Alaa Y. Ghidan et al., Madridge J Nanotechnol Nanosci. 2018
http://dx.doi.org/10.18689/2638-2075.a3.002

3rd International
Nanotechnology Conference & Expo
May 7-9, 2018 Rome, Italy

Green Synthesis of Magnesium Oxide MgONPs Nanoparticles Using *Chamaemelum nobile* Flowers Extract: Effect on the Green Peach Aphid

Alaa Y. Ghidan[1]*, Tawfiq M. Al-Antary[1] and Akl M. Awwad[2]
[1]Department of Plant Protection, School of Agriculture, The University of Jordan, Jordan
[2]Department of Material Science, Royal Scientific Society, Jordan

Green Synthesis approach has been adopted to synthesize magnesium oxide (MgONPs) nanoparticles using *Chamaemelum nobile* flowers aqueous extract in one-pot reaction. The synthesized magnesium hydroxide and oxide nanoparticles were characterized by X-ray diffraction (XRD), Fourier transform infrared (FT-IR), Scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS). The Scanning electron microscopy (SEM) micrographs of synthesized MgONPs showed the smooth surface and random arrangement of MgO nanoflakes with an average thickness of less than 10 nm with an average size of 20–40 nm. Formation of MgO mesoporous structure can be attributed to the presence of *C. nobile* flowers on the surface of nanoflakes. The highest mortality percent (%) of 1st and 2nd nymphal instars of the grren peach aphid was at 8000 (µg/ml) concentration of MgONPs. It was 86% after 24 hrs, and then reached 88% after 48 and 100% after 72 hours, while mortality increased at 4000 (µg/ml) concentration and reached 86 after 48 hrs and 100% after 72 hrs. The lowest mortality was at using 250 (µg/ml) after 24 hrs then increased to 49 and 88% after 48 and 72 hrs, respectively. The mortalities in case of control were significantly the least after 24, 48 and 72 hrs compared with the other treatments. While the highest mortality% of 3rd and 4th nymphal instars of the green peach was at 8000 (µg/ml) concentration of MgONPs. It was 78% after 24 hrs, and then reached 83, 98% after 48 and 72 hrs, respectively. While mortality at 4000 (µg/ml) concentration and reached 81, 97% after 48 and 72 hrs, respectively. The lowest mortality was at 250 (µg/ml) after 24 hr then increased to 41 and 87% after 48 and 72 hrs, respectively.

Keywords: Green synthesis, Magnesium oxide nanoparticles, *Chamaemelum nobile* flowers extract, Green peach aphid, Mortality.

Biography:

The presenter Alaa Y. Ghidan, the PhD at The Jordan University, and she has six publications about the same field of nanotechnology, synthesis as an eco-friendly method.

References

Pilarska, A., Wysokowski, M., Markiewicz, E., Jesionowski, T. Synthesis of magnesium hydroxide and its calcinates by a precipitation method with the use of magnesium sulfate and poly (ethylene glycols).Powder Technology 235 (2013)148-157.

Sierra-Fernandez, A., Gomez –villalba, L.S., Munoz, L, Flores, G., Rafael Fort, R., Rabanal, M.E. Effect of temperature and reaction time of the synthesis of nanocrystallinebrucite. International Journal of modern manufacturing Technology VI (2014)50-54.

Shen, H., Liu, Y., Song, B. Prepaation and characterization of magnesium hydroxed nanoparticles in a novel impinging strem-rotating packed bed reactor. Journal of Chemical Engineering of Japin49(2016)372-378.

Shin, H., YozhiLiu, Y. In situ synthesis of hydrophobic magnesium hydroxide nanoparticles in a novel impinging stream-rotating packed bed reactor. Chinese Journal of Chemical Engineering 24(2016)1306-1312. http://dx. Doi.org/10.1016/j.cjche.2016.07.012

Song.X., Sun, S., Zhang, D., Wang, J., Yu, J.Synthesis and characterization of magnesium hydroxide by batch reaction crystallization. Frontiers of Chemical Science and Engineering 5(2011)416-421.

Tai, C.Y., Tai, C-T., Chang, M-H., and Li, H-S.Synthesis of magnesium hydroxide and oxide nanoparticles using a spinning disk reactor. Ind. Eng. Chem. Res., 46 (2007)5536-5541.

Zhou, W., Qiao, X., Zhang, L., Guo, J., Zheng, J. Synthesis and hemolytic activity of magnesium hydroxide nanoparticles. Advanced Materials Research 971-973(2014)228-231.

Yan, H., Zhang, X-h., Wu, j-m., wei L-q., Liu, X-g., Xg., B-s

The use of CTAB to improve the crystallinity and dispersibility of ultrafine magnesium hydroxide by hydrothermal route. Powder Technology 188(2008)128-132.

Yousefi, M. A fast method for synthesis magnesium hydroxide nanoparticles, thermal stable and flame retardant poly vinyl alcohol nanocomposite.Journal of nanostructures 4(2014)383-388.

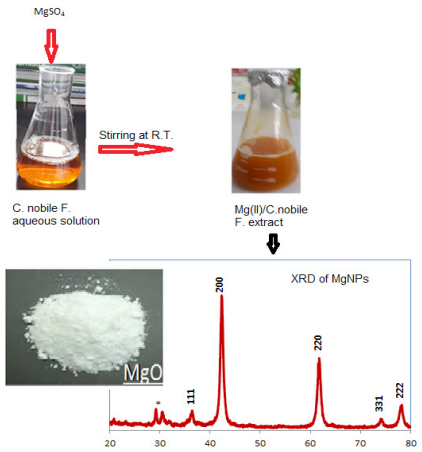

Figure 1. Graphical abstract of synthesis magnesium oxide nanoparticles.