

An investigation of Anti-cancer activity of *Moringa oleifera* leaves

Eman N. Ali^{1*}, and Nazik Musa²

¹Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, Malaysia

²Department of Pharmacognosy, Omdurman Islamic University, Sudan

*Corresponding Author: eman@ump.edu.my

Abstract

Moringa oleifera have been called a “Miracle tree” for its variety uses of all parts of the tree (seeds, leaves, fruits, roots, bark). Many researchers have reported that *Moringa oleifera* plant can be considered for a balanced nutrition for population, it is used in many countries at tropical and subtropical belt as a daily food and medicine. It is used as antifungal, anti-skin disease agent. The fruits are potential anti-inflammatory phenolic glycosides. Leaves were reported as good anti-oxidant. The seeds and stem bark showed antioxidant activity as well. In addition, *Moringa oleifera* seeds can be used as anti-tumor. Experimental work of other researchers emphasized on the presence of anti-cancer compounds in the seeds. *Moringa oleifera* leaves extract has potential as anti-cancer too. To investigate the anti-cancer ability of *Moringa oleifera* leaves, the brine shrimp lethality assay is considered a useful tool for preliminary assessment of toxicity. It has also been suggested for screening pharmacological activities in plant extracts. Therefore, this preliminary study was carried out to investigate the brine shrimp lethality by *Moringa oleifera* leaves. The results showed that the *Moringa oleifera* leaves can be considered as anti-cancer agent. The fresh leaves were grinded and applied to brine shrimp to be evaluated in the lethality test of brine shrimp. Toxicities of extract were tested at different dose of 5, 10, 15, and 20 mg of *Moringa oleifera* leaves. The survivors of brine shrimp were counted during 24 h. A parallel series of tests with the standard potassium dichromate solution (positive control) and the blank control were conducted. The lethality was 100% during 18 hrs using 10 mg *Moringa oleifera* leaves. It is encouraging results to do further studies for considering *Moringa oleifera* leaves as anti-cancer daily basis nutrition.

Keywords: *Moringa oleifera*, anti-cancer, brine shrimp bioassay.

Introduction

Moringa oleifera have been called a “Miracle tree” for its variety uses of all parts of the tree (seeds, leaves, fruits, roots, bark). Many researchers have reported that *Moringa oleifera* plant can be considered for a balanced nutrition for population, it is used in many countries at tropical and subtropical belt as a daily food and medicine. Yameoga et al., (2011) reported that *Moringa oleifera* plant can be considered for a balanced nutrition for population, it is used in many countries at tropical and subtropical belt as a daily food and medicine. It is used as antifungal (Ping-Hsien et al., 2007) and anti-skin disease agent. Cheenpracha et al., (2010) reported that the fruits are potential anti-inflammatory phenolic glycosides. Leaves was reported as good anti-oxidant (Chumark et al., 2008; Verma et al., 2009; Siddiq et al., 2005; Moyo et al., 2012; Iqbal & Bhanger, 2006; Vongsak et al., 2013; Qwele et al., 2013). The seeds showed antioxidant activity

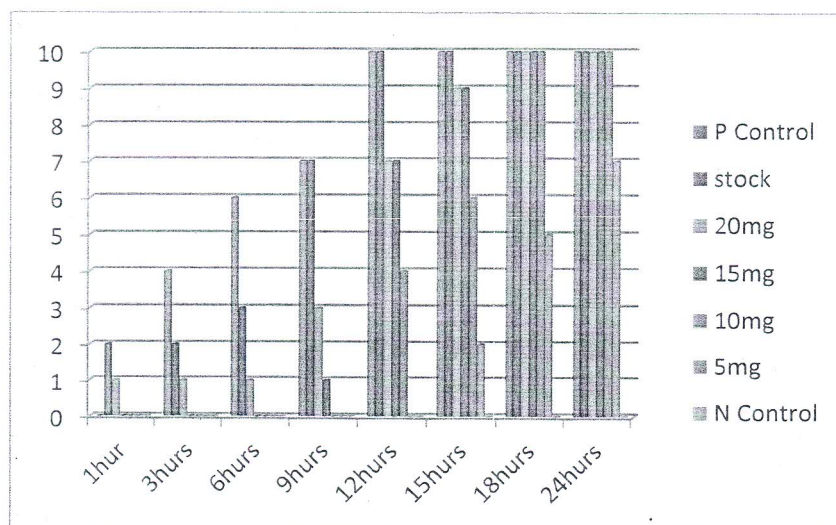


Figure 1, lethality results by brine shrimp.

Conclusion:

It can be concluded from this study that *Moringa oleifera* leaves is a potential solution as natural anti-cancer. Further studies can be carried out to understand the mechanism of the activity against cancer cells to recommend it as anti-cancer agent before commercialization.

Acknowledgment

The author would like to thank Research & Innovation department/ Universiti Malaysia Pahang/ Malaysia, for financial support for this research work and publication of this paper under grant #: **RDU 110386**.

References

Baravalia Y., Vaghasiya Y., and Chanda S (2012). Brine Shrimp Cytotoxicity, Anti-inflammatory and Analgesic Properties of *Woodfodia fruticosa* Kurz Flowers. Iranian Journal of Pharmaceutical Research 11 (3), pp. 851-861.

Carballo J., Hernandez-Inda Z.L., Perez P., and Garcia-Gravalos M. (2002). A comparison between two brine shrimp assays to detect *in vitro* cytotoxicity in marine natural products. DOI: 10.1186/1472-6750-2-17. <http://www.biomedcentral.com/1472-6750-2-17>.

Cheenpracha S., Park E.J., Yoshida W. Y., Barit C., Wall M., Pezzuto J. M., and Chang L. C. (2010). Potential anti-inflammatory phenolic glycosides from the medicinal plant *Moringa oleifera* fruits. Journal of Bioorganic & Medicinal Chemistry 18: 6598-6602.

Chumark P., Khunawat P., Sanvarinda Y., Phornchirasilp S., Morales N. P., Phivthong-ngam L., Ratanachamngong P., Srisawat S., and Pongrapeeporn K. S. (2008). The *in vitro* and *ex vivo* antioxidant properties, hypolipidaemic and antiatherosclerotic activities of water extract of *Moringa oleifera* Lam. leaves. Journal of Ethnopharmacology 116: 439-446.

- Costa-Lotufo L.V., Khan M. T. H., Ather A., Wilke D. V., Jimenez P. C., Pessoa C., Amaral de Moraes M. E., and Odorico de Moraes M. (2005). Studies of anticancer potential of plants used in Bangladeshi folk medicine. *Journal of Ethnopharmacology* 99, pp. 21-30.
- Guevara A. P., Vargas C., Sakurai H., Fujiwara Y., Hashimoto K., Maoka T., Kozuka M., Ito Y., Tokuda H., and Nishini H. (1999). An antitumor promoter from *Moringa oleifera* Lam. *Mutation Research* 440, pp. 181-188.
- Iqbal S., and Bhangar M.I. (2006). Effect of season and production location on antioxidant activity of *Moringa oleifera* leaves grown in Pakistan. *Journal of Food Composition and Analysis*, 19: 544-551.
- Khaled, A.T. (2006). Cytotoxicity Evaluation of Jordanian Wild Plants using Brine Shrimp Lethality Test. *J. J. Appl. Sci.* Vol. 8, No. 1, 12-17.
- Kumbhare MR., Guleha V., and Sivakumar T (2012). Estimation of total phenolic content, cytotoxicity and *in-vitro* antioxidant activity of stem bark of *Moringa oleifera*. *Asian Pacific Journal of Tropical Disease*, pp. 144-150.
- Moyo B., Oyedemi S.O., Masika P.J., and Muchenje V. (2012). Polyphenolic content and antioxidant properties of *Moringa oleifera* leaf extracts and enzymatic activity of liver from goats supplemented with *Moringa oleifera* leaves/ sunflower seed cake. *Journal of Meat Science* 91, pp. 441-447.
- Ping-Hsien, C., Chi-Wei, L., Jia-Ying, C., Murugan, M., Bor-Jinn, S., and Hueih-Min, C. (2007). Anti-fungal activity of crude extracts and essential oil of *Moringa oleifera* Lam. *Bioresource Technology*, 98, 232-236.
- Pusapati, M. R., Santhipriya, T., Nagasri, S., Chowdary, Y.A., Pasumarthy, N.V.G (2012). Preliminary Phytochemical Screening and Antibacterial Activities of Ethanolic Extract of *Calotropis Procera* Flowers Against Human Pathogenic Strains. *Asian Journal of Pharmaceutical and Clinical Research* Vol 5, (3), 127-131.
- Qwele K., Hugo A., Oyedemi S.O., Moyo B., Masika P.J., and Muchenje V. (2013). Chemical composition, fatty acid content and antioxidant potential of meat from goats supplemented with *Moringa (Moringa oleifera)* leaves, sunflower cake and grass hay. *Journal of Meat Science* 93, pp. 455-462.
- Santos A.F.S., Argolo A.C.C., Coelho L.C.B.B., and Paiva P.M.G (2005). Detection of water soluble lectin and antioxidant component from *Moringa oleifera*. *Journal of Water Research* 39, pp. 975-980.
- Siddiq A., Anwar F., Manzoor M., and Fatima A. (2005). Antioxidant activity of Different Solvent Extracts of *Moringa oleifera* Leaves under Accelerated Storage of Sunflower Oil. *Asian Journal of Plant Sciences* 4 (6), pp. 630-635.

Sigaroodi F., Ahvazi M., Hadjiakhoondi A., Taghizadeh M., Yazdani D., Sigaroodi S., and Bidel S. (2012). Cytotoxicity and Antioxidant Activity of 23 Plant Species of Leguminosae. Iranian Journal of Pharmaceutical Research , 11 (1): 295-302.

SudhaKesavan S., Vijayalakshmi S., Nandhini S. U., Latha M. B., and Selvam M. M. (2011). Application of Brine Shrimp Bioassay for Screening Cytotoxic Actinomycetes. International Journal of Pharmacy and Pharmaceutical Science Research 1 (3): 104-107.

Sreelatha S., Jeyachitra A., and Padma P.R (2011). Antiproliferation and induction of apoptosis by *Moringa oleifera* leaf extract on human cancer cell. Journal of Food and Chemical Toxicology, 49, pp. 1270-1275.

Verma A.R., Vijayakumar M., Mathela C. S., and Rao C. V. (2009). *In vitro* and *in vivo* antioxidant properties of different fractions of *Moringa oleifera* Leaves. Journal of Food and Chemical Toxicology 47, pp. 2196-2201.

Vongsak B., Sithisarn P., Mangmool S., Thogpraditchote S., Wongkrajang Y., and Gritsanapan (2013). Maximizing total phenolics, total flavonoids contents and antioxidant activity of *Moringa oleifera* leaf extracts by the appropriate extraction method. Journal of Industrial Crops and Products, 44, pp. 566-571.

Yameoga C. W., Bengaly M. D., Savadogo A., Nikiema P. A., and Traore S. A. (2011). Determination on Chemical Composition and Nutritional Values of *Morniga oleifera* Leaves. Pakistan Journal of Nutrition 10 (3): 264-268.