Biosynthesis and Chemical Synthesis of NPs

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Biosynthesis of Au Nanoparticles

Experimental Procedures

A total of 0.5 L of home delivered milk was boiled, cooled and mixed with 10 mL of standard buttermilk, curdled at 27^{o} C for 24 h, and the whey was collected by coarse filtration (Whatman 40). All the reactions were done in the laboratory atmosphere in glass apparatus. The filtrate was pale yellow in appearance, and the pH was typically 4.4. The presence of lactic acid bacteria in the supernatant was ascertained with optical microscope. $HAuCl_4$ and $AgNO_3$ were purchased from Sigma Aldrich, with rated purity of 99%. To 5 mL of this solution taken in a test tube, 2 mg of $HAuCl_4$. $3H_2O$ was added and kept in the laboratory under ambient conditions. The solution became purple in about 12 h. A purple mass gets deposited at the bottom of the test tube after 24 h. Within 3 days, all of the gold containing material deposited, forming a violet film, and the solution became colorless. In the case of Ag, 1mg of $AgNO_3$ was added to 5 mL of whey and kept in the laboratory overnight. The solution became pale brown and after 2 days, precipitation was noticed.

Biosynthesis of magnetite Fe_3O_4

Experimental Procedures

Chemical Synthesis of magnetite Fe_3O_4

Experimental Procedures

4 mmol (0.65g) of $FeCl_3$ and 2 mmol (0.12g) or iron powder were added to the hexane solution (20 mL) containing 32.4 mmol (6.0g) of dodecylamine and 12 mmol (3.5 mL) of oleic acid at room temperature. The resulting mixture was transferred into a 60 mL Teflon-lined stainless-steel autoclave. The autoclave was sealed and maintained in an electric oven at 180^{o}C for 24 h and then cooled to room temperature naturally. The product was washed with absolute ethanol several times followed by centrifugation (1500 rpm for 5mn) and finally dried in a vacuum at 60oC for 8 h.

Biosynthesis of Gold Nanoparticles in the presence of plants

- **Moringa**
- **Calotropis**

Biosynthesis of Gold Nanoparticles in the presence of bacteria

- **Bacillus Megaterium**

Biosynthesis of Gold Nanoparticles in the presence of dye

Preliminary Results

UV-vis spectroscopic analyses were performed on all the biosynthesized gold nanoparticles samples which revealed a 514-515nm λmax. SEM analyses were also performed on a few samples prepared in the presence of plants including Calotropis, B2, Moringa… See SEM appendices as well as chemical composition of these nanoparticles. TEM analyses of these samples will be performed in Princeton.