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Genotoxicity and cytotoxicity of Noscapine Nanosuspension Prepared by Microfluidic Reactors on HepG2 Cell Line

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The present research applied nanoprecipitation process in microfluidic devices to prepare nanosuspension of stable noscapine. Artificial neural networks (ANNs) modeling was then employed to optimize the precipitation time of particles. The prepared particles' size was assessed via dynamic light scattering. The response surfaces obtained from ANNs model illustrated the determining effect of input variables (anti-solvent flow rate, surfactant concentration, inlet angle and longitude output of arm) on the output variable (sedimentation time). Moreover, the present research aimed to investigate the induction of DNA destruction, viability and colony formability of HepG2 tumor spheroid culture influenced by noscapine and nanosuspension of noscapine. The culture of HepG2 cells as spheroids was treated with different concentrations of noscapine for 24 h on Day 11. Afterward, viability assay and alkaline comet assay methods, respectively, were applied to examine the viability and induced DNA destructions. Based on the results, no significant impacts of Tween 40 diluent were detected on the viability and DNA damage levels in comparison with the control ($p > 0.05$). Moreover, increasing noscapine concentration resulted in a dose-dependent reduction in viability cells of hepatic cancer cells and elevated DNA damages showing a correlation between rises of DNA damages and viability decline. Based on the colony assay results, no significant impacts of Tween 40 diluent were detected on the colony numbers in comparison with the control ($p > 0.05$). Moreover, increasing noscapine concentration resulted in a dose-dependent reduction in colony numbers of hepatic cancer cells.

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