

## RSM-CCD optimized synthesis of chitosan and gelatin-based HPNs containing ATL- $\beta$ -CD inclusion complexes as controlled drug delivery systems

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### Abstract

The present study proposes the synthesis and optimization of pH responsive hybrid polymer network, consisting of chitosan, gelatine cross-linked by glutaraldehyde under microwave conditions. Different reaction parameters like backbone ratio, amount of solvent, pH, the time, the temperature of reaction mixture and concentration of cross-linker were optimized with response surface methodology in order to maximize the percentage swelling. ANOVA model fits were made for the data and gave the linear model as the best fit with a predicted  $R^2 = 0.9747$ . The maximum desirability was found at pH = 7 with the percentage swelling of 508.061%. Poor loading of drug in traditional drug delivery is improved by incorporating preformed inclusion complex of Atenolol with  $\beta$ -cyclodextrin (1:1) under microwave conditions directly into the HPN matrix. Further, HPN matrix was explored for the in situ controlled release of ATL under different pH conditions at 37° C. ATL release showed the best fit to the Ritger-Peppas and Peppas-Sahlin equation. Thus HPN prepared by using RSM design is a good device to deliver the ATL in a controlled manner.



### Biography

Rajeev Jindal, Associate Professor of the Dr.B. R. Ambedkar National Institute of Technology, India. He has completed his Ph.D. in Panjab University, Chandigarh. He has participated in national and international projects. He have done about 82 publications.

### Publications

- Exploring the heavy metal ion sequestration ability of gum copal-collagen hybrid based interpenetrating polymer network: Kinetics, isotherms, and biodegradation studies
- Insight into adsorption kinetics and isotherms for adsorption of methylene blue using gum rosin alcohol/psyllium-based green adsorbent
- Evaluation of flocculation characteristics and biodegradation studies of reduced gum rosin and psyllium-based hydrogel
- Monodispersed Silica Nanoparticles Incorporated Nanocomposites of Gelatin and Psyllium for Sequestration of Noxious Pollutants
- Synthesis, optimization and characterization of PVA-co-poly(methacrylic acid) green adsorbents and applications in environmental remediation

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