Green synthesis of zinc nanoparticles: An insight in leather nano-coating applications

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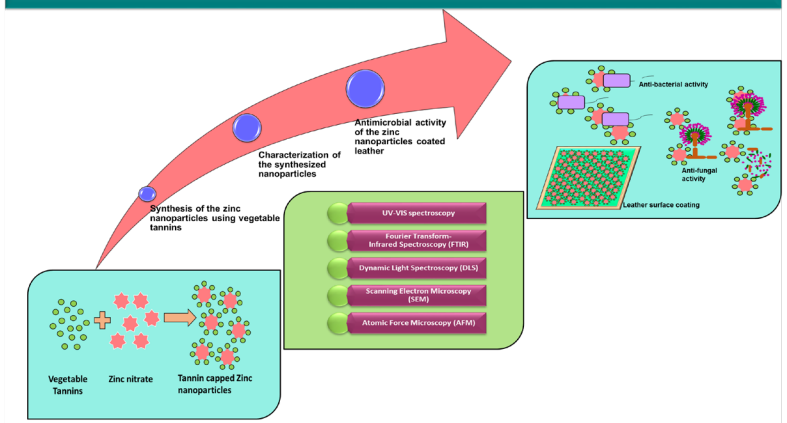
Abstract

Zinc nanoparticles have been synthesized with vegetable tannins (wattle and chestnut) and used as an antimicrobial agent in vegetable tanned leather. Antibacterial (*Escherichia coli* and *Bacillus cerus*) and antifungal activity (*Aspergillus niger*) of Zn-nano coated leather has been assessed. Chestnut (20mm) and Wattle (22mm) mediated nanoparticles (C-ZnNPs) exhibit higher bactericidal activity against *E. coli.* C-ZnNPs and W-ZnNPs showed significant inhibitions as 8 and 9mm against *Aspergillus niger* respectively exhibiting antimicrobial properties.

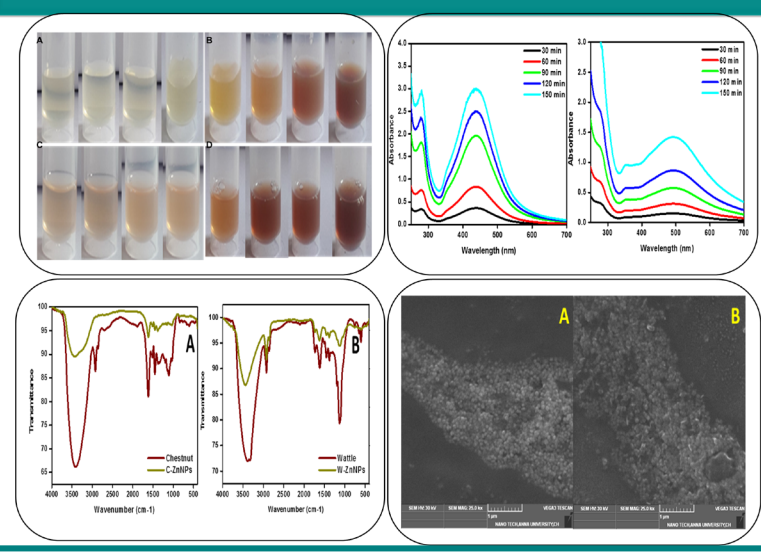
Introduction

- Improving microbial resistance of vegetable tanned leathers
- Zinc and vegetable tannins are promising candidates
- Nanotechnology is provides platform to blend different materials
- A new class of eco benign natural antimicrobial chemicals as alternatives
- In situ application method to avoid such hazardous chemicals

Methodology



Results



Antimicrobial activity

S.no.	Zn NPs (Constant concentration 100 µl)	Zone of inhibitions (in mm)		
		Antibacterial		Antifungal
		Bacillus cerus	E.coli	Aspergillus niger
1.	NC	20	16	8
2.	NW	22	18	9

Conclusion

- Sizes of the Zinc capped vegetable tannin nanoparticles have been determined below 100 nm
- Exhibit greater resistance to bacteria and fungus
- Effectively utilized for protection of leather against microbial attack and further augmented for its durability.

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