ABSTRACT

Composition Optimization of Hesperetin Nanosuspension Using Wet Beads Milling Method Based on Design of Experiment (DoE)

Achmad Aziz Choiri

The aim of this study was to determine the effect of different polymers, different concentrations of polymer, the size of milling beads and duration of milling on the particle size reduction of hesperetin nanosuspension. Top down method using wet beads milling process was used in this study. The factors influencing particle size stability of hesperetin nanosuspension during 14 days storage was also investigated. Two different storage conditions were applied: at 8ºC and at room temperature. Photon Correlation Spectroscopy and light microscope analysis were used to evaluate particle size of hesperetin nanosuspension after predetermined time of milling and storage. Minitab statistical software 19.0 was utilized to determine which factor that gave the significant impact on particle size reduction, possibility of interactions between factors and to optimize setting of factors to produce the smallest and the most stable particle size of hesperetin nanosuspension. Based on pareto chart, different size of beads had the most influential impact for the production of hesperetin nanosuspension whilst polymer and concentration of polymer influenced stability of hesperetin nanosuspension during storage. Based on the contour plot analysis , hesperetin nanosuspension with particle size smaller than 250 nm could be produced by using with 20% w/w Kollicoat IR® , milled for 6 hours with milling beads sized 0.5 mm. Additionally, the hesperetin nanosuspension stabilized with Kollicoat IR® was stable at 8ºC storage whilst nanosuspension stabilized with PVP K-30 was stable at room temperature storage.

Keyword: nanosuspensions, hesperetins, Kollicoat IR® , PVP K-30