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## Chitosan nanoparticles - Challenges for antibiotic drug delivery using Penicillin as a model drug

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Antibiotic resistance is one of the major health problems worldwide. Resistance to penicillin is well recognized in *Staphylococcus aureus* and *Staphylococcus epidermidis*. During last decade various resistance mechanisms such as decreased uptake, increased efflux of drug from bacterial cell, formation of biofilms to avoid contact with antibiotics have been identified that lead to failure in the treatment. The concept of drug delivery system is rapidly moving towards the development of biodegradable polymeric nanoparticles. For past two decades many researchers have been developing nanoparticle drug delivery especially delivering of anticancer drugs and vaccines. The main advantage of this system is to deliver drug moiety at the site of cell that can improve pharmacokinetic and pharmacodynamic profiles of the drug. Thus the nanoparticles improve solubility, stability and bioavailability of various drugs. However, it is limited by toxic profile. Therefore, nanoparticle drug delivery system is highly challengeable for researchers to overcome toxicity. The application of nanoparticle in the field of Medicine and Pharmaceuticals will be exposed more and more in near future.

In our study, the antibacterial efficacy of penicillin loaded chitosan nanoparticles was evaluated against selected bacterial strains namely *Staphylococcus aureus*, *Streptococcus pyogenes*, *Bacillus subtilis*, *Escherichia coli* and *Klebsiella planticola* of clinical origin. The study suggested that penicillin nanoparticles showed better antibiotic delivery system than conventional penicillin. However, the study is still under process in order to overcome lacunae that we experienced in our earlier studies.

### Biography

B. B. Barik has completed his PhD in 1993 from Jadavpur University, Kolkata, India. He is the Professor in the department of Pharmaceutics, College of Pharmacy, Jazan University, Kingdom of Saudi Arabia. Earlier he worked as professor and head in the Univ Dept of Pharm Sci, Utkal University, Bhubaneswar, India and College of Pharmaceutical Sci, Berhampur, Odisha. He has published more than 50 papers in reputed journals and presented more than 100 papers in national and international conferences. He is serving as reviewer and editorial board member of reputed journals.

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