FORMULASI DAN PENGEMBANGAN SEDIAAN GEL NIASINAMIDA DENGAN CARBOPOL 940 DAN NATRIUM ALGINAT

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ABSTRAK

Kulit wajah rentan terhadap polusi dan radikal bebas. Niasinamida banyak digunakan dalam sediaan topikal karena efek mencerahkan dan protektif, serta lebih nyaman diformulasikan dalam bentuk gel yang ringan dan mudah meresap. Penelitian ini bertujuan untuk memformulasikan sediaan gel niasinamida dengan menggunakan dua jenis *gelling agent*, yaitu Carbopol 940 dan natrium alginat, serta membandingkan mutu evaluasi fisik sediaan dengan sediaan komersial yang beredar dipasaran. Tujuh formula dibuat, terdiri dari tiga formula berbasis Carbopol 940 (F1, F2, F3), tiga formula berbasis natrium alginat (F4, F5, F6), dan satu formula pembanding komersil (F7). Evaluasi meliputi uji organoleptis, homogenitas, pH, viskositas, daya sebar, stabilitas (cycling test), dan uji hedonik.

Hasil pengamatan menunjukkan formula berbasis Carbopol 940 (F1, F2, F3) serta formula pembanding (F7) memiliki penampakan bening, sedangkan formula berbasis natrium alginat (F4, F5, F6) tampak kurang bening. Uji homogenitas memperlihatkan seluruh formula homogen, kecuali F3 yang menunjukkan adanya gumpalan kecil. Nilai pH formula berkisar antara 5,02–6,06, sesuai untuk sediaan topikal. Viskositas gel berbasis Carbopol 940 lebih tinggi dibanding natrium alginat, dengan rentang 3.880–13.400 cps untuk Carbopol 940, 3.760–7.760 cps untuk natrium alginat, dan 7.680 cps untuk sediaan komersil. Uji daya sebar menunjukkan hasil antara 5,4–6,8 cm dengan luas area antara 16,97 cm^2, dengan kecenderungan berbanding terbalik dengan viskositas. Uji stabilitas melalui *cycling test* memperlihatkan sebagian besar formula stabil tanpa perubahan organoleptis, homogenitas, maupun pH yang signifikan. Uji hedonik menggunakan Friedman Test menunjukkan adanya perbedaan tingkat kesukaan panelis ($p < 0,05$), dengan formula berbasis Carbopol 940 lebih disukai dibandingkan natrium alginat, dan hasilnya mendekati sediaan komersil.

Kata kunci: gel, niasinamida, Carbopol 940, natrium alginat, viskositas, stabilitas, hedonik.

FORMULATION AND DEVELOPMENT OF NIACINAMIDE GEL PREPARATIONS WITH CARBOPOL 940 AND SODIUM ALGINATE

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ABSTRACT

Facial skin is vulnerable to pollution and free radicals. Niacinamide is widely used in topical preparations due to its brightening and protective effects, and is more convenient when formulated in a light, easily absorbed gel form. This study aimed to formulate a niacinamide gel preparation using two types of gelling agents: Carbopol 940 and sodium alginate, and to compare the physical quality of the preparation with commercial preparations on the market. Seven formulas were created: three Carbopol 940-based formulas (F1, F2, F3), three sodium alginate-based formulas (F4, F5, F6), and one commercial reference formula (F7). The evaluation included organoleptic tests, homogeneity, pH, viscosity, spreadability, stability (cycling test), and hedonic tests.

The results showed that the Carbopol 940-based formulas (F1, F2, F3) and reference formula (F7) had a clear appearance, while the sodium alginate-based formulas (F4, F5, F6) appeared slightly cloudy. Homogeneity test showed that all formulas were homogeneous, except for F3 which showed small lumps. The pH value of the formulas ranged from 5.02–6.06, suitable for topical preparations. The viscosity of Carbopol 940-based gels was higher than sodium alginate, with a range of 3,880–13,400 cps for Carbopol 940, 3,760–7,760 cps for sodium alginate, and 7,680 cps for commercial preparations. Spreadability test showed results between 5.4–6.8 cm with an area of 16.97 cm², with a tendency inversely proportional to viscosity. Stability test through cycling test showed that most formulas were stable without significant changes in organoleptic, homogeneity, or pH. Hedonic test using Friedman Test showed differences in panelists' preference levels ($p < 0.05$), with Carbopol 940-based formulas being preferred over sodium alginate, and the results were close to commercial preparations.

Keywords*: gel, niacinamide, Carbopol 940, sodium alginate, viscosity, stability, hedonic.*

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