Multicomponent nanosystems with applications in pathologies with cardio-cerebro-vascular risk

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The thesis entitled ***Multicomponent nanosystems with applications in pathologies with cardio-cerebro-vascular risk***, had as aim the obtaining and the characterization of nanosystems with polymeric and lipid matrix loaded with synthetic substances, respectively a standardized plant extract for biomedical applications, with special reference to their administration in the therapy of diseases with cardio-cerebro-vascular risk. Thus, were obtained and characterized polymeric nanosystems based on PEG4000, PEG6000 and PLGA in which the amlodipine-valsartan combination (1:16 mg) was incorporated. The nanosystems had nanometric dimensions, a negative zeta potential, which means a good stability, and values of the polydispersity index below 0.2, which means a high degree of uniformity. The *in vitro* release of active substances from polymeric nanosystems was also evaluated and 5 mathematical models were applied, two of which proved to be the best (Higuchi and Korsmeyer-Peppas). The optimal polymeric nanosystem (PLGA: AML: VAL = 10: 1: 16 mg) was selected for which were demonstrated the compatibility between the polymer matrix and the active substances, a spherical morphology and smooth texture, a good intracellular distribution, as well as a high degree of safety. Also, were obtained and characterized qualitative and quantitative (HPLC) and in terms of antioxidant effect (DPPH method) and cytototoxic effect (MTS method) four standardized plant extracts of plant species: *Sambucus ebulus, Lycium barbarum, Armoracia rusticana, Echinacea purpurea*. The highest amount of polyphenols and the highest antioxidant activity was observed for *Sambucus ebulus* extract. Subsequently, it was incorporated into three types of lipid nanosystems (liposomes, transfersomes and ethosomes), which proved nanometric dimensions, quasi-spherical particles, uniform particle distribution, good stability, a slow release of phytoconstituents, and a cytoprotective effect.