Abstract—Background: Cervical cancer is the second leading cancer globally with high mortality rate. It is mainly caused by human papillomavirus (HPV). Liquid crystal is a substance which forms organized mesophase, with unique microstructure and physicochemical properties. Liquid crystal can accommodate for both hydrophilic and hydrophobic drug. Curcumin is a hydrophobic compound with good anti-proliferative, anti-oxidative and anti-cancer properties. Disadvantage of curcumin is poor bioavailability. Objective: To formulate a novel topical drug delivery system using curcumin liquid crystal system to treat cervical cancer and to study its physicochemical properties. Method: Curcumin liquid crystal system was formulated using surfactant, glycerol and water together with curcumin. Three types of surfactants were used to determine the optimized formulations, Tween 80, cremphor EL and labrasol. The optimized formulations were subjected to physicochemical analysis, as well as the efficacy on HeLa cells. The cytotoxicity of the formulation were compared with blank liquid crystal and pure curcumin compound by performing T-Tests for significance level of p less or equal to 0.05 (≤ p0.05). Conclusion: Curcumin liquid crystal system was able to release required amount of drug and effective against cervical cancer cell line.

Keywords— Cervical cancer, liquid crystal, curcumin, HeLa cells.