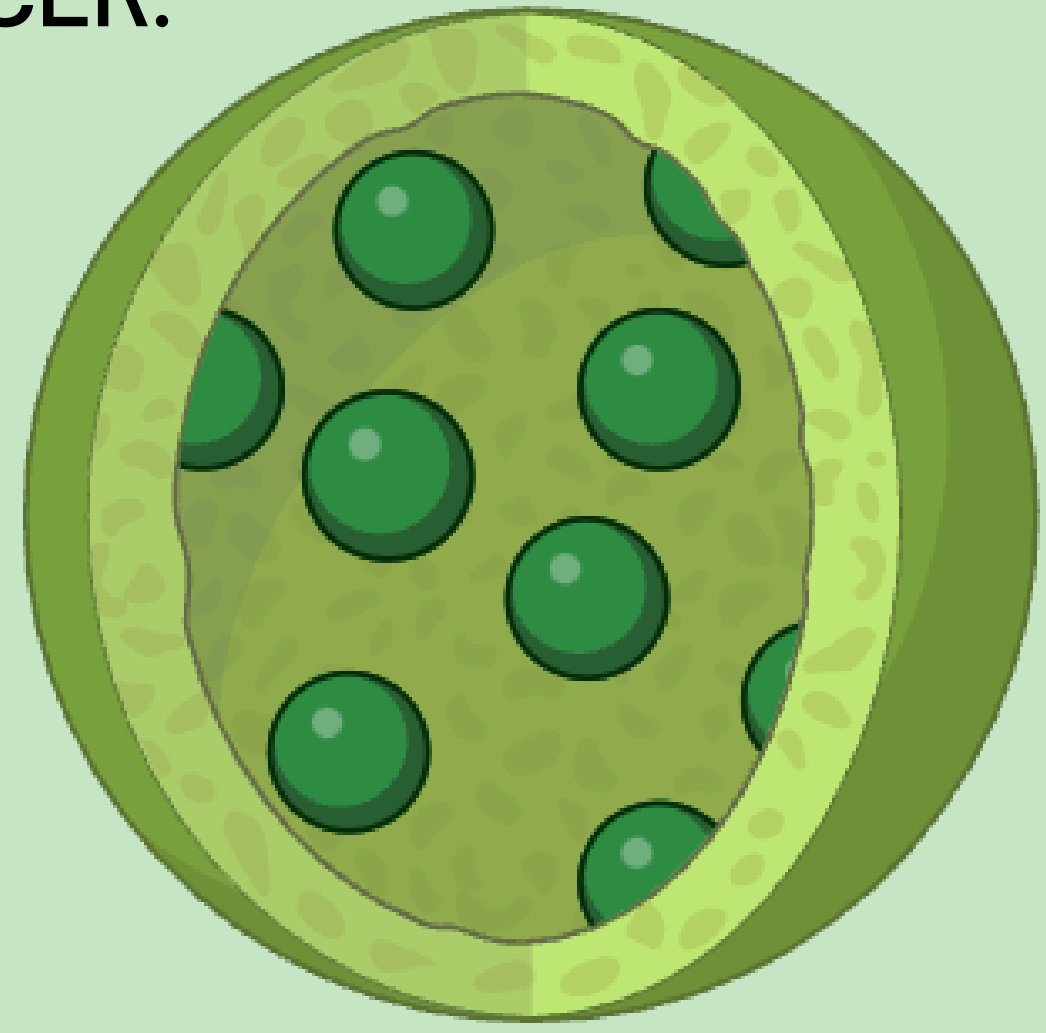


REUSEABLE AND EFFICIENT CATALYTIC ALGINATE BEADS ENCAPSULATED WITH SILVER NANOCCLUSERS SYNTHESIZED USING MANGOSTEEN - IOCFB 2024

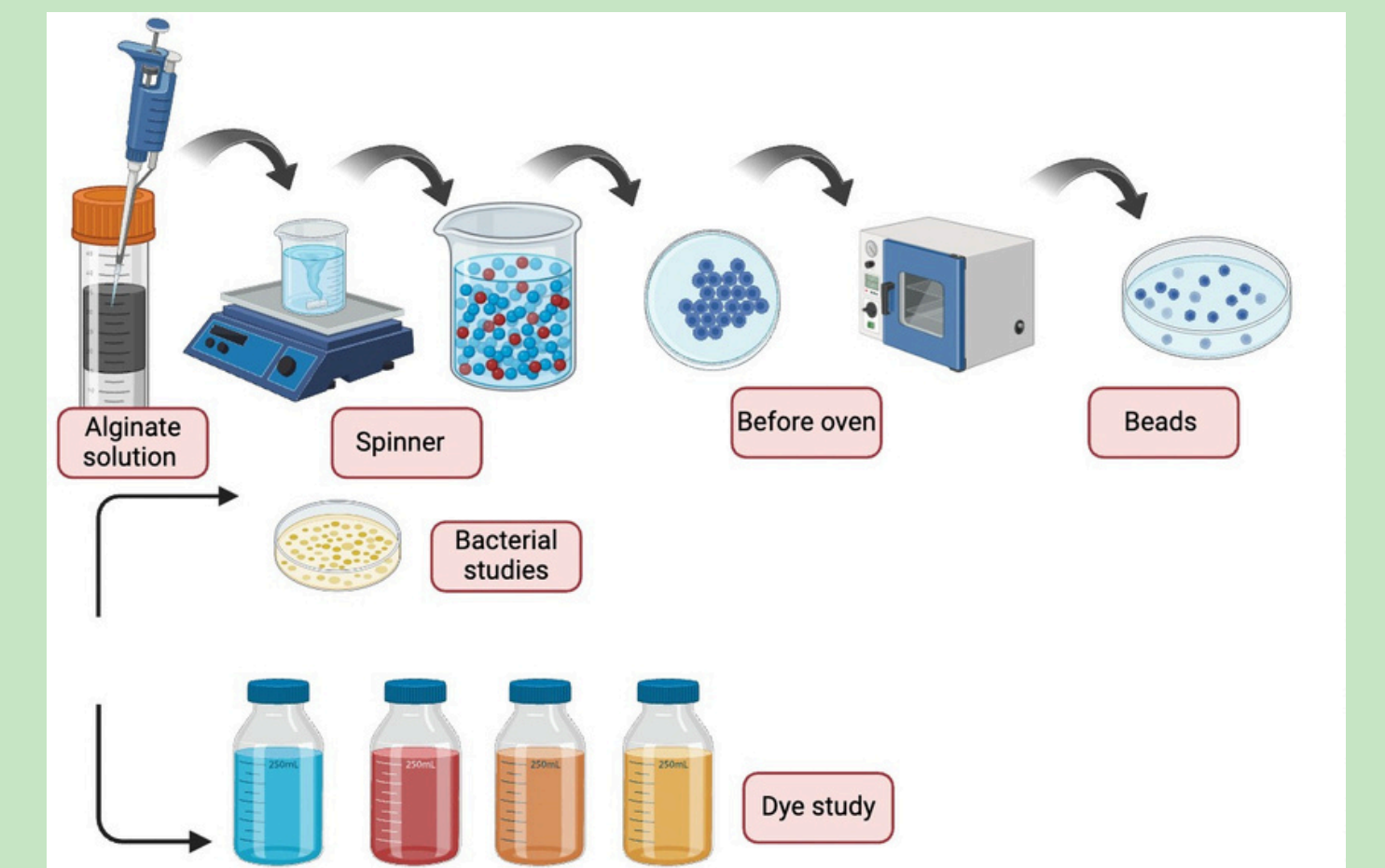
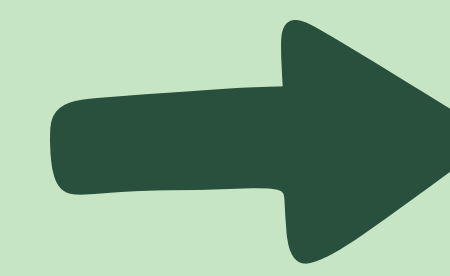
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INTRODUCTION

NEONATOLOGY IS AN EMERGING RESEARCH FIELD FOCUSED ON USING HUMAN HAIR SIZE PARTICLES CALLED NANOPARTICLES, WHICH HAVE SPECIAL PROPERTIES INCLUDING (CATALYTIC NATURE, ANTIMICROBIAL, ANTIFUNGAL, ANTI-INFLAMMATORY AND ANTI-VIRAL ACTIVITY) IN THE MEDICAL FIELD AND HUMAN HEALTH. THIS STUDY AIMS TO DISCOVER NEW TREATMENT MODALITIES BY USING FRUIT PEELS IN SILVER NANOPARTICLE SYNTHESIS USING ENVIRONMENT-FRIENDLY, HARMLESS, AND COST-EFFICIENT METHODS. NANOPARTICLES HAVE MANY APPLICATIONS, INCLUDING DRUG DELIVERY, PHOTOELECTROCHEMICAL, FOOD, HEALTH, AND COSMETICS, AND THEY HAVE BEEN FOUND TO BE EFFECTIVE AGAINST CARDIOVASCULAR DISEASE AND CANCER.

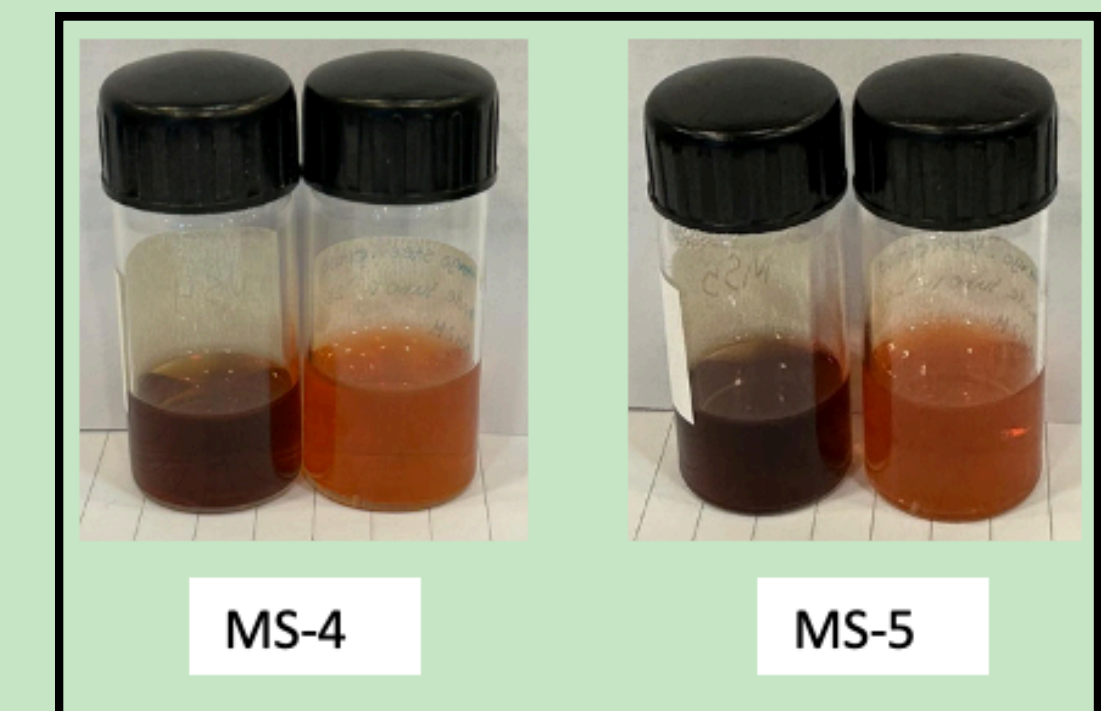
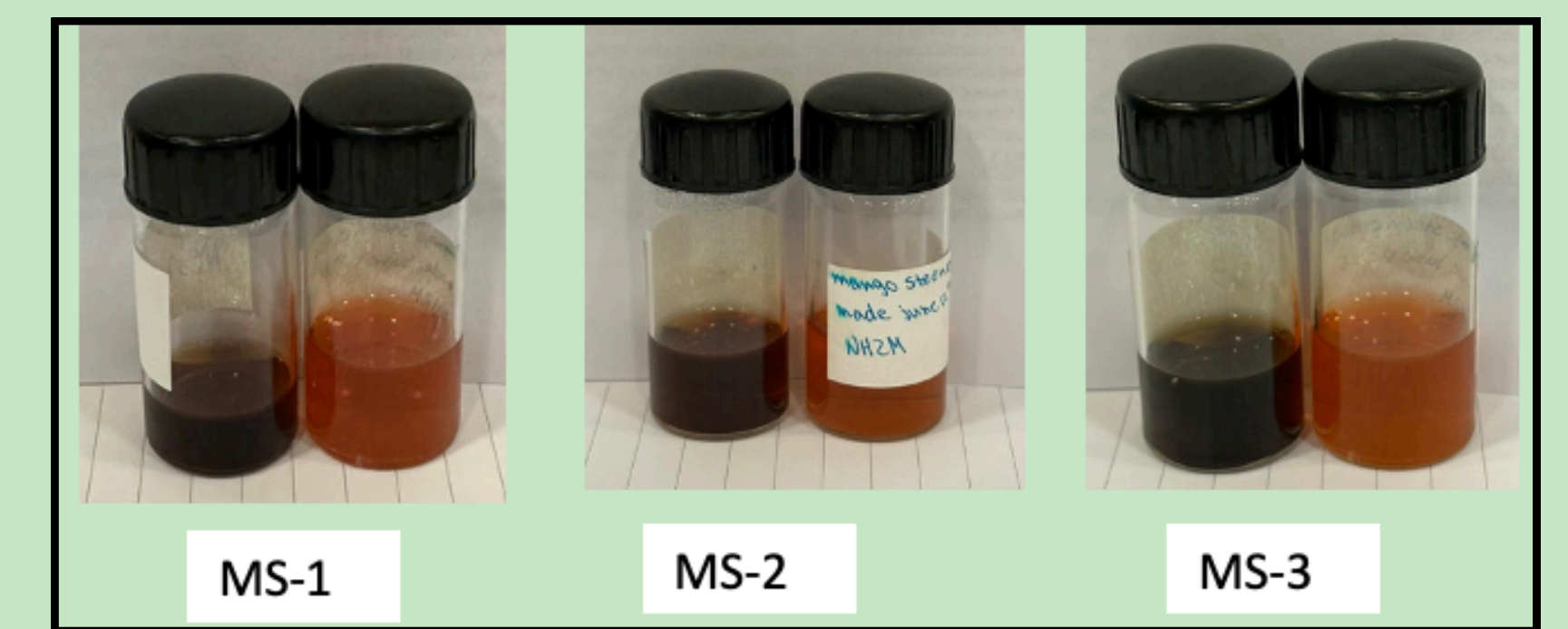


METHODOLOGY



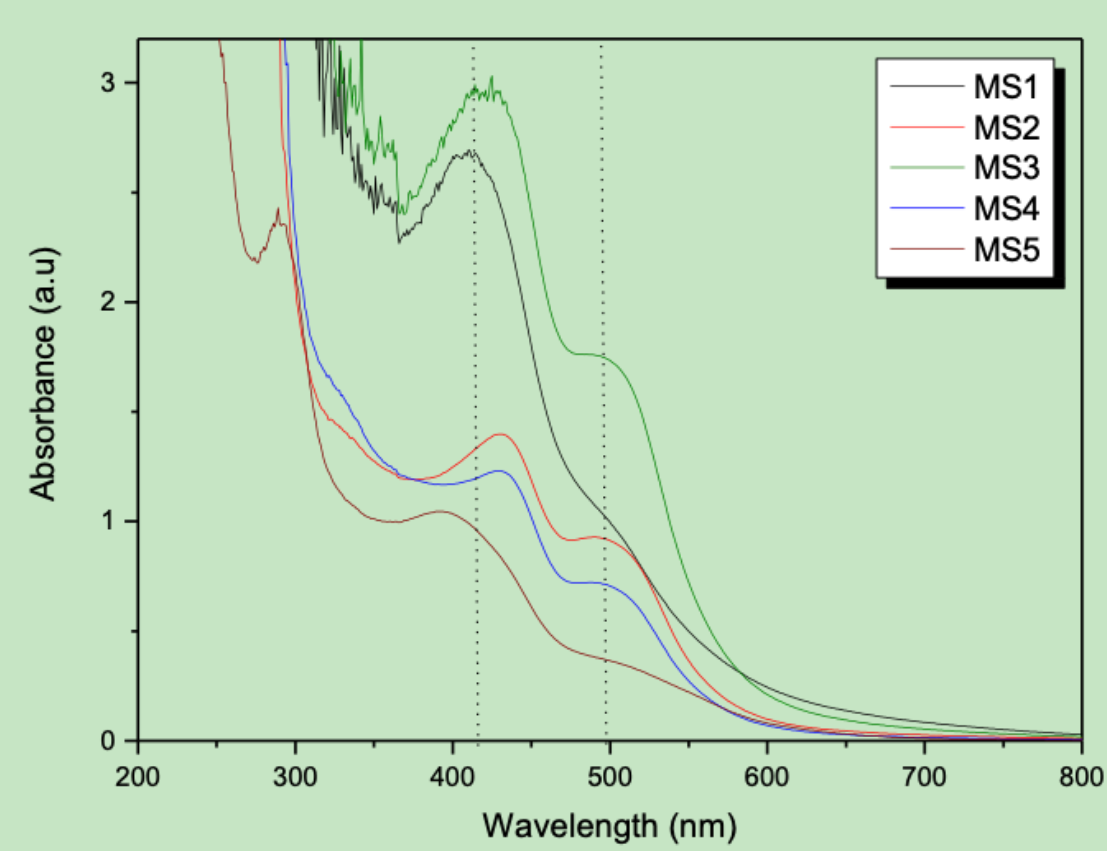
Sample	Extract	AgNO3	NaOH
MS-1	2 ml	4 ml	250µL
MS-2	3 ml	3 ml	250µL
MS-3	4 ml	2 ml	250µL
MS-4	5 ml	1 ml	250µL
MS-5	1 ml	5 ml	250µL

TABLE 1

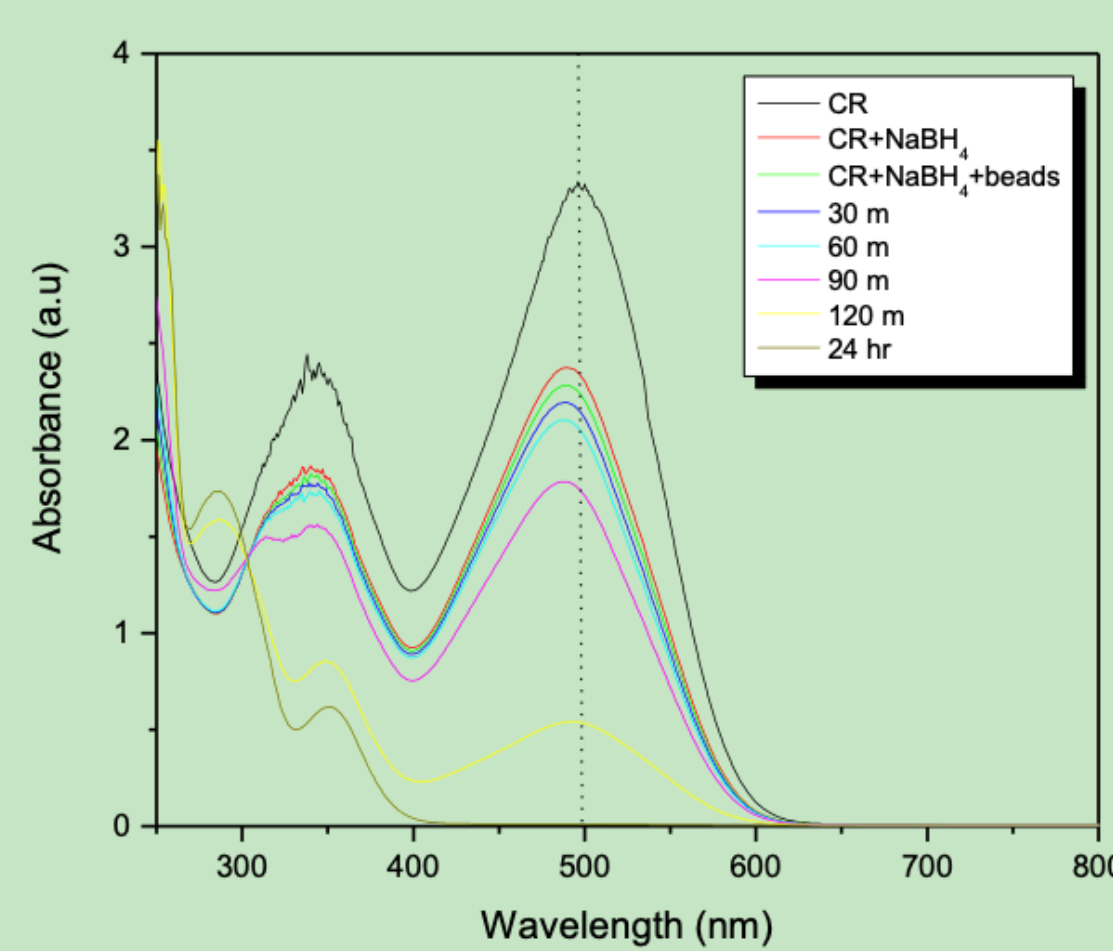


RESULTS

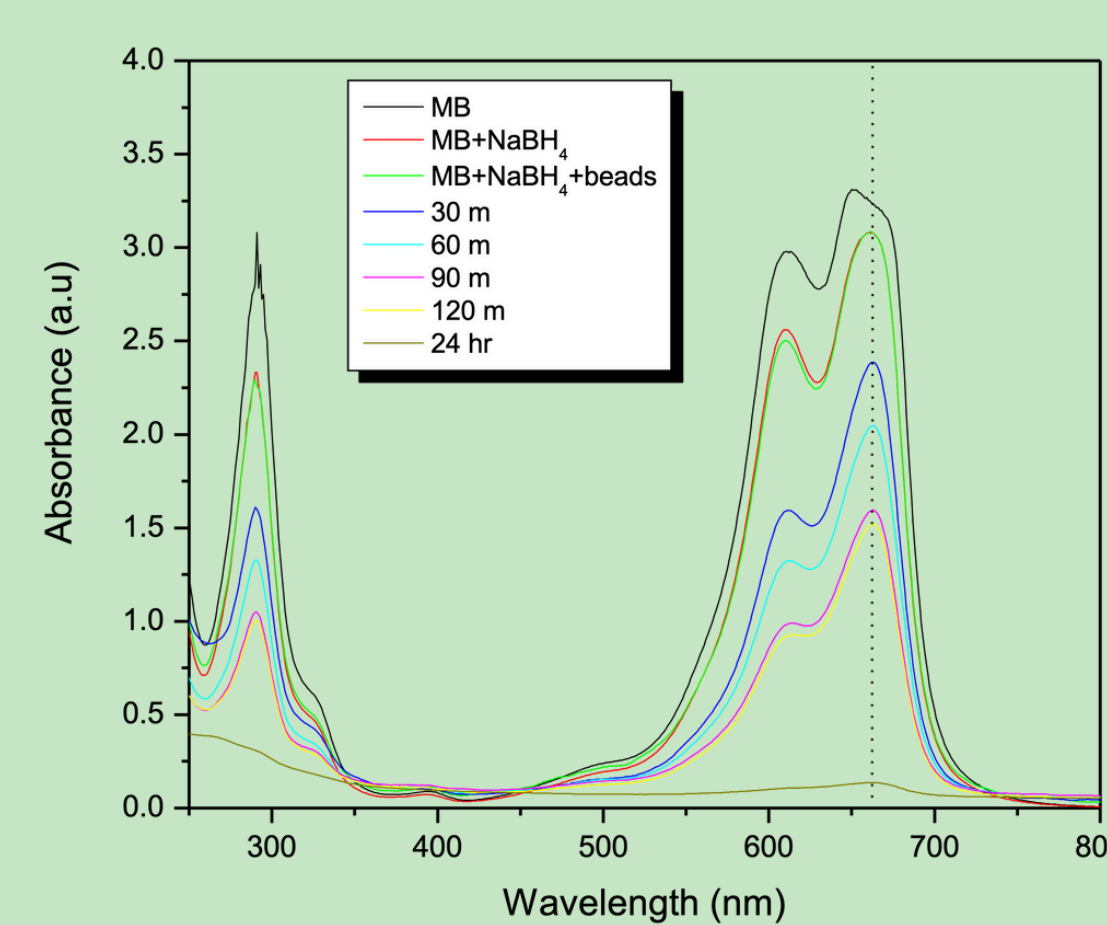
1 AgNP + mangosteen extract



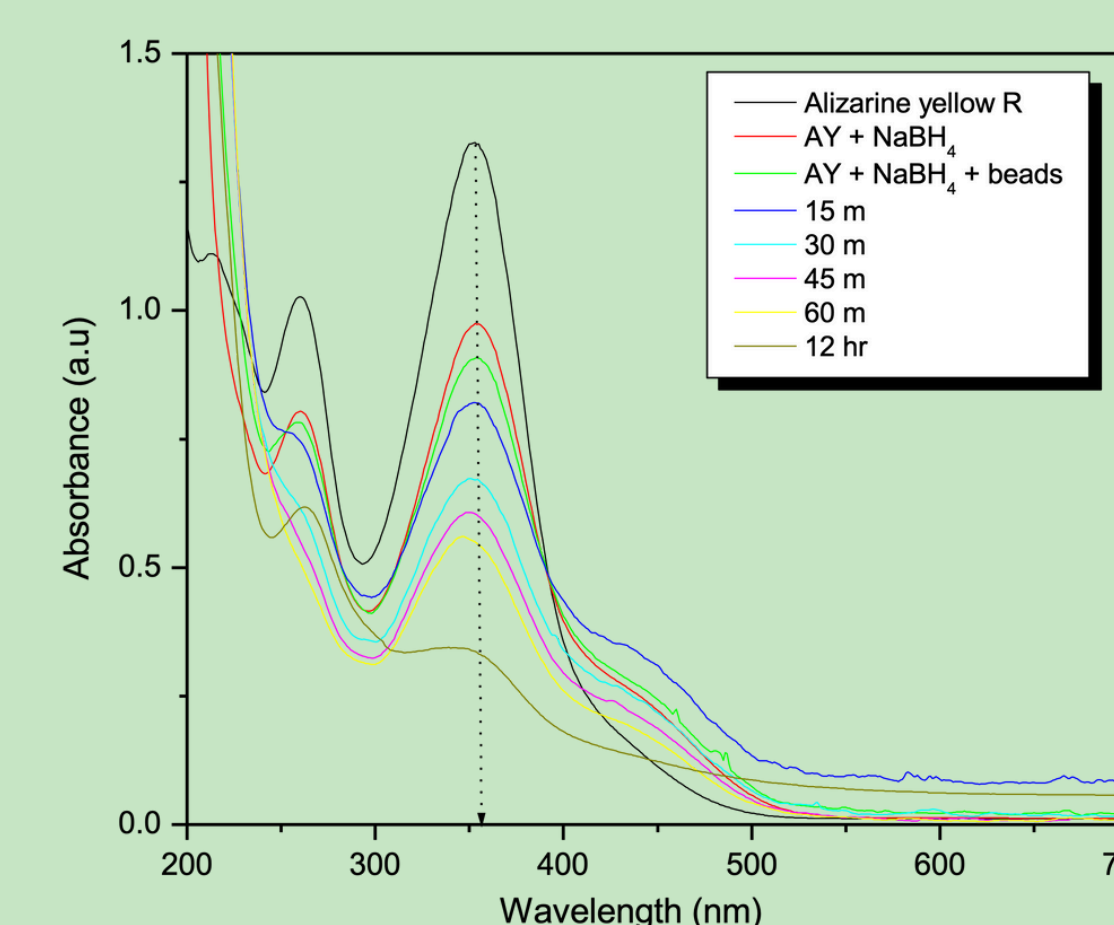
2 AgNP + mangosteen extract + Congo Red + beads



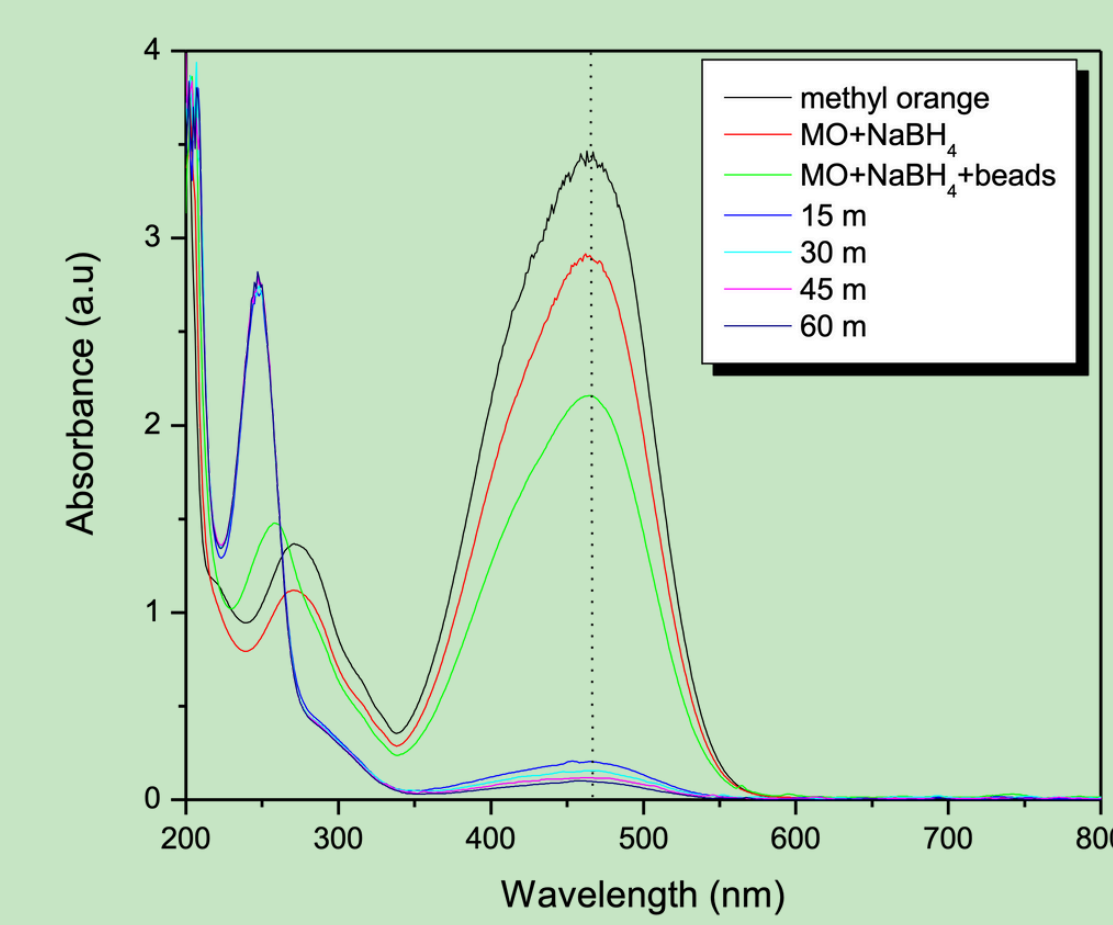
3 AgNP + mangosteen extract + Methyl blue + beads



4 AgNP + mangosteen extract + Alizarine yellow + beads



5 AgNP + mangosteen extract + Methyl Orange + beads



Sample	λ_1	λ_2	Absorbance 1	Absorbance 2
MS1	411	505	2.65	0.961
MS2	430	497	1.39	0.929
MS3	423	507	2.96	1.67
MS4	430	505	1.23	0.687
MS5	412	505	2.65	0.371

Sample	λ	Absorbance
Congo red	497	3.3
CR + NaBH ₄	491	2.36
CR + NaBH ₄ + beads	489	2.28
30 min	489	2.19
60 min	488	2.11
90 min	488	1.79
120 min	495	0.53
24 hrs	499	0.023

Sample	λ	Absorbance
Methyl blue	663	3.2
MB + NaBH ₄	661	3.05
MB + NaBH ₄ + beads	663	3.08
30 min	663	2.37
60 min	663	2.04
90 min	664	1.61
120 min	663	1.52
24 hrs	667	0.13

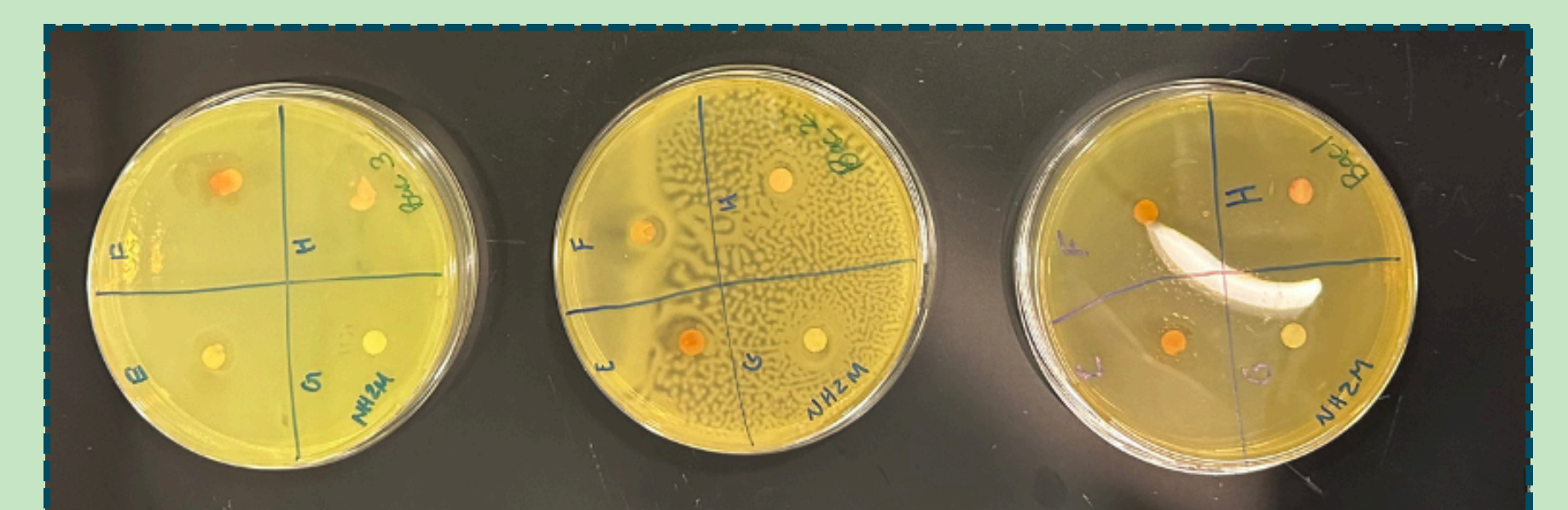
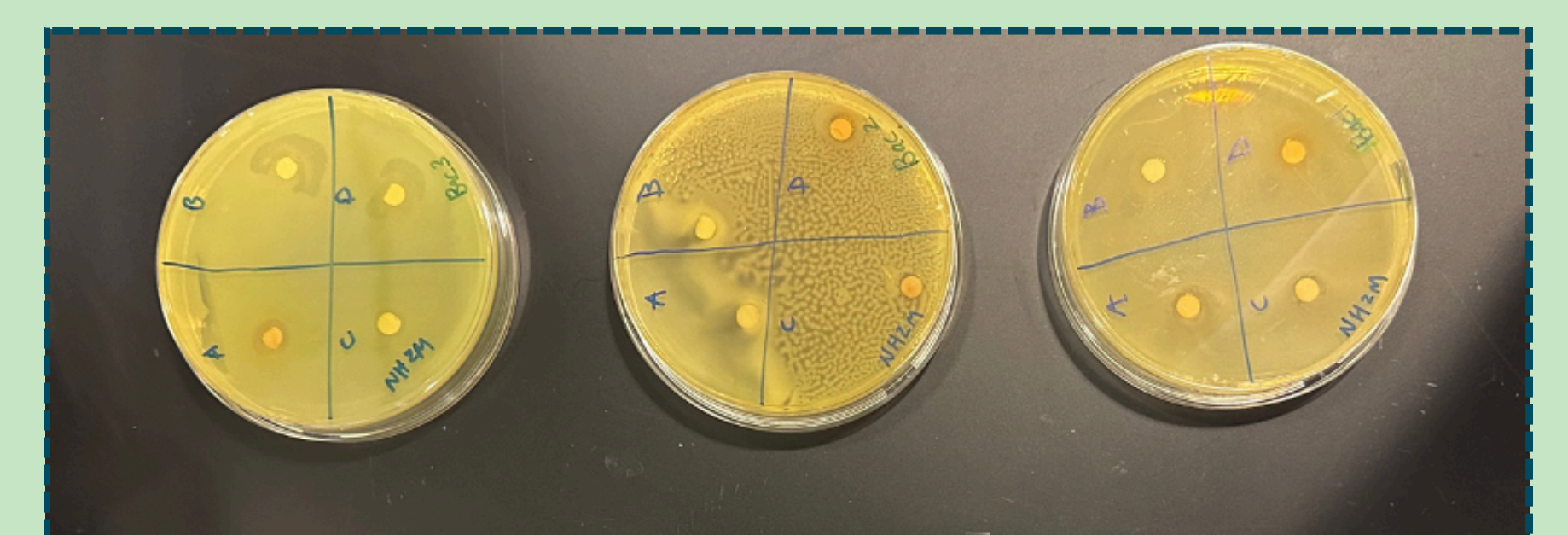
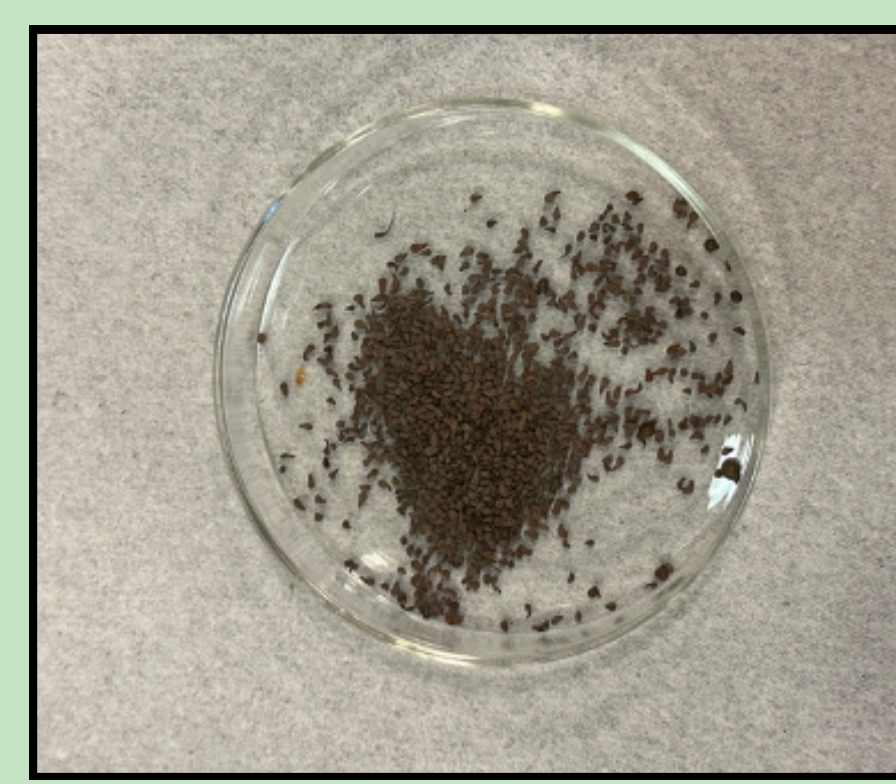
Sample	λ	Absorbance
Alizarine yellow	352	1.32
AY + NaBH ₄	355	0.97
AY + NaBH ₄ + beads	354	0.9
15 min	353	0.81
30 min	351	0.6
45 min	350	0.6
60 min	350	0.55
24 hrs	351	0.34

Sample	λ	Absorbance
Methyl Orange	465	3.43
MO + NaBH ₄	463	2.89
MO + NaBH ₄ + beads	465	2.15
15 min	466	0.208
30 min	469	0.150
45 min	464	0.12
60 min	465	0.1

CONCLUSION

IN THIS STUDY, WE HAVE DEVELOPED STABLE SILVER NANOPARTICLES USING THE PEELS OF MANGOSTEEN FRUIT. THIS FRUIT PEEL CONTAINS SEVERAL PHYTOCHEMICALS INCLUDING FLAVONOIDS AND POLYPHENOLS (PHENOLIC COMPOUNDS). THESE PHYTOCHEMICALS POSSESS ANTI-AGING, ANTIOXIDANT AND CYTOPROTECTIVE PROPERTIES. THE FORMATION OF NANOPARTICLES WAS CONFIRMED BY THE CHARACTERISTIC SURFACE PLASMON RESONANCE PEAK AT AROUND 400 NM.

THE SYNTHESIZED NANOPARTICLES WAS ENCAPSULATED IN SODIUM ALGINATE BEADS BY A SINGLE STEP METHOD BY IONOTROPIC CROSSLINKING USING CALCIUM CHLORIDE (5 WT%). THE RESULTING BEADS WERE COMPACT AND POROUS. THE PHOTOCATALYTIC PROPERTIES OF THE BEADS WAS EVALUATED USING VARIOUS TOXIC DYES SUCH AS CONGO RED, METHYLENE BLUE, ALIZARIN YELLOW AND METHYL ORANGE BOTH IN THE PRESENCE AND ABSENCE OF SOLAR RADIATION.



BAC 1: E. COLI
BAC 2: SALMONELLA
BAC 3: P. AERUGINOSA

A = EXTRACT (CONTROL)
B = MS1
C = MS2
D = MS3 III (200 NAOH)
E = MS3 (30 NAOH)
F = MS4
G = MS5
H = CR + NABH₄ + BEADS (W/ AG NP)