Formulasi dan Evaluasi Sediaan Sirup Kering Simvastatin dan Uji Stabilitas Fisik Sirup Rekonstitusi = Formulation and Evaluation of Simvastatin Dry Syrup and Physical Stability Test of Reconstituted Syrup

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Abstrak

Simvastatin merupakan obat lini pertama dalam pengobatan dislipidemia. Simvastatin praktis tidak larut dalam air, sehingga kelarutan simvastatin dalam larutan saluran cerna terbatas dan mengakibatkan bioavailabilitas yang rendah. Simvastatin juga bersifat tidak stabil dalam larutan. Penelitian ini bertujuan untuk meningkatkan kelarutan simvastatin dalam air dan memformulasikan sediaan cair yang stabil secara fisik. Peningkatan kelarutan simvastatin dilakukan dengan cara pembuatan dispersi padat menggunakan pembawa manitol dan PVP K-30. Evaluasi dispersi padat menunjukkan bahwa kelarutan simvastatin dalam dispersi padat F1 (simvastatin-manitol-PVP 1:1:0.02) memberikan kelarutan yang lebih besar daripada F2 (simvastatin-manitol-PVP 1:2:0.01), dengan kelarutan sebesar 25,514 mg/100 mL. Dispersi padat F1 diformulasikan dalam sirup kering dengan bahan tambahan natrium benzoat, asam sitrat, natrium sitrat, dan perisa jeruk menghasilkan serbuk kering dengan laju alir 60,44 gram/detik, sudut istirahat 28,997o dan kandungan lembab 1,927 ± 0,032%. Evaluasi stabilitas fisik menunjukkan bahwa sirup yang terekonstitusi stabil dari segi organoleptis, pH 5,165, dan viskositas sebesar 58,521 cps. Pembuatan dispersi padat simvastatin menggunakan manitol dan PVP K-30 terbukti meningkatkan kelarutan simvastatin dan evaluasi stabilitas fisik sirup kering menunjukkan bahwa sirup kering stabil secara fisik setelah diamati selama 12 hari, sesuai dengan ketentuan BUD (beyond-use date) menurut USP 41.
.....Simvastatin is a first-line drug in the treatment of dyslipidemia. Simvastatin is practically insoluble in water, so the solubility of simvastatin in gastrointestinal solutions is limited and results in low bioavailability. Simvastatin is also unstable in solution. This study aims to increase the solubility of simvastatin in water and formulate a physically stable liquid dosage form. The preparation for increasing the solubility of simvastatin was carried out by making a solid dispersion with mannitol and PVP K-30 as a carrier. Evaluation of solid dispersion showed that the solubility of simvastatin in solid dispersion F1 (simvastatin-mannitol-PVP 1:1:0.02) showed greater solubility than F2 (simvastatin-mannitol-PVP 1:2:0.01) with solubility in water of 25.514 mg/100 ml. F1 solid dispersion was formulated in dry syrup with sodium benzoate, citric acid, sodium citrate, and orange flavoring agent as excipients. Simvastatin dry powder with flowrate of 60.44 gram/second, angle of repose 28.997o and moisture content of 1.927 ± 0.032% was obtained. Physical stability evaluation showed that the reconstituted syrup was stable in terms of organoleptic, pH of 5.165, and viscosity of 58.521 cps. Preparation of simvastatin solid dispersion using mannitol and PVP K-30 was shown to increase the solubility of simvastatin and evaluation of the physical stability of dry syrup showed that dry syrup was physically stable after being observed for 12 days, in accordance with the provisions of the BUD (beyond-use date) according to USP 41.