A drug delivery system that can be used in diseases caused by oxidative damage: Preparation and Characterization of Ferulic Acid Loaded PLGA-Based Nanosystems

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In this study, ferulic acid loaded PLGA-based nanoparticles (NPs) were prepared by the 'nanoprecipitation' method and the effects of Poloxamer 188 concentration in the aqueous phase and Span 60 concentration in the organic phase content on the NP properties were investigated. With increasing Poloxamer 188 and Span 60 concentration, an increase in particle size was detected. A-Blank coded formulation was selected optimally and ferulic acid loaded form was prepared in order to avoid excessive excipients. The particle size of the ferulic acid-loaded A-FA coded NP formulation was obtained as 174.70 nm ± 0.89 and the formulation proved to be monodisperse with a PDI value of 0.113 ± 0.006. The zeta potential value was -22.00 mV ± 0.56 and it was concluded that it could be stable for a long time. Due to the low affinity of ferulic acid to the water phase and thus its tendency to migrate to the organic phase, high encapsulation efficiency (EE%) was achieved and the EE % was 76.48 ± 3.12%. When the ferulic acid release from the A-FA coded NP formulation was compared with pure ferulic acid, it was determined that the A-FA coded NP formulation had a slower and 24-hour extended release. According to the results obtained with DDSolver, a high correlation was observed between the Peppas-Sahlin model and the Weibull model. In conclusion, in vitro results have proven successful encapsulation and extended release for oral use.