FTIK-P24 UTICAJ KONCENTRACIJE PANTENOLA NA REOLOŠKA SVOJSTVA U/V KREMOVA

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Savremeni razvoj dermokozmetičkih proizvoda zahteva modifikaciju formulacije bez narušavanja kvaliteta, strukturne stabilnosti i prihvatljivosti proizvoda. Pantenol (INCI: Panthenol) je čest sastojak kozmetičkih proizvoda zbog humektantnog i kondicionirajućeg efekta, čime doprinosi hidrataciji i glatkoći kože. Cilj rada bio je ispitivanje uticaja koncentracije pantenola na reološko ponašanje U/V kremova.

Ispitivani su U/V kremovi sledećeg sastava (INCI): Aqua, Glyceryl Stearate, C12-15 Alkyl Benzoate, Isopropyl Palmitate, Dimethicone, Propylene Glycol, Ceteareth-20, Cetyl Alcohol, Sodium Polyacrylate, Polysorbate 80, Dimethicone/Divinyldimethicone/Silsesquioxane Crosspolymer, Phenoxyethanol, Ethylhexylglycerin, Tocopheryl Acetate i Lactic Acid, sa pantenolom u koncentracijama 0, 2, 4, 6, 8 i 10%. Reološka ispitivanja izvedena su na Haake MARS reometru (Thermo Scientific, Karlsruhe, Nemačka), primenom Z20 DIN cilindrične merne geometrije, pri 22 ± 0,1 °C. Kontinualnom analizom određene su krive tečenja i prividna viskoznost primenom histerezne procedure, dok su oscilatornim ispitivanjima određeni elastični modul (G'), viskozni modul (G") i tan δ u zavisnosti od frekvencije i napona smicanja.

Sve formulacije pokazale su viskoelastično ponašanje sa dominantnom elastičnom komponentom, budući da je G' bio veći od G", a tan δ manji od 1. Sa povećanjem koncentracije pantenola smanjivao se G', što ukazuje na manju otpornost strukture prema deformaciji, kao i prividna viskoznost i početni otpor uspostavljanju toka pri malim brzinama smicanja.

Rezultati ukazuju da povećanje koncentracije pantenola ne menja osnovni viskoelastični karakter U/V kremova, ali dovodi do smanjenja elastičnog modula, prividne viskoznosti i početnog otpora uspostavljanju toka. Ovaj uticaj treba uzeti u obzir pri optimizaciji formulacije dermokozmetičkog proizvoda, dok se željena reološka svojstva obezbeđuju odgovarajućim izborom i koncentracijom reoloških modifikatora.

FTIK-P24 EFFECT OF PANTHENOL CONCENTRATION ON THE RHEOLOGICAL PROPERTIES OF O/W CREAMS

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Development of dermocosmetic products requires formulation modification without compromising quality, structural stability, or product acceptability. Panthenol (INCI: Panthenol) is commonly used for its humectant and skin-conditioning effects, contributing to skin hydration and smoothness. This study investigated the effect of panthenol concentration on the rheological behavior of oil-in-water (O/W) creams.

The investigated O/W creams had the following composition (INCI): Aqua, Glyceryl Stearate, C12-15 Alkyl Benzoate, Isopropyl Palmitate, Dimethicone, Propylene Glycol, Ceteareth-20, Cetyl Alcohol, Sodium Polyacrylate, Polysorbate 80, Dimethicone/Divinyldimethicone/Silsesquioxane Crosspolymer, Phenoxyethanol, Ethylhexylglycerin, Tocopheryl Acetate, and Lactic Acid, with panthenol concentrations of 0, 2, 4, 6, 8, and 10%. Rheological measurements were performed using a Haake MARS rheometer (Thermo Scientific, Karlsruhe, Germany) with a Z20 DIN concentric-cylinder geometry at 22 ± 0.1 °C. Continuous-flow analysis included flow curves and apparent viscosity determined using a hysteresis procedure, while oscillatory measurements included the storage modulus (G'), loss modulus (G"), and tan δ as functions of frequency and shear stress.

All formulations exhibited viscoelastic behavior with a dominant elastic component, as G' exceeded G" and tan δ remained below 1. Increasing panthenol concentration reduced G', indicating lower structural resistance to deformation, and decreased apparent viscosity and initial resistance to flow at low shear rates.

Increasing panthenol concentration did not alter the fundamental viscoelastic character of O/W creams, but reduced the storage modulus, apparent viscosity, and initial resistance to flow. This effect should be considered during formulation optimization in final products, while the desired rheological properties should be ensured by selecting appropriate rheological modifiers and their concentrations.

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