr. Pratiwi Pudjiastuti, M.Si. Departemen of Chemistry, Faculty of Science and Technology, Airlangga University, Surabaya.

ABSTRACT

Material of drug delivery system from seaweed carrageenan-alginate is developed as an alternative for commercial capsules. The purpose of this research is to create and characterize of carrageenan-alginate with sorbitol plasticizer and CaCl₂ 1% (b/v) in concentration variety of 0.25 mL; 0.5 mL; 0.75 mL; 1.00 mL for capsules KASC1, KASC2, KASC3, KASC4 and 1% (b/v) CaCl₂ as crosslinker. The plasticizer of sorbitol used has a variation of 0.25 mL (KASC1 capsule); 0.5 mL (KASC2 capsule); 0.75 mL (KASC3 capsule); 1.00 mL (KASC4 capsule). The process of making capsules through four stages, namely preparation, heating, printing, and drying. Characterizations of capsule were be determined, include: swelling degree, tensile, disintegration, dissolution, drug release kinetics, FTIR and SEM. The best mechanical property is capsule KASC2. The swelling degrees, stress, strains and modulus young of capsules were 290.501%, 387 MPa, 5.8%, and 10869.6 MPa, respectively. Disintegration of capsules was observed in range of 65-75 minutes. The drug release kinetics of capsule shells showed optimal results with a zero's model at pH 1.2 with a constant values of 0.0405 mg/s and a regression values R² = 0.9975. The FTIR showed no significant spectral changes. The SEM of capsule KASC2 results have a average pore size of 3.2608 μm. The copolymer of carrageenan-alginate capsules with sorbitol plasticizer 0.50 mL and crosslinker CaCl₂ 1% (b/v) could be probably used as controlled release drug delivery system materials.

Keywords: Drug delivery system, carrageenan, alginate, sorbitol, CaCl₂