

UTICAJ ARAPSKJE GUME NA REOLOŠKA SVOJSTVA RASTVORA TRAGAKANT GUME

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Danas postoji sve veće interesovanje za upotrebu polisaharida biljnog porekla, kao što su tragakant guma (TG) i arapska guma (AG), zbog njihove široke dostupnosti, relativno niske cene, biokompatibilnosti, biorazgradivosti, jedinstvenih fizičko-hemijskih svojstava i različitih funkcionalnih karakteristika. Posebno su značajna reološka svojstva, zbog njihove sposobnosti modifikovanja reoloških karakteristika vodenih sistema [1, 2].

Cilj ovog istraživanja je bio ispitivanje uticaja dodatka AG na reološko ponašanje rastvora TG. Pripremljeni su vodeni rastvori TG (0,01–1,5%) i smeše sa fiksnim koncentracijama TG (0,5% i 1%) i rastućim koncentracijama AG. Krive proticanja su određene pomoću rotacionog reometra sa koaksijalnom cilindričnom geometrijom na 25 °C u opsegu brzina smicanja 0,001–100 s⁻¹, a dobijeni podaci su fitovani *Ostwald-de Waele* modelom.

Rastvori TG pokazali su Njutnovsko ponašanje pri veoma niskim koncentracijama (do 0,05%), dok su u koncentracijama $\geq 0,1\%$ imali pseudoplastičan karakter, uz porast indeksa konzistencije (K) i smanjenje indeksa protoka (n). Dodavanje AG rastvorima TG značajno je modifikovalo njihova reološka svojstva. U rastvorima sa 0,5% i 1% TG, povećanje koncentracije AG dovelo je do smanjenja K indeksa i porasta n indeksa, što ukazuje na pomak ka ponašanju sličnijem Njutnovskom.

Dobijeni rezultati pokazuju da se pseudoplastičan karakter vodenih rastvora TG menja dodatkom AG zavisno od koncentracije, što ukazuje na prisustvo međumolekulskih interakcija između ova dva polisaharida. Rezultati ovog istraživanja otvaraju mogućnost unapređenja kontrole viskoziteta i teksturnih parametara u višekomponentnim farmaceutskim, prehrambenim i kozmetičkim formulacijama.

Literatura

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THE INFLUENCE OF GUM ARABIC ON THE RHEOLOGICAL PROPERTIES OF TRAGACANTH GUM SOLUTIONS

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There is a growing interest in using plant-derived polysaccharides, like tragacanth gum (TG) and gum arabic (GA), due to their wide availability, relatively low cost, biocompatibility, biodegradability, unique physicochemical properties, and various functional characteristics. Rheological properties are particularly important due to their ability to modify the rheological characteristics of aqueous systems [1, 2].

The aim of this study was to investigate the effect of GA addition on the rheological behavior of TG solutions. Aqueous TG solutions (0.01–1.5%) and mixtures containing fixed concentrations of TG (0.5% and 1%) with increasing GA concentrations were prepared. Flow curves were determined using a rotational rheometer with coaxial cylinder geometry at 25 °C in the shear rate range of 0.001–100 s⁻¹, and the obtained data were fitted to the Ostwald–de Waele model.

Pure TG solutions exhibited Newtonian behavior at very low concentrations ($\leq 0.05\%$), whereas concentrations $\geq 0.1\%$ showed pseudoplastic character, with increased consistency index (K) and decreased flow index (n). The addition of GA to TG solutions significantly modified their rheological properties. In solutions containing 0.5% and 1% TG, increasing GA concentration led to a decrease in the K index and an increase in the n index, indicating a shift toward more Newtonian behavior.

The obtained results demonstrate that the pseudoplastic behavior of TG aqueous solutions is altered by GA addition in a concentration-dependent manner, suggesting intermolecular interactions between these two polysaccharides. Such findings provide new opportunities for controlling viscosity and texture in multicomponent pharmaceutical, food, and cosmetic formulations.

References

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