# Extraction, purification, and characterization of polysaccharide of Araucaria heterophylla L and Prosopsis chilensis L and utilization of polysaccharides in nanocarrier synthesis


## ABSTRACT

Background: Plant gums consist of polysaccharides which can be used in the preparation of nanocarriers and provide a wide application in pharmaceutical applications including as drug delivery agents and the matrices for drug release. The objectives of the study were to collect plant gums from Araucaria heterophylla L and Prosopis chilensis L and to extract and characterize their polysaccharides. Then to utilize these plant gum-derived polysaccharides for the formulation of nanocarriers to use for drug loading and to examine their purpose in drug delivery in vitro. Methods: Plant gum was collected, polysaccharide was extracted, purified, characterized using UV-Vis, FTIR, TGA and GCMS and subjected to various bioactive studies. The purified polysaccharide was used for making curcumin-loaded nanocarriers using STMP (sodium trimetaphosphate). Bioactivities were performed on the crude, purified and drugloaded nanocarriers. These polysaccharide-based nanocarriers were characterized using UVVis spectrophotometer, FTIR, SEM, and AFM. Drug release kinetics were performed for the drug-loaded nanocarriers. Results: The presence of glucose, xylose and sucrose was studied from the UV-Vis and GCMS analysis. Purified polysaccharides of both the plants showed antioxidant activity and also antibacterial activity against Bacillus sp. Purified polysaccharides were used for nanocarrier synthesis, where the size and shape of the nanocarriers were studied using SEM analysis and AFM analysis. The size of the drug-loaded nanocarriers was found to be around 200 nm. The curcumin-loaded nanocarriers were releasing curcumin slow and steady. Conclusion: The extracted pure polysaccharide of A. heterophylla and P. chilensis acted as good antioxidants and showed antibacterial activity against Bacillus sp. These polysaccharides were fabricated into curcumin-loaded nanocarriers whose size was below 200 nm. Both the drug-loaded nanocarriers synthesized using A. heterophylla and P. chilensis showed antibacterial activity with a steady drug release profile. Hence, these natural exudates can serve as biodegradable nanocarriers in drug delivery.



**Keyword:** Araucaria heterophylla L; Prosopis chilensis L; Gum polysaccharide