

SYNTHESIS OF SILVER NANOPARTICLES FROM *SYZYGium SAMAGENSE* FLOWER EXTRACT

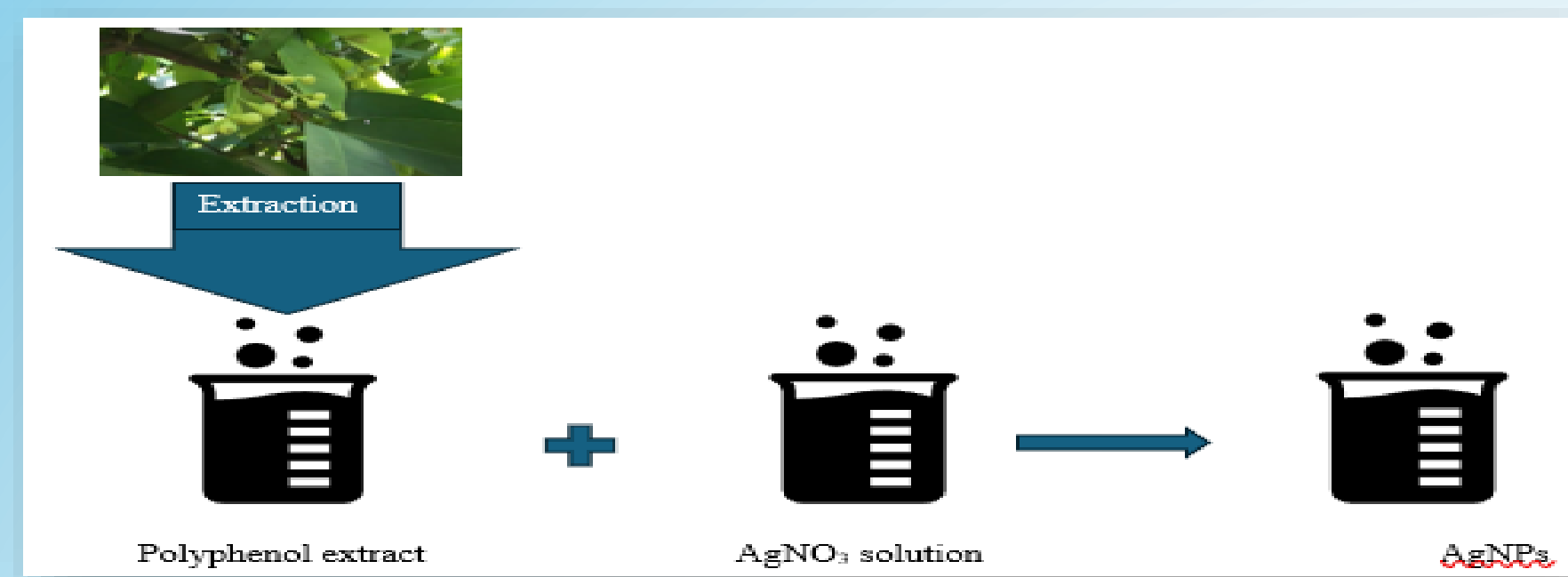
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INTRODUCTION

Nanosilver particles are very rich potential in many fields such as biomedical, drug delivery, water treatment, and agriculture. This study focused on formulating silver nanoparticles using polyphenols in An Phuoc plum (*Syzygium Samagense*) extracts as the reducing agent.

An Phuoc plum is a popular fruit in many provinces of South Vietnam. To ensure the quality of the fruit, about 80% of flower buds will be cut off during cultivation. In general, the amount of discarded plum blossom buds is 2 - 5 kg depending on the age of the tree and can become an environmental threat.

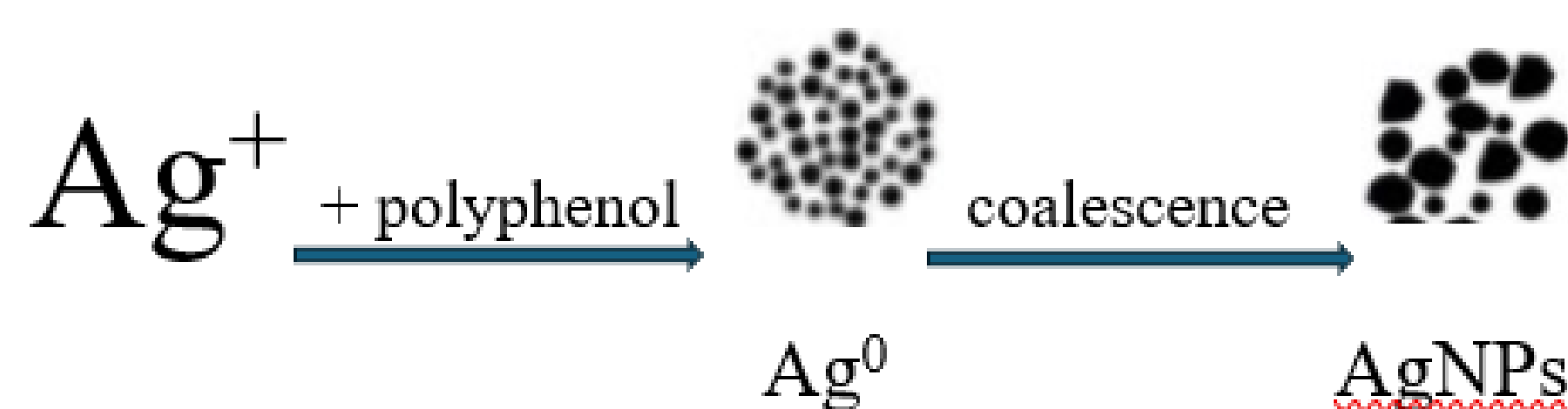


METHODS

Plum blossom buds were dried for adding distilled water and incubated in a temperature at 80°C => polyphenol extract solution.

Total polyphenol content in plum blossom buds extract was determined based on TCVN 9745-1:2013.

Put 2ml of polyphenol extract and 30ml of 2mM AgNO₃ -> magnetic stirrer, heated at 70°C for 15 minutes -> synthesized silver nanoparticles.



RESULTS

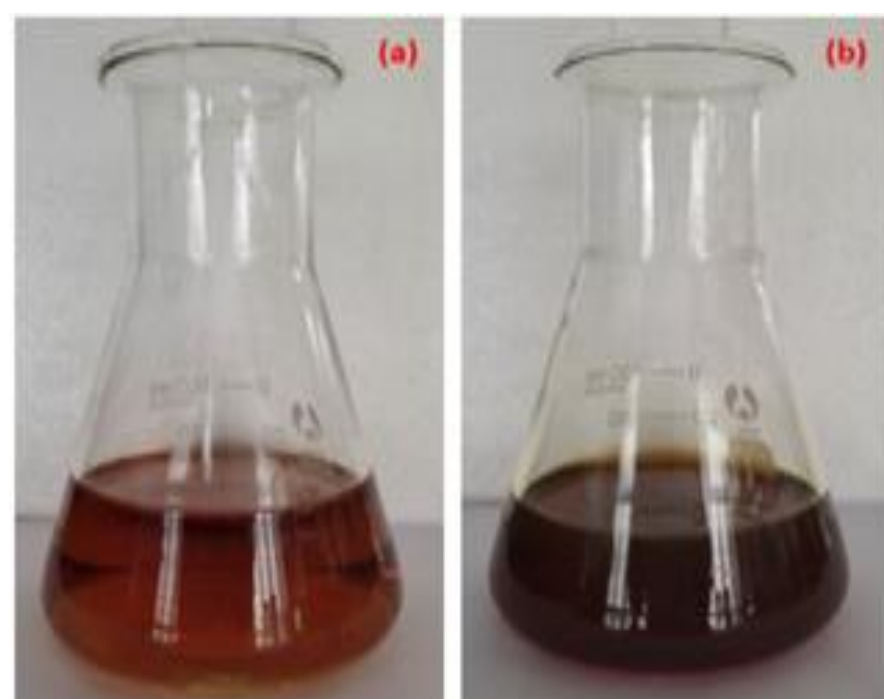


Fig 1. (a) Polyphenol extract solution, (b) Silver nano solution

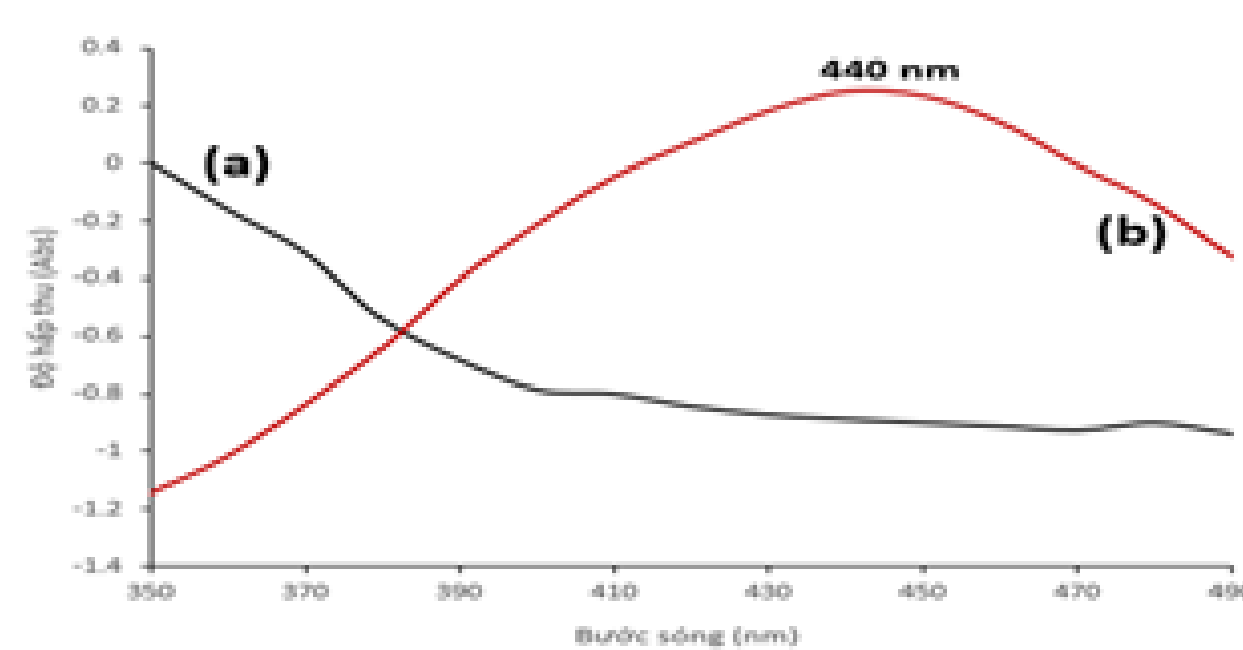


Fig 2. (a) UV-vis spectrum of polyphenol extract, (b) UV-vis spectrum of silver nano solution

The total polyphenol content (P_T) in plum blossom extract was 1.71 mgGAE/mL (calculated by the volume of extract).

Before reacting with the silver nitrate solution, the color of the plum bud extract was orange-yellow (**Fig 1a**) and no maximum absorbance peak was detected in the UV-Vis spectrum in the 350-490 nm region (**Fig 2**).

After the reaction (70 °C for 15 minutes), the color of the plum blossom extract and AgNO₃ mixture was converted to a dark brown (**Fig 1b**). Besides, a maximum absorption peak of the solution was recognized around 440 ± 15.1 nm (**Fig 2**). This absorbance peak showed a high similarity with the characterized peak of silver nanoparticles.

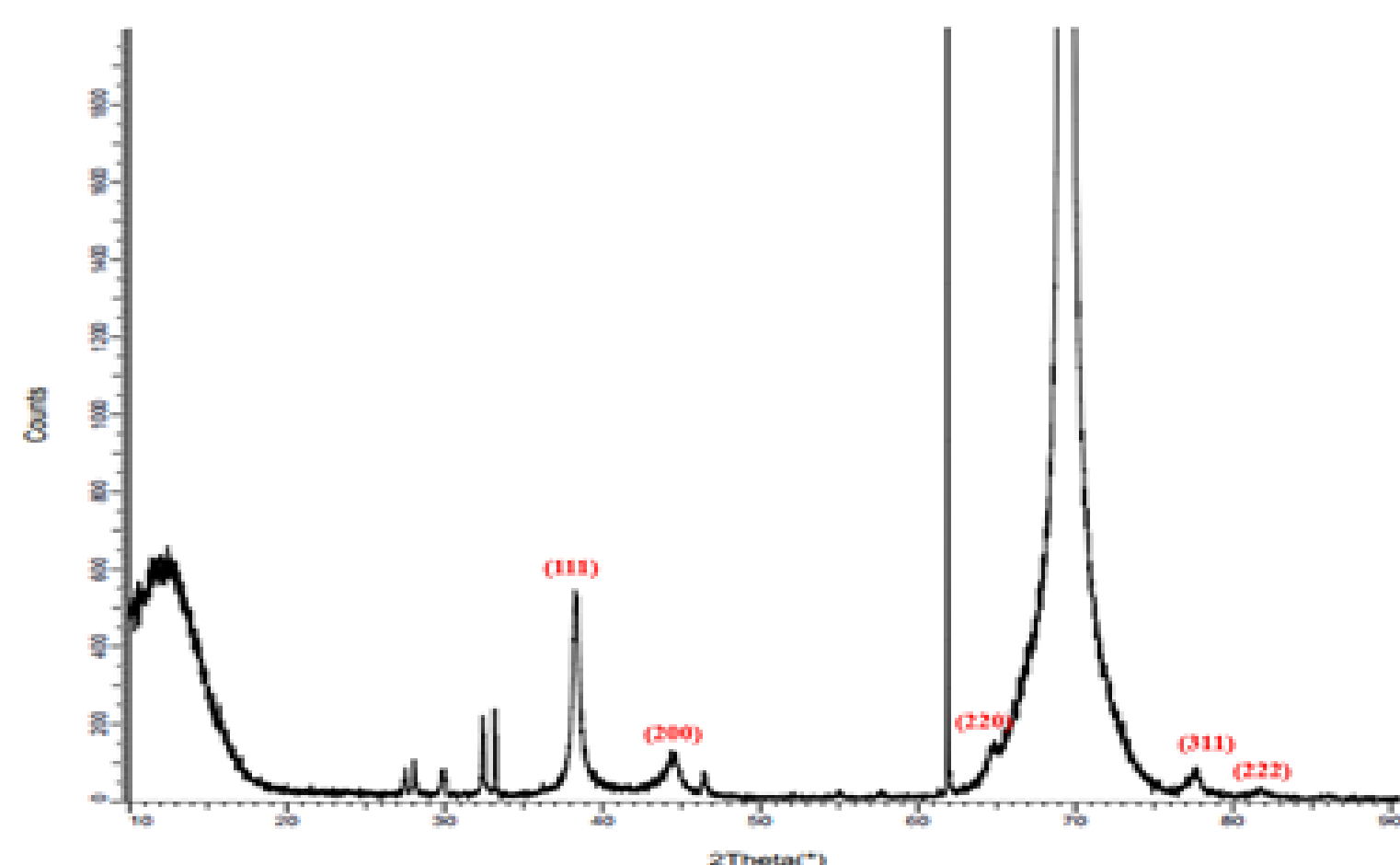


Fig 3. X-ray diffraction (XRD) spectra of silver nanoparticles

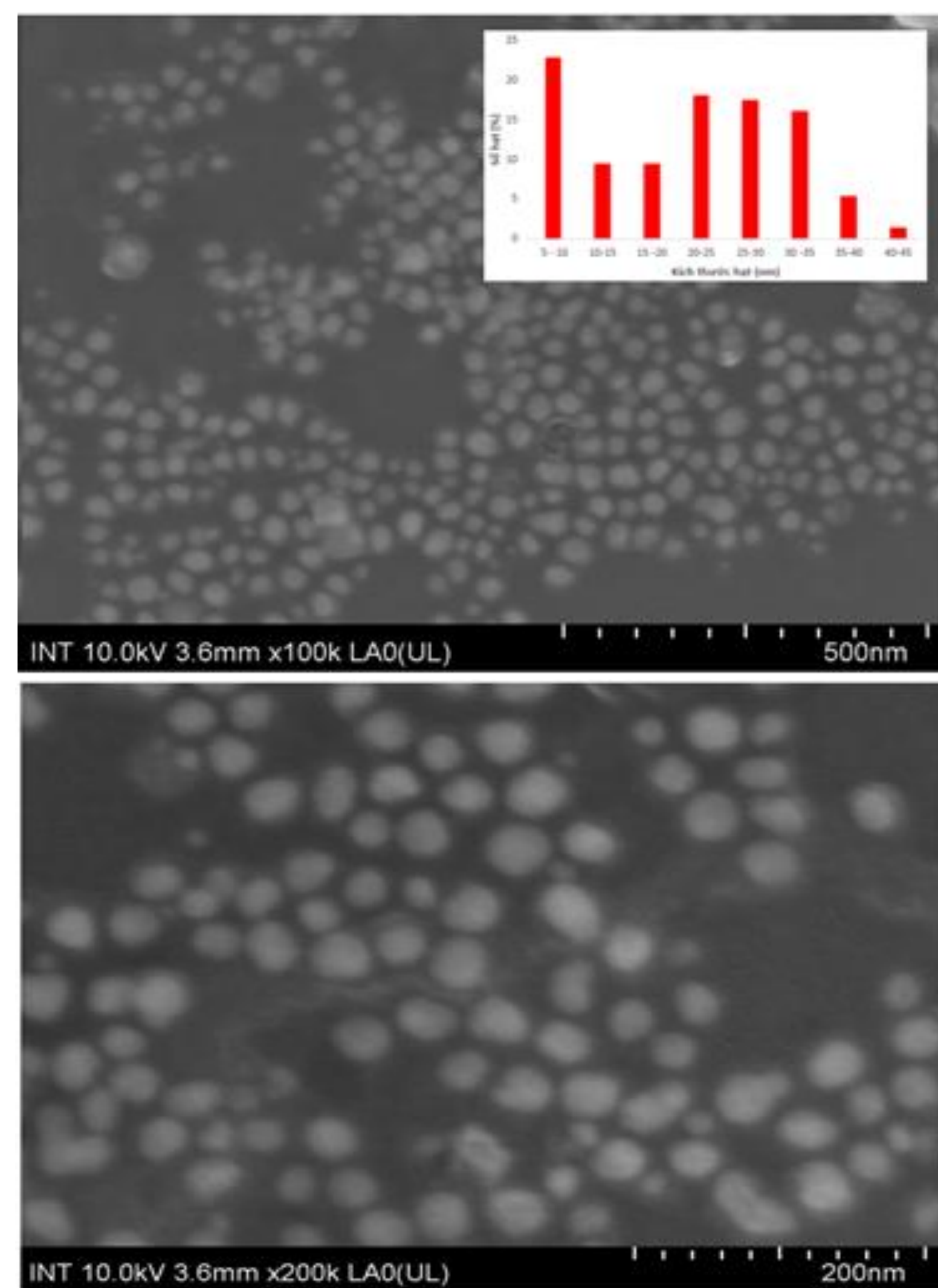


Fig 4. FE-SEM image of silver nano solution.

The X-ray diffraction spectrum recognized 5 strong peaks at 2θ values of 38.29°, 44.26°, 64.88°, 77.66°, and 81.7° respectively (**Fig 3**). These XRD peaks were characterized for the lattice constants of (111), (200), (220), (311), and (222) (**Fig 3**). This result was in line with the finding of UV-Vis data (**Fig 2**) and confirmed the existence of pure silver crystals with a face-centered cubic lattice.

The FE-SEM analysis (**Fig 4**), obtained silver nanoparticles were uniformly distributed and their average size was in the range of 20-35 nm.

CONCLUSION

The polyphenol content (360 mgGAE/g raw material) was extracted in An Phuoc plum blossom buds.

Successfully synthesized nano silver (medium size 20nm) by green chemical was reduction method using An Phuoc plum blossom extract (*Syzygium Samarangense*).

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