Development of Poly(*n*-butyl cyanoacrylate) Colloidal Nanospheres Loaded with Lipophilic Anticancer Drugs Intended for Targeted Drug Delivery

Georgi Yordanov and Ceco Dushkin

Faculty of Chemistry, University of Sofia, 1126 Sofia, Bulgaria.
E-mail: chem_gbg@yahoo.com (G. Yordanov)

The colloidal particles of poly(alkyl cyanoacrylate) are considered as one of the most perspective synthetic biomaterials for drug delivery applications, especially for improvement of cancer chemotherapy [1]. The classical method for their preparation is the emulsion polymerization in aqueous medium. Previously, we have used this method for the entrapment of the antibiotic ciprofloxacin [2] and the anticancer agent chlorambucil [3] in poly(*n*-butyl cyanoacrylate) nanospheres. Recently, we have demonstrated the successful utilization of the nanoprecipitation method for the entrapment of lipophilic drugs in poly(*n*-butyl cyanoacrylate) nanospheres [4].

Here, we report our recent results on the development of novel colloidal formulations of classical lipophilic anticancer drugs. The drugs are loaded into poly(*n*-butyl cyanoacrylate) colloidal nanospheres by the two methods – emulsion polymerization and nanoprecipitation. A presynthesized polymer is used in the nanoprecipitation approach, thus avoiding any chemical reactions during the entrapment of drugs in the colloidal nanospheres. Therefore, this method is preferred for the cases of chemically sensitive drugs, which are rather possible to be inactivated at the conditions of the classical emulsion polymerization. Drug-loaded colloidal nanospheres with various surface coatings are obtained and characterized for particle morphology, size distribution, ζ-potential, drug content and drug release kinetics in physiological phosphate-buffered saline. We suppose that the as-obtained drug-loaded colloidal nanospheres are suitable for future biomedical tests and evaluation of their potential application in targeted drug delivery.

References

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