

***Plectranthus tenuiflorus* (Shara) Promotes Wound Healing: *In vitro* and *in vivo* Studies**

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Abstract: The present study proved that both *Plectranthus tenuiflorus* juice and essential oil exerted a healing promoting effect in rat wound model. The effect was shown to be mainly via their ability to stimulate fibroblasts proliferation in addition to an anti-bacterial effect of its thymol content. Leaves of the plant were collected from different regions. The whole leave juice or essential oil were extracted by chemical steam distillation method. Different concentrations were tested for their effects on the proliferation of human foreskin fibroblasts in tissue culture. Its efficiency in enhancing wound healing processes using excision wound model in rat was also designed. The results revealed complete wound healing (100% contraction) at day 14 (10% juice), day 17 (80% juice) and day 18 (10% essential oil) compared to 22 days. Histological studies showed that at day 14 complete epithelization, well formed small sized scar tissue and reappearance of cutaneous appendages were evident in wounds painted with 10% essential oil, followed by 80% juice. *In vitro* study proved a stimulatory effect of plant extracts on human fibroblasts which may explain the speeding of healing process. The healing promoting effect of *P. tenuiflorus* may be attributed to the high content of calcium (903.16333 ± 0.21); zinc (0.37933 ± 0.05). Essential amino acids (Ala, Leu, Glu, Asp, Asn, Phe and His) seemed also to have a role. On the other hand, thymol was known to have an anti-bacterial effect. Thymol found in this study to be the main component (82.16%) of *P. tenuiflorus* extracts.

Key words: *Plectranthus tenuiflorus*, essential oil, leaves juice, whole extract, wound healing

INTRODUCTION

Wound healing is a sequent vital process that usually ends in the production of a healthy scar (Rohrich and Robinson, 1999). The biology of healing has been a concern of physicians throughout the ages. Despite great advances, at present there is no magic bullet that can be used for successful fast management of wounds to obtain a normal healing process.

The key cells in wound healing are fibroblasts where, tensile wound strength depend mainly on its activity and the rate at which it synthesizes collagen (Bailey *et al.*, 1975; Kumar *et al.*, 2004), next the ability of the skin epidermal cells to divide, migrate to re-epithelize and cover the wounded area is the second important process for developing a healthy wound scar (Hordichok and Steyger, 2007).

Ancient physicians in Egypt, Greece, India and Europe practiced gentle methods to deal with wounds during healing process. They appreciated the importance

of using natural herbal products for protecting injured tissues from the environmental factors and invaded microorganism (De Fatima *et al.*, 2008).

Throughout history, a large variety of plants and plants extracts has been utilized to speed and control wound healing process (Tisserand, 1988).

A good number of these plants was proved to contain significant quantities of aromatic essence, for example bush fuschia (*Eremophila alternifolia*) (Mathews *et al.*, 1988; Rowley *et al.*, 2008), manuka (*Leptospermum scoparium*) (Lis-Balchin and Hart, 1998), yarrow (*Achillea millefolium*) (Kuropka *et al.*, 1991; Tariq *et al.*, 2008) and poplar buds (*Populus candicans*) (Davis *et al.*, 1991).

Plectranthus L. Herit is a large genus of the *Lamiaceae* family widely distributed in tropical regions of Africa, Asia and Australia (Codd, 1985; Ascensão *et al.*, 1999; Abdel-Mogib *et al.*, 2002) that natively grows in Western and Southern region of Saudi Arabia (Collenette, 1998; Rahman *et al.*, 2004). Several