

## Documents

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**Rheological Assessments on Alginate and Carrageenan as Nanoparticle Carriers for Topical Oral Cancer Drug**  
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### Abstract

Commercially available topical oral drugs in current markets have low efficacy in delivery active load to the infected site due to poor formulation. Delivery of the active ingredients proven to be challenging as compared to skin due the presence of saliva and low shear. The aim of this project to improve formulation and characterised suitable hydrogels which later will be incorporated with nanoparticle drug for oral cancer. The gels are formulated at different pH values (4, 7, 10) and concentrations as such (0.1%, 0.15%, 0.2%, 0.25%, 0.5% and 1.0% for alginate whereas kappa-carrageenan and iota-carrageenan were formulated with 0.25%, 0.5% and 1.0%). The viscosity and zeta potential of the formulated gels are studied using HAAKE™ MARS™ rheometer and Zetasizer Nano-Z respectively. Findings revealed both 1% of kappa-carrageenan and 1% iota-carrageenan of pH 4 and pH 7 are the best candidates for nanoparticle drug delivery as the viscosity and zeta potential for 1% kappa-carrageenan (pH 4), 1% kappa-carrageenan (pH 7), 1% iota-carrageenan (pH 4), and 1% iota-carrageenan (pH 7) amongst the highest as such 70.507±6.190, 61.040±3.199, 59.490±7.799, 67.953±2.034 Pa·s, correspondingly with zeta potential value of -19.4 mV, -20.6 mV, -33.1 mV and -30.4 mV. All hydrogels formulated with different concentration were affected by pH values, by having pH value 4 and 7 appeared to have high viscosity with pseudoplastic behaviour based on the rheological profile, except for alginate due to high density sodium alginate was used in this study. © 2023, Brawijaya University. All rights reserved.

### Author Keywords

Hydrogels; Nanoparticle; Oral Cancer; Rheology; Topical Oral Drug

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