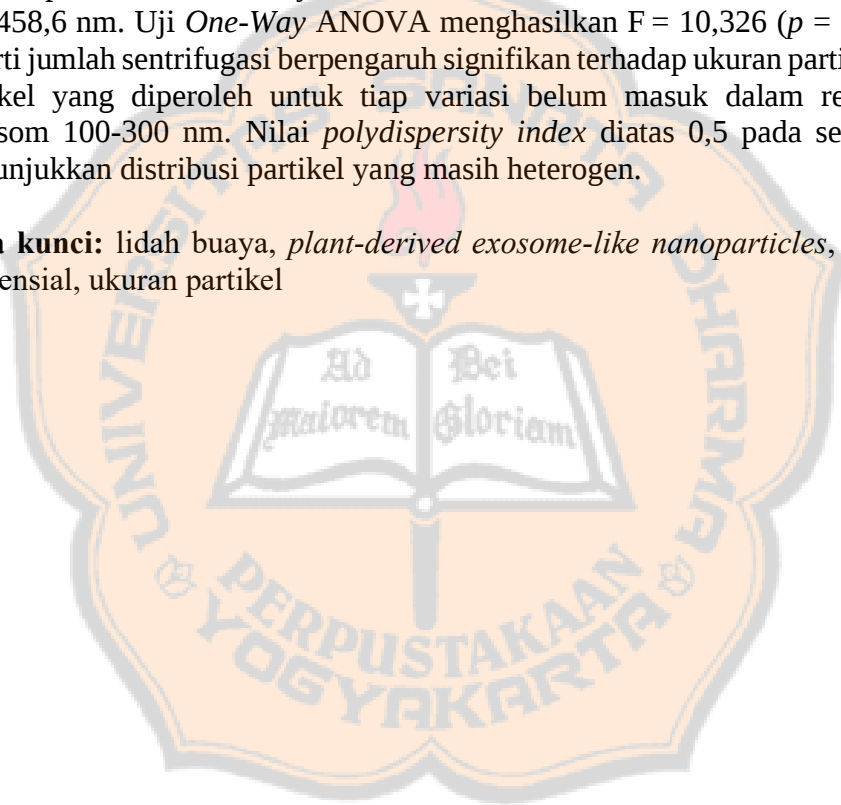


ABSTRAK

Plant-derived exosome-like nanoparticles (PELNs) mulai banyak diteliti sebagai pilihan lain dibanding eksosom mamalia, terutama karena risikonya lebih kecil dan biaya produksinya lebih terjangkau. Lidah buaya (*Aloe vera* (L.) Burm.f.) termasuk tanaman yang potensial sebagai *sumber plant-derived exosome-like nanoparticles*, karena memiliki kandungan senyawa bioaktif yang beragam serta aktivitas antiinflamasi dan antioksidan yang sudah banyak dilaporkan. Penelitian ini dilakukan untuk melihat apakah jumlah sentrifugasi memengaruhi ukuran partikel eksosom yang diisolasi dari lidah buaya. Penelitian ini menggunakan metode sentrifugasi diferensial dengan variasi pengulangan pada kecepatan 2.000 x g sebanyak 2, 4, dan 6 kali, kemudian dimurnikan dengan *tangential flow filtration*. Ukuran partikel diukur menggunakan *particle size analyzer* dengan metode *dynamic light scattering*. Hasil penelitian menunjukkan rata-rata ukuran partikel pada variasi 2 kali yaitu 414,3 nm, variasi 4 kali 409,1 nm, dan variasi 6 kali 458,6 nm. Uji *One-Way ANOVA* menghasilkan $F = 10,326$ ($p = 0,011$) yang berarti jumlah sentrifugasi berpengaruh signifikan terhadap ukuran partikel. Ukuran partikel yang diperoleh untuk tiap variasi belum masuk dalam rentang ideal eksosom 100-300 nm. Nilai *polydispersity index* diatas 0,5 pada semua variasi menunjukkan distribusi partikel yang masih heterogen.

Kata kunci: lidah buaya, *plant-derived exosome-like nanoparticles*, sentrifugasi diferensial, ukuran partikel



ABSTRACT

Plant-derived exosome-like nanoparticles (PELNs) have increasingly been studied as an alternative to mammalian exosomes, mainly because of their lower risk profile and more affordable production costs. Aloe vera (Aloe vera (L.) Burm.f.) is one of the plants with strong potential as a source of plant-derived exosome-like nanoparticles, given its diverse bioactive compound content and its widely reported anti-inflammatory and antioxidant activities. This study was conducted to determine whether the number of centrifugation cycles affects the particle size of exosomes isolated from Aloe vera. The isolation was performed using differential centrifugation with repetitions of 2, 4, and 6 cycles at a speed of $2,000 \times g$, followed by purification using tangential flow filtration. Particle size was measured with a particle size analyzer using the dynamic light scattering method. The results showed an average particle size of 414.2 nm for the 2-cycle variation, 409.1 nm for the 4-cycle variation, and 458.6 nm for the 6-cycle variation. A One-Way ANOVA test yielded $F = 10.326$ ($p=0.011$), indicating that the number of centrifugation cycles had a significant effect on particle size. The particle sizes obtained for each variation did not fall within the ideal exosome size range of 100 to 300 nm. Polydispersity index values above 0.5 in all variations indicated that particle distribution remained heterogeneous.

Keywords: *aloe vera, plant-derived exosome-like nanoparticles, differential centrifugation, particle size*