

Hartanti, Evin A, 2019, Preparation and Characterization of Capsule Shells from the Copolymer of Karaginan-Alginate with Glycerol Plasticizer and KCl Crosslinker as Material Drug Delivery Carrier, Thesis under the guidance of Siti Wafiroh, S.Si, M.Si., and Dr. Pratiwi Pudjiastuti, M.Si., Department of Chemistry, Faculty of Science and Technology, Airlangga University

ABSTRACT

Drug delivery carrier is used to release drugs into the body according to the target location. Drug delivery carriers made from pig gelatin are widely used as commercial capsules. Carrageenan and alginate are expected to be a substitute for halal-confirmed pig gelatin. The purpose of this research are to preparation and characterize carrageenan-alginate capsules with glycerol plasticizers and KCl crosslinkers as drug delivery carrier materials. Preparation capsules with 0.25 mL glycerol plasticizer variations (KAKG1); 0.50 mL (KAKG2); 0.75 mL (KAKG3); and 1.00 mL (KAKG4) through four steps, mixing, heating, printing, and drying. Characterization of capsules includes swelling degree test, tensile test, disintegration test with *salicylamide* drug, dissolution test, release kinetic test, FTIR test, and SEM test. Capsules with the most optimum mechanical properties are KAKG1 capsules with swelling degrees of 21.1%, stress of 217.4 MPa, strain of 0.191, and Modulus young of 1358.7 MPa. Disintegration test with *salicylamide* drug results have a time of 44 minutes. The dissolution test results were release levels of *salicylamide* at pH 1.2 of 6.151%, pH 4.5 of 5.924%, and pH of 6.8 of 7.447%. The release kinetics test has the highest linearity in the Higuchi method pH 1.2 with the value $R^2 = 0.9441$ and the release rate constant value (k) of $0.8493 \text{ M}\cdot\text{s}^{-1/2}$. FTIR test results have a new functional group (-COOK) and (-SO₃K) at wave number 1,600.92 and 925,83 cm⁻¹. The SEM test results showed 2-4 μm surface pores and 1-7 μm cross sections. Based on this research, capsules from the carrageenan-alginate copolymer with glycerol plasticizer and KCl crosslinker can be used as drug delivery carrier.

Keywords: drug delivery carrier, carrageenan, alginate, glycerol, KCl, *salicylamide*