The silver nanoparticles are well known for their unique electronic, catalytic and optical properties. These nanoparticles are often synthesized by chemical reduction, electrochemical, reverse micelles and other routes that use toxic chemical agents. The approach is to use plant extract because it contains organic molecules that can to reduce silver ions and stabilize nanoparticles, is eco-friendly, economical and does not produce hazard residues. But the effect of experimental conditions for biosynthesis are rarely not studied like contribution of different conditions. For this reason, in this investigation were evaluated some conditions like pH, temperature and volumetric ratio of silver nitrate solution/extract using Taguchi methodology, a robust experimental design for optimization of process, on biosynthesis of silver nanoparticles by *Tagetes lucida* Cav. flowers extract. The response variables were max absorbance wavelength and FMWH of UV/Vis spectra because the size and distribution have effect on Surface Plasmon Resonance (SPR). The biosynthesized silver nanoparticles in optimal conditions were characterized by Scanning Electron Microscopy (SEM) and Fourier Transform Infrared Spectroscopy (FTIR). The main effects showed the optimal condition are 1:9 (Extract:AgNO₃), pH = 10 and temperature of 60°C . The UV-Vis spectra had the lowest max absorbance wavelength and narrower FMWH, 409 nm and 80 nm, respectively. The micrographs demonstrated like sphered particles shape.

**Keywords:** silver nanoparticles, *Tagetes lucida* Cav, biosynthesis

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