A system that can cross the blood-brain barrier in the treatment of Alzheimer: Donepezil hydrochloride incorporated Resomer RG 502 H nanoparticle systems

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Great success has been achieved in treatments with nanoparticle (NP) systems. In this study, donepezil hydrochloride (DNP) loaded PLGA-based NPs were prepared by the 'Double Emulsification Solvent Evaporation' method and the effect of PVA concentration in the aqueous phase and probe sonication time on NP properties was investigated. It was found that increasing PVA concentration and probe sonication time resulted in a decrease in particle size. After the examinations, the I-DNP coded formulation was chosen as optimum. The particle size of the I-DNP coded NP formulation was obtained as 136.37 nm ± 0.93 and the formulation proved to be monodisperse with a PDI value of 0.122±0.011. The zeta potential value was -24.17 mV±1.21 and it was concluded that it could be stable for a long time. In the encapsulation efficiency study, a value of 69.22±4.84%, ideal for oral administration, was obtained. When the release of DNP from the I-DNP coded NP formulation was compared with the pure DNP, it was determined that the I-DNP coded NP formulation had a slower and extended 24-hour release. In line with the results obtained with DDSolver, it was concluded that the release kinetics are predominantly governed not by only a single mechanism, but by a combined Fickian and non-Fickian mechanism. As a result, NP systems that have a particle size that can pass the blood brain barrier and provide extended release have been successfully produced. This study was financed by Anadolu University Scientific Research Project Foundation (No: 2304S027).