

Effect of Dimethyl Sulphate on The Growth and Some Chemical Compositions of *Balanites aegyptiaca*, Delile

Gehan, G. Mostafa

Dept.of Hort.(ornamental plants),Fac.Of Agric., South Valley Univ. Qena, Egypt.

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ABSTRACT

The investigation was carried out during the two successive seasons of 2008 and 2009 at the Nursery of Ornamental Plants, Faculty of Agriculture, South Valley University, Qena, Egypt. Seeds of *Balanites aegyptiaca* were soaked in dimethyl sulphate solution at 0,1000,2000,3000,4000 and 5000 ppm. for 14 hours to study the effect of dimethyl sulphate on the plant growth and to produce new patterns of vegetative growth and chemical composition.

The concentration of 2000 ppm. increased significantly the no. of branches and leaves in both seasons and stem diameter, plant height, fresh weight of vegetative growth and saponins content in the roots in the first season. The concentration of 3000 ppm. increased significantly the seed germination percentage in both seasons and saponins content in the roots in the second season. The plant height was increased by using the concentrations of 3000, 4000 and 5000 ppm. in the second season.

On the other side the treatments had no significant effect on the chlorophyll content in both seasons, stem diameter in the second season and leaf area in the first season.

All concentrations of dimethyl sulphate increased significantly the saponins content in the leaves in both seasons and alkaloid content in the leaves in the first season, while they decreased significantly the alkaloid content in the roots in the first season.

Albino plants were obtained in both seasons. The changes of leaf form or shape were also observed. two dwarfed albino plant with green spots was obtained from the seeds treated with 1000 and 3000 ppm. Also, one plant with variegated leaves was appeared from the treatment of 1000 ppm. These plants can be propagated through tissue culture as new cultivar.

Key Words: *balanites aegyptiaca*, dimethyl sulphate, alkaloid, saponin, induced variation

INTRODUCTION

Balanites aegyptiaca (L.) Delile belongs to the family Balanitaceae, popularly known as the "desert date", soapberry tree, thorn tree propagated by seeds. It is a evergreen woody tree(10 m.)with a stem diameter of about 30 cm. and snarled mass of barbed branches. It is a slow-growing tree with a capacity of coppicing. It is found throughout the arid region of the world, grows in the dry, sunny areas of Africa, the Middle East, India and Burma (Hall and Walker,1991).

The tree is an important species for dry areas. Thorns are up to 8 cm., soft at first and then woody. The leaves are distinctive pairs of grey- green color and ovate shape. Flowers are fragrant in yellow-green clusters. Fruits are oblong , 5 cm. with both ends round, yellow when ripe with a hard seed inside(Bekelet *et al.*,1993).

The fruits can be eaten and they have been used in the treatment of liver and spleen disease, as they were recorded to kill the snails which carry schistosomiasis and bilharzias flukes. The roots are used for abdominal pains , a purgative gum from the wood is mixed with maize meal porridge to treat chest complaints. Edible fruit has 30-40% of edible oil. Seed kernel yield the sapogenin and yanogenin. Seeds are given in cough and colic bark, unripe fruit

and leaves are pungent, bitter, purgative and anthelmintic for cattle (El Sadat,2005).

The usefulness of these plants materials medicinally is due to the presence of bioactive constituents such as alkaloids, saponins. Saponin is the active component which prevent disease invasion of plants by parasitic fungi, hence have some antifungal properties (Osugwu *et al.*,2007 and Saharan *et al.*,2008). Saponin is useful in medicine and pharmaceutical industry due to its foaming ability that produces frothy effects in the food industry . Saponin is also used in the manufacture of shampoos, insecticides various drug preparations and synthesis of steroidal hormones (Sodipo and Akiniyi,200).

Alkaloids play some metabolic role and control development in living system(Edeoga and Eriata,2001). They are also involved in protective function in animals and are used as medicine especially the steroidal alkaloids(Stevens *et al.*,1992). Alkaloids are known to exhibit marked physiological activity when administered to animals (Okwu,2004). Pure isolated plant alkaloids and their synthetic derivatives are used as basic medicinal agents for analgesic antispasmodic and bactericidal effects (Stray,1998).

Dimethyl sulphate (DMS) is a chemical compound with the formula $(\text{CH}_3\text{O})_2\text{SO}_2$ which is monofunctional alkylating agents that have been