International Journal of Pharmacology, Phytochemistry and Ethnomedicine *Online: 2015-12-02*
ISSN: 2297-6922, Vol. 1, pp 1-4
doi:10.18052/www.scipress.com/IJPPE.1.1

Nano particles as new disinfectan In *Moringa oleifera*

Nabeel K. Al-Ani*, Asma G. Oriabi*, Enas S.Bahjat

Department of Biotechnology, College of Science University of Al-Nahrain Baghdad, Iraq.

Corresponding address: nklani54@yahoo.com

Mobile: 00 964 7901743509

Keywords: nanoparticles, Moringa oleifera, disinfectant, in vitro.

ABSTRACT. Contamination is a big problem in *in vitro* cultures, especially in woody plants. In this paper, different sterilization material been used to compare their efficiency in sterilization with Nanoparticles. Silver and copper Nanoparticles had been widely used in many fields. Plants in vitro rarely get used with nanoparticles. Silver &Cupper nanoparticles had used in many concentrations. It was clear that using these particles have a good benefit to get clean cultures, even with high concentrations. This paper gives us clear idea to use silver Nanoparticles as alternative cleaning solution.

1. INTRODUCTION

It has been noted that infection for *in vitro* plants is big problem in micropropagation, and chemical available to control these contaminations, but the efficiency of these chemical are either limited or toxic. Antibiotics are also used in controlling internal bacterial contaminations [1]. However, they may affect the growth and response of explants and may induce resistance in bacteria. Therefore, they not recommended for using in plant tissue culture techniques[1]. Mercury chloride ($HgCL_2$) has been widely used to control infections in explants. $HgCL_2$ is very toxic and to be used with high cautions [2]. Such chemicals are not only toxic for the explants and peoples working in this field but they may affect the environment. Therefore, finding an effective and safe substance for decontaminated of explants is very important, and that is what this paper aim to.

The term Nano-technology was first used by Japanese scientist "Taniguchi" at the University of Japan[3] .

Nano-agriculture involves the employment of nano-particles in agriculture with the ambition that these particles will impart some beneficial effects to the crops. Recently, confocal fluorescence image studies have revealed the capacity of single walled carbon nanotubes (SWNTs) to traverse across both the plant cell wall and cell membrane[4]. The study also pointed out that SWNTs can serve as effective nanotransporters to deliver DNA and small dye molecules into intact plant cells. There are also some reports on other nanoparticles as smart treatment- delivery systems in plants[4].

Nano – silver is new and non – toxic material which shows high capabilities in decontamination of microorganisms, e.g. fungus, bacteria, and viruses. The detrimental effects of this chemical have been shown more than 600 microorganisms [5]. This capability of nano-silver is due to release of tiny particles of silver so it is able to destroy not only bacteria, fungus but also the viruses [6].

Because of complexity in producing chemical silver Nano particles, there is a new adventure to produce these particles from plants using leaves such as *Euophorbia hirta[7] .Aloe vera* [8]and geranium[9] are plants which had been used intensively.

2. MATERIAL AND METHODS

Types and media preparation:

MS medium were prepared by dissolving 4.1g/l from a readymade sachets MS medium. After dissolving, this medium supplemented with 30g/l sugar, 8g/l Agar . The whole media were sterilized in autoclave at 121 °C for 15 minutes [10],[11]. Nanoperticles for silver and copper were imported from NANO pars SPADANA Technology. The concentration was 4000mg/l for silver

Nanoparticles and 800 mg/l for cupper respectively. The preparation of green silver particles was as follow:

Explants sterilization:

5Cm Stem cutting of *Moringa oleifera* Lam (Moringaceae) , were sterilized in three different concentrations of :

1. 0.5,0.75,1.0,2.o % of $NAOCL_2$. Then, washed three times in sterilized distilled water 5 minutes each time.
2. Same concentration was used with cupper and silver nanoparticles . Then,the samples washed three times in sterilized distilled water 5 minutes each time.

1CM of sterilized stem was cultured on prepared medium. Ten replicates were used each treatment. The results collected after 10 days in culture.

3. RESULT AND DISCUSSION

In the first experiment, the segments sterilized with NaOcl2 with different concentrations. All the samples were contaminated except with 2.0% about 75% were continued living. Figure 1 below explain these results:

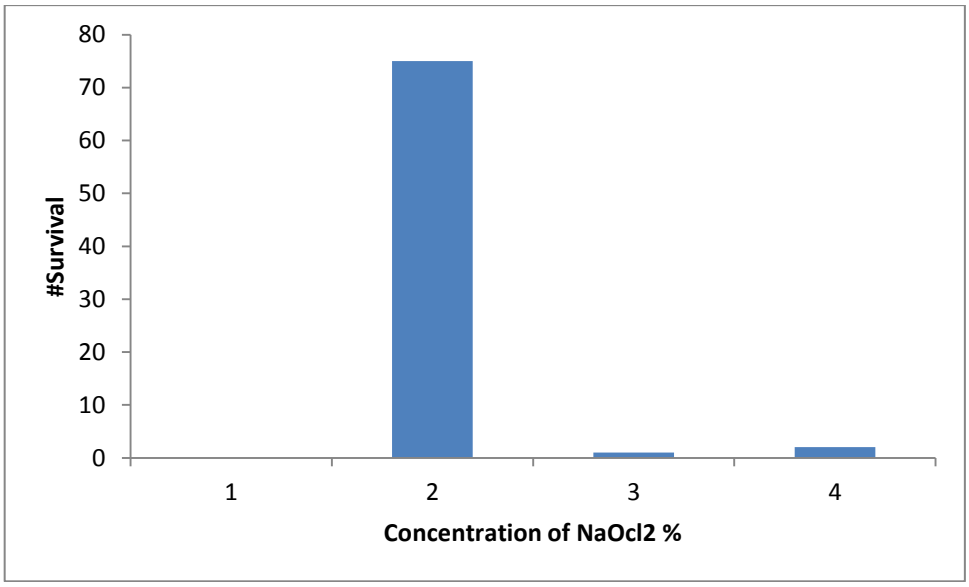

Fig. 1. The percentage of survival in different concentration of NaOCL2.

The above result expected as less than 2% the concentrations were very low and above 2% they were toxic.

In the second experiment, different concentrations of cupper nanoparticles used. The results was in figure 2 .

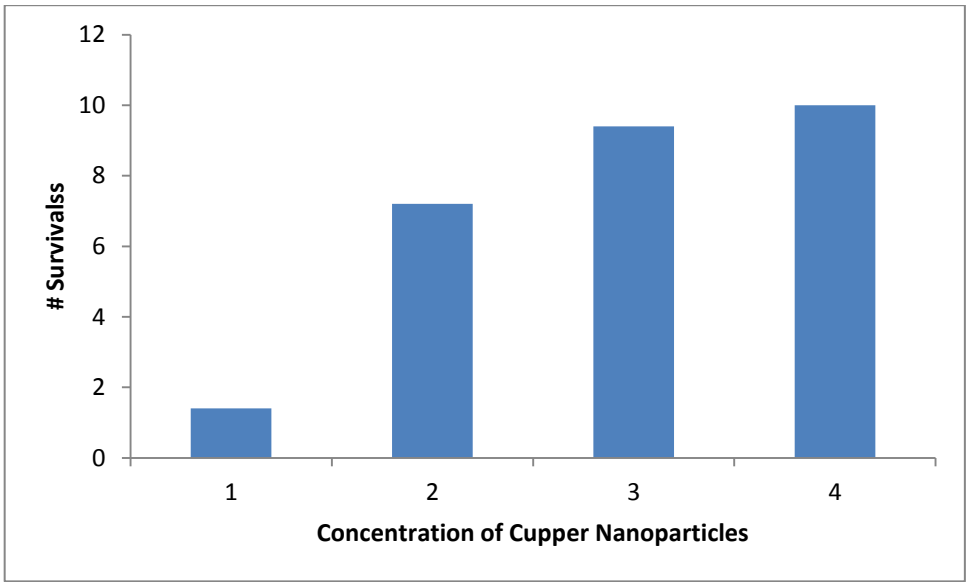

Fig. 2. The percentage of survival in different concentration of cupper Nanoparticles.

Cupper nanoparticles found to be very efficient in different concentrations. Nevertheless, the silver nanoparticles was effective also as in Figure 3 below

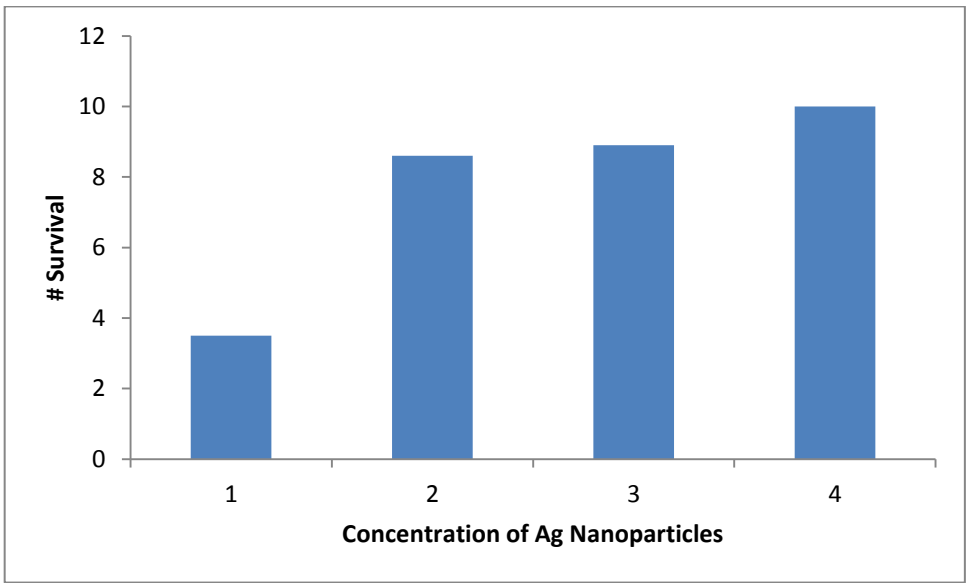

Fig. 3. The percentage of survival in different concentration of silver Nanoparticles

It is well know that silver has an advantages for plant cells [10-13].However, cupper especially in high concentrations may be toxic to the plants [14]

4. REFERENCES

[1] Dabai, Y., A. Arzai, and S. Muhammad, In vitro antibacterial activity of single and combined antibiotics on bone bacteria isolate. Pak. J. Biol. Sci, 2007. **6**: p. 1-3.
[2] Cassells, A.C., Pathogen and microbial contamination management in micropropagation—an overview. 1997: Springer.
[3] Taniguchi, N., On the basic concept of nano-technology Proceedings of the International Conference on Production Engineering Tokyo Part II Japan Society of Precision Engineering. 1974.
[4] LQCBW Q, XZLJ F., Nano let.9,1007. 2009.

[5] Abdi G.Salehi H.and Khosh-khuri , M., A novel nanomaterial for removal of Bacterial contamination in Valerian (V.officinalis) tissue culture. Acta physiol.plant 2008. **.30**: p. 709-714.
[6] Sondi, I. and B. Salopek-Sondi, Silver nanoparticles as antimicrobial agent: a case study on E. coli as a model for Gram-negative bacteria. Journal of colloid and interface science, 2004. **275**(1): p. 177-182.
[7] Elumalai, E., et al., Green synthesis of silver nanoparticle using Euphorbia hirta L and their antifungal activities. Archives of Applied Science Research, 2010. **2**(6): p. 76-81.
[8] Chandran, S.P., et al., Synthesis of gold nanotriangles and silver nanoparticles using Aloevera plant extract. Biotechnology progress, 2006. **22**(2): p. 577-583.
[9] Shankar, S.S., A. Ahmad, and M. Sastry, Geranium leaf assisted biosynthesis of silver nanoparticles. Biotechnology progress, 2003. **19**(6): p. 1627-1631.
[10] Ghosh, S., et al., Synthesis of silver nanoparticles using Dioscorea bulbifera tuber extract and evaluation of its synergistic potential in combination with antimicrobial agents. International journal of nanomedicine, 2012. **7**: p. 483.
[11] Birla, S., et al., Fabrication of silver nanoparticles by Phoma glomerata and its combined effect against Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus. Letters in Applied Microbiology, 2009. **48**(2): p. 173-179.
[12] Kim, J.S., et al., Antimicrobial effects of silver nanoparticles. Nanomedicine: Nanotechnology, Biology and Medicine, 2007. **3**(1): p. 95-101.
[13] Rai, M., A. Yadav, and A. Gade, Silver nanoparticles as a new generation of antimicrobials. Biotechnology advances, 2009. **27**(1): p. 76-83.
[14] Ren, G., et al., Characterisation of copper oxide nanoparticles for antimicrobial applications. International journal of antimicrobial agents, 2009. **33**(6): p. 587-590.