

From microparticles to cyclodextrins: innovative drug delivery systems with versatile applications

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Drug delivery systems have a significant impact on the bioavailability and effectiveness of the drugs, especially when the solubility and the permeability through biological barriers of the actives are limited. Different drug delivery systems are studied, and the presentation focuses on mainly three types of delivery systems: microparticles, lipid nanoparticles and cyclodextrins. Microparticles were used for the formulation and protection of probiotic bacterial strains in combination with chitosan coating. Interesting interactions of probiotics and chitosan was revealed, which had significant effect on the viability of probiotics. Lipid nanoparticles were applied to improve the absorption of drugs with low permeability on Caco-2 intestinal absorption model and proved to enhance the permeability of BGP-15 molecule. Cyclodextrins were studied to get insight their behaviour in biological systems. Fluorescent cyclodextrins and radiolabelled derivatives were used to study the in vitro and in vivo behaviour of these macrocycles, especially on cancer models. Cellular internalization and pharmacokinetics of cyclodextrins were also revealed. In conclusion the presentation aims at briefly demonstrate some of the experimental results obtained by the application and investigation of the above-mentioned drug delivery systems and show the applied model systems.