## *ABSTRACT*

*Cervical cancer is the fourth most common cancer among women worldwide, with an estimated* 660,000 *new cases and* 350,000 *deaths in* 2022. *Cervical cancer poses a significant health burden in Southeast Asian countries due to the high prevalence of human papillomavirus* (HPV). *One of the therapeutic approaches for cervical cancer is chemotherapy. The use of herbal compounds in chemotherapy is currently being extensively explored, with curcumin being one of the most studied candidates. Curcumin exhibits strong anticancer potential, making it a promising therapeutic agent. However, its non-polar nature results in poor water solubility, thereby limiting its bioavailability and therapeutic efficacy. To address this challenge, the present study aimed to develop and optimize a curcumin liposomal formulation, determine the encapsulation efficiency of curcumin using a coconut-based liposome system, evaluate the morphology and physicochemical properties of liposome-encapsulated curcumin, and assess the effect of the* $IC_{50}$ *values of coconut liposome–curcumin encapsulation on cancer cells. The methods employed included isolation and encapsulation processes, characterization using UV-Vis spectrophotometry, LC-HRMS, particle size analysis* (PSA), (TEM), *antioxidant activity assessment with the 2,2-diphenyl-1-picrylhydrazyl* (DPPH) *assay, and cytotoxicity evaluation using the* MTT *assay. The results demonstrated an encapsulation efficiency* (EE) *ranging from* 78.17% *to* 85.06%, *with nanoparticle and a spherical morphology. The ζ-potential and polydispersity index (*PI*) indicated instability of the liposomes, making them prone to aggregation. The liposome system exhibited a controlled release trend over* 11 *days, as shown by cumulative release data. Encapsulation of curcumin within coconut liposomes did not significantly affect the* $IC_{50}$ *values in cervical cancer cells (*HeLa*) or normal cells (*Vero*) compared with free curcumin.*



***Keywords****: Curcumin, Cocoliposome, Drug Delivery System, Cervical Cancer*