

Biological Synthesis of Metal Nanoparticles Using Plant Leaf Extracts and Their Application

송재용, 김범수*
충북대학교 화학공학과
(bskim@chungbuk.ac.kr*)

Five plant leaf extracts (Pine, Persimmon, Ginkgo, Magnolia and Platanus) were used and compared for their extracellular synthesis of metal nanoparticles. Stable silver, gold and platinum nanoparticles were formed by treating aqueous solution of AgNO_3 , HAuCl_4 and $\text{H}_2\text{PtCl}_6 \cdot 6\text{H}_2\text{O}$, respectively, with the plant leaf extracts as reducing agent. Only 11 and 3 min were required for more than 90% conversion to silver and gold nanoparticles, respectively, at the reaction temperature of 95 °C using Magnolia leaf broth. The silver nanoparticles are relatively spherical and uniform, while mixture of triangles, pentagons, hexagons, and spheres are obtained with gold nanoparticles. Particles size could be controlled by changing temperature and composition of the reaction mixture. As possible ecofriendly alternatives to chemical and physical methods, biologically synthesized nanoparticles using plant extracts may have applications in various human body-contacting areas. We tested antibacterial activities of natural latex foam products treated with silver nanoparticles which was biologically synthesized. The growth of *Escherichia coli* in shake flask culture was significantly suppressed by treatment of silver nanoparticles.