

Nano formulation of curcumin

Cur-NLC (curcumin nano-lipid carrier) was prepared by hot homogenization method [68]. The solid lipid (stearic acid) (500 mg) was heated in a beaker and sesame oil (200 μ l) was mixed. Accurately weighed amount of curcumin (50 mg) was added and mixed this mixture. Another beaker containing water (25 ml) mixed with tween-80 (25 μ l) and sodium dodecyl sulphate (50 mg) was heated up to 70°C. It was followed by homogenization of both the phases for 15 min at a speed of 5000 rpm. The image of Cur-NLC were taken by *Transmission Electron Microscope Scanning (TEM – SCAN)* (Figure S1). Cur-NLC was characterized by the determination of particle size, polydispersity index (PDI), zeta potential.

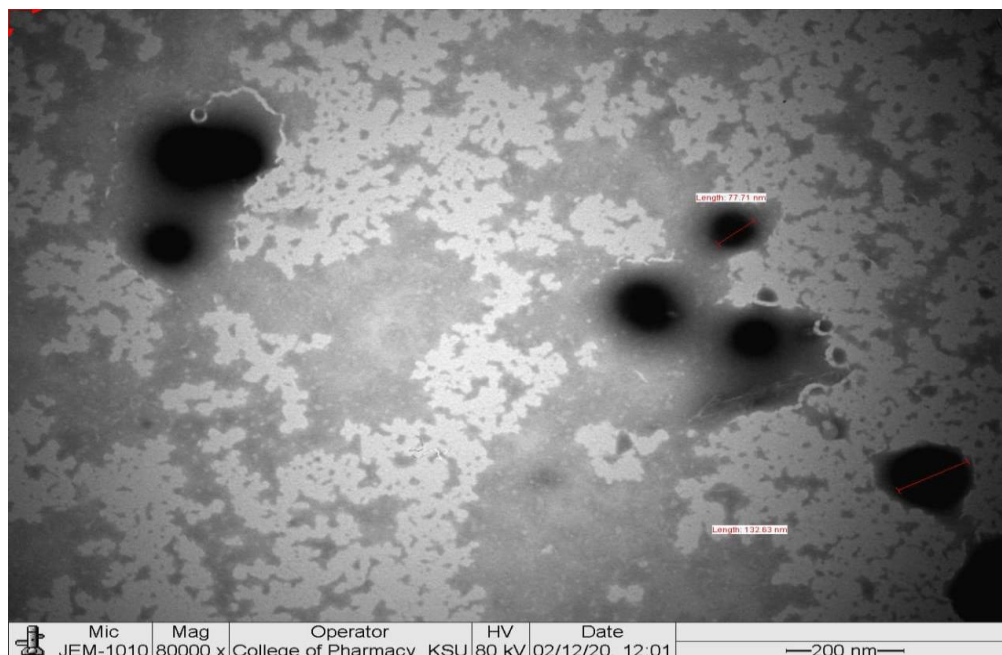


Figure S1. Micrograph of Cur-NLC obtained from transmission electron microscopy.

Particle size, polydispersity index and zeta potential

Cur-NLC was successfully prepared and characterized based on particle size, zeta potential and polydispersity index (PDI). The mean size of Cur-NLC was found to be 60.58 ± 4.16 d.nm ($n = 3$) (Figure S2). The PDI was found to be 0.252 ± 0.019 ($n = 3$).

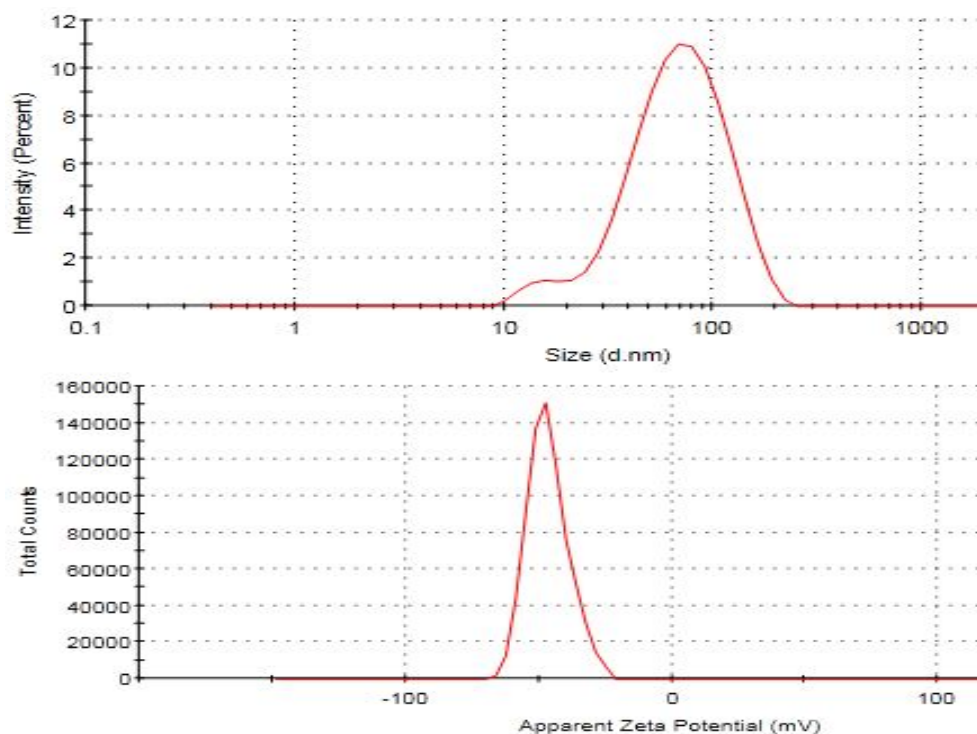


Figure S2. Size (60.58 ± 4.16 d.nm) and zeta potential (-48.57 ± 2.61 mV ($n = 3$)) of Cur-NLC ($n = 3$); Cur-NLC particle size distribution, average particle size distribution of one of three ($n = 3$) optimized formulations. The size of the particle was 60.58 ± 4.16 nm with narrow size distribution (< 0.5).

The optimum clinical outcomes can be achieved with a constant and narrow size distribution of nano-carrier formulations. The narrow size distribution is achieved by the smaller value of PDI [69]. Thus, Cur-NLC is considered as nano-formulations with narrow size distribution.

The surface charge of NLC was characterized by determining the zeta potential. The zeta potential of Cur-NLC was found to be -48.57 ± 2.61 mV ($n = 3$). The surface charge is considered to be a key factor for the stability of colloidal dispersions. The zeta potential value of greater than ± 20 mV is required for electrostatic stabilization [68]. Cur-NLC exhibited larger zeta potential value indicating its stability for longer duration of time.

References

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69. Makeen, H.A.; Mohan, S.; Al-Kasim, M.A.; Ibraheem M.A.; Ahmed, R.A.; Syed, N.K.; Sultan, M.H.; Al-Bratty, M.; Alhazmi, H.A.; Safhi, M.M.; Ali, R.; Alam, M.I. Gefitinib loaded nanostructured lipid carriers: Characterization, evaluation and anti-human colon cancer activity in vitro. *Drug Delivery* **2020**, *271*, 622-631.