

ABSTRAK

Eksosom merupakan vesikel ekstraseluler yang dihasilkan oleh hampir semua sel eukariotik melalui mekanisme endosomal. Pemanfaatan eksosom mamalia masih menghadapi kendala berupa isolasi yang kompleks dan biaya produksi yang tinggi, sehingga mendorong pengembangan *Plant-Derived Exosome-Like Nanoparticles* (PELNs) sebagai alternatif yang lebih aman dan mudah diproduksi. Lidah buaya (*Aloe vera* (L.) Burm.f.) berpotensi sebagai sumber PELNs. Penelitian ini bertujuan untuk mengevaluasi pengaruh durasi sentrifugasi terhadap karakteristik PELNs lidah buaya berdasarkan ukuran partikel. Penelitian dilakukan secara eksperimental dengan durasi sentrifugasi 20, 30, dan 40 menit pada kecepatan $10.000\times g$, kemudian dikarakterisasi menggunakan *Particle Size Analyzer* (PSA), dilanjutkan pemurnian dengan *Tangential Flow Filtration* (TFF) dan identifikasi protein. Hasil pengukuran ukuran partikel menunjukkan rata-rata berturut-turut $216,0\pm 2,4$ nm; $208,9\pm 1,4$ nm; dan $208,7\pm 1,5$ nm, yang sesuai dengan rentang ukuran EVs tanaman lidah buaya. Analisis *one-way* ANOVA menunjukkan durasi sentrifugasi berpengaruh signifikan terhadap ukuran partikel ($p<0,05$).

Kata Kunci: eksosom, *plant-derived exosome-like nanoparticles*, lidah buaya, sentrifugasi, ukuran partikel

ABSTRACT

Exosomes are extracellular vesicles produced by nearly all eukaryotic cells through the endosomal pathway. The utilization of mammalian-derived exosomes continues to face significant challenges, including complex isolation procedures and high production costs. These limitations have driven the development of Plant-Derived Exosome-Like Nanoparticles (PELNs) as a safer and more easily produced alternative. Aloe vera (L.) Burm.f. has been identified as a promising source of PELNs. This study aimed to evaluate the effect of centrifugation duration on the characteristics of Aloe vera-derived PELNs based on particle size. An experimental study was conducted using centrifugation durations of 20, 30, and 40 minutes at $10,000 \times g$. The resulting nanoparticles were characterized using a Particle Size Analyzer (PSA), followed by purification using Tangential Flow Filtration (TFF) and protein identification. Particle size measurements yielded mean values of 216.0 ± 2.4 nm, 208.9 ± 1.4 nm, and 208.7 ± 1.5 nm, respectively, which are consistent with the reported size range of extracellular vesicles (EVs) derived from Aloe vera. One-way ANOVA revealed that centrifugation duration had a statistically significant effect on particle size ($p < 0.05$).

Keywords: exosomes, plant-derived exosome-like nanoparticles, Aloe vera, centrifugation, particle size

