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Rheological characterization of different gelling polymers for dental gel formulation (Article)

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Abstract

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Objective: This study is aimed to select the best gelling agents as candidates to be developed into dental gels, based on their rheological profiles. **Significance:** This study opens up more options for dental gel formulator to choose regarding the range of good gelling polymers, as the vehicle for their pharmaceutical active ingredients. **Methods:** 11 types of gelling agents, which consist of 1%, 3%, and 5% w/w concentration for each gel, were prepared. The rheological profiles were measured using rheometers, and the data was analyzed to calculate their apparent viscosities, rheological modelling, and the linear viscoelastic range profiles. **Results:** It was found that 3%, 5% carbopol 940, 5% guar gum, 5%?-carrageenan 3% kelcogel F, 1%, 3%, and 5% w/w konjac gum are the best candidates to be developed into dental gels based on their rheological properties. They exhibit good viscoelastic properties, acceptable viscosity profiles at three different shear rates of 10 s⁻¹, 50 s⁻¹, and 100 s⁻¹ Pas, having high consistency factor (K), best flow behaviour (n) value, high G' value, G'=G'' value, and the crossing point of G' and G'' happens at further shear stress range compared to other gels. **Conclusion:** All the rheological profiles for each of the gels at 3 different concentrations were successfully characterized, analyzed and documented. © 2017, Pharmainfo Publications. All rights reserved.

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Author keywords

Gelling polymers Gels Linear viscoelasticity range Rheology Shear stress Viscosity

Indexed keywords

EMTREE drug terms: carbomer gelling agent guar gum hydroxypropylmethylcellulose

EMTREE medical terms: Article drug formulation flow behavior index flow kinetics gel model nonhuman shear rate viscoelasticity viscosity

Chemicals and CAS Registry Numbers:

carbomer, 9007-20-9, 9062-04-8; guar gum, 9000-30-0; hydroxypropylmethylcellulose, 9004-65-3

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