

Synergistic Enhancement of Electrospun Keratin Mats with Medicinal Plants and Green-Synthesized Silver Nanoparticles for Biomedical Applications

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INTRODUCTION & AIM

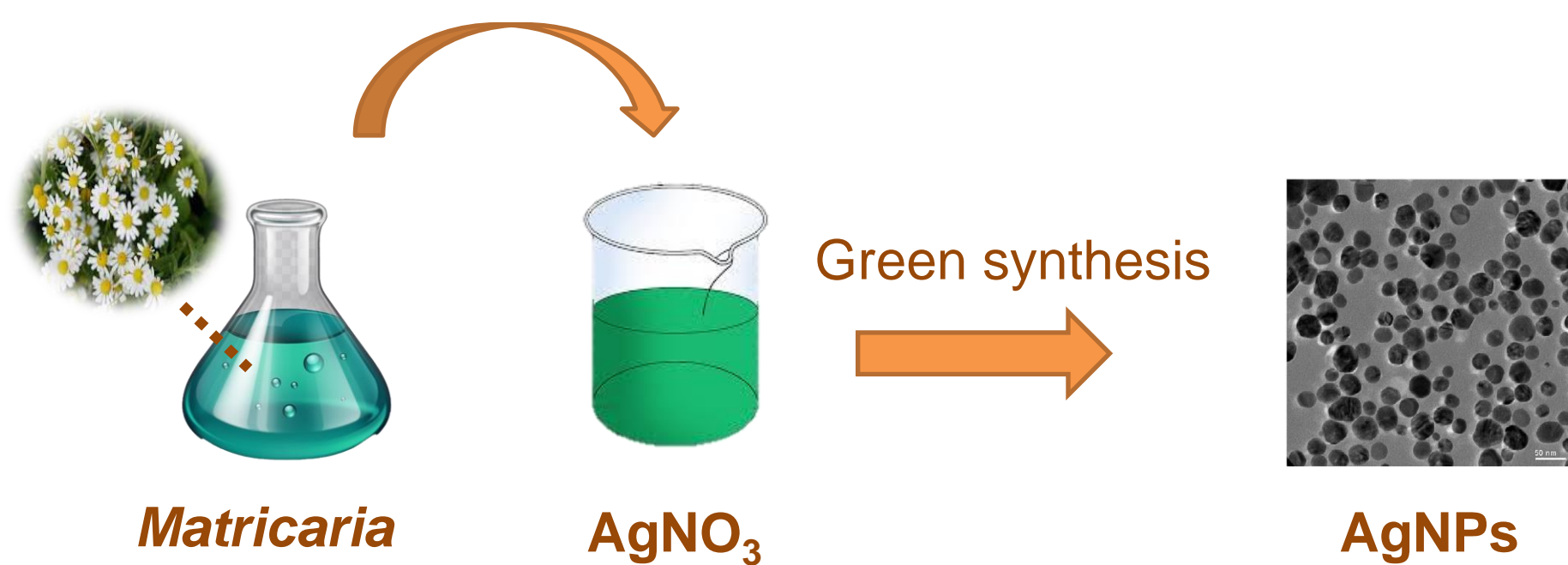
Keratin, a versatile polymer rich in cysteine and disulfide bonds, exhibits strength and elasticity, making it crucial for tissue engineering. Its biocompatibility and biodegradability foster the development of advanced biomaterials. Incorporating medicinal plant extracts enhances keratin's therapeutic potential. Additionally, green-synthesized silver nanoparticles (AgNPs) provide antimicrobial properties. Electrospun keratin-based mats may be promising materials for medical applications since electrospinning enables the fabrication of nanofibrous scaffolds with high surface area-to-volume ratios, mimicking the extracellular matrix's structure.

This research aims to develop electrospun keratin mats enhanced with medical plants and green-synthesized AgNPs for medical dressings.

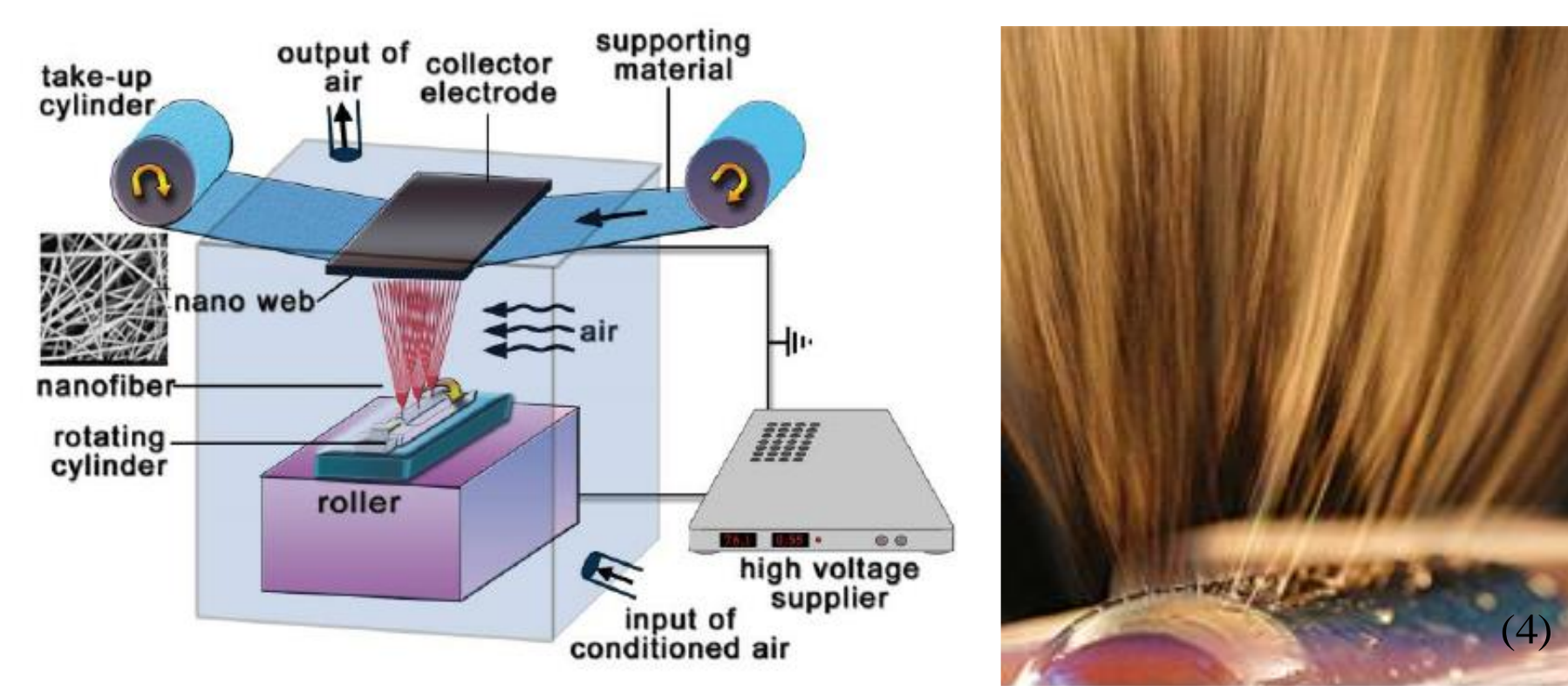
MATERIALS AND METHODS



Keratin from sheep wool

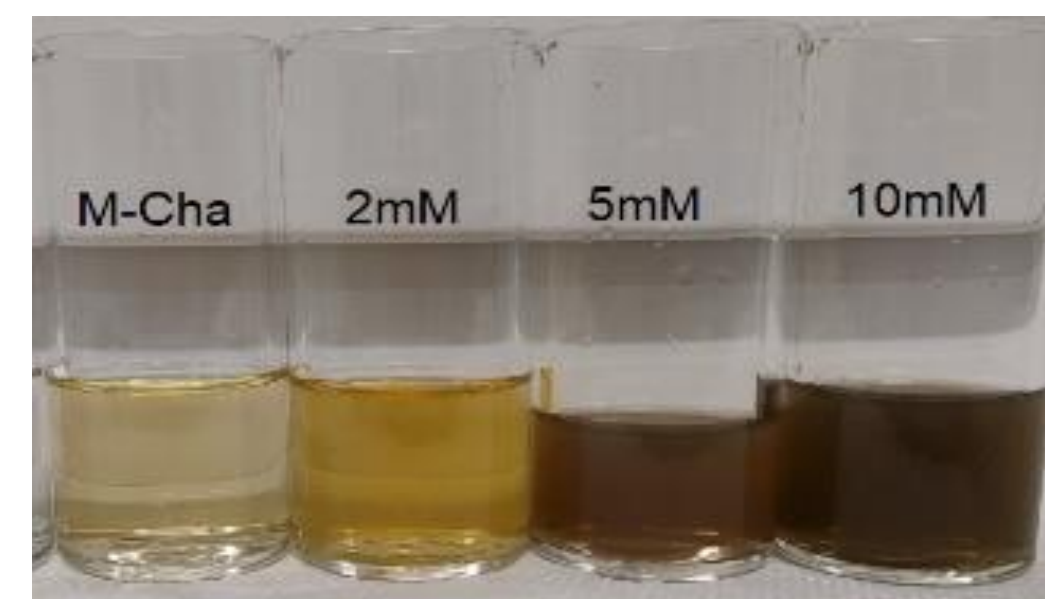


Green synthesis of AgNPs

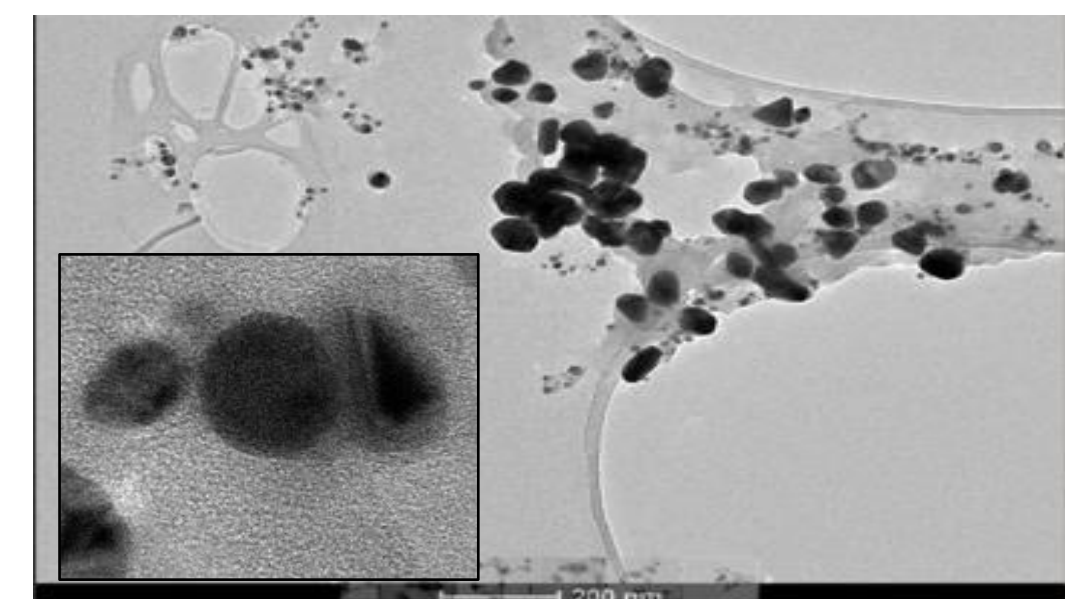


Electrospinning

RESULTS & DISCUSSION



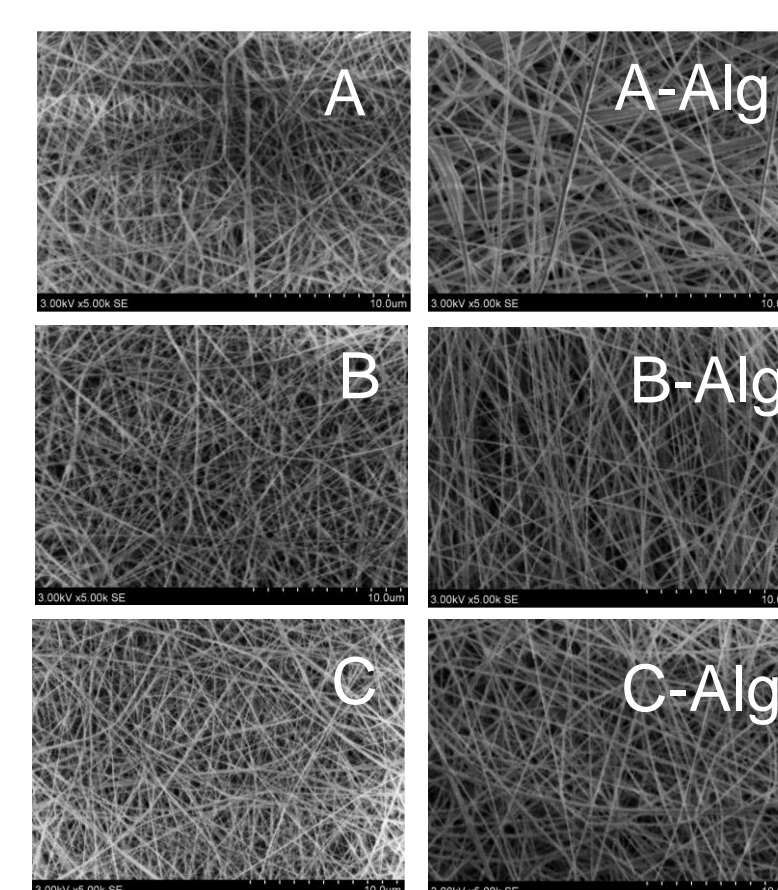
AgNPs colloid solution colour change



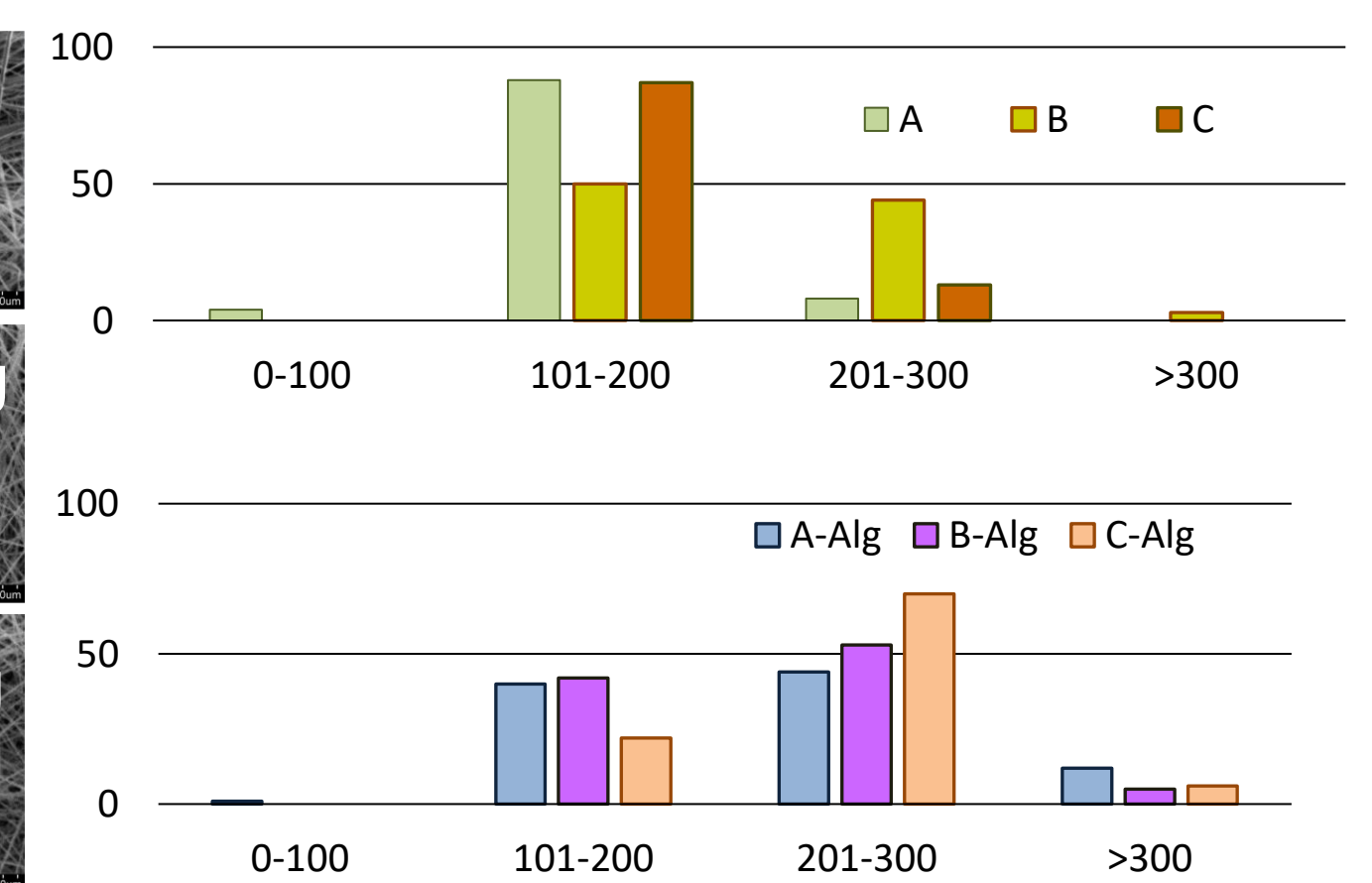
AgNPs TEM image

Electrospinning solutions

Sample code	KerH	PEO (c=10%)	H ₂ O	<i>M. Cha.</i> extract	<i>M. Cha.</i> AgNPs	Sodium alginate
A	14%	72%	14%			
B	13%	64%	13%	10%		
C	13%	64%	13%		10%	
A-Alg	14%	69%	14%			3%
B-Alg	13%	62%	13%	9%		3%
C-Alg	13%	62%	13%		9%	3%



Electrospun mats



Nano-micro fibers diameters dstrubtion

CONCLUSION

The findings indicate that keratin-based compositions enriched with *M. chamomilla* extract and greensynthesized AgNPs can be effectively electrospun. Incorporating *Sodium Alginate* enhances the versatility of the electrospun mats for medical applications. Nevertheless, further in-depth investigation is required.