Transdermal Drug Delivery Enhancement by Essential Oils of *Eucalyptus globulus*

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**Abstract:** The present article focuses on the use of essential oils of *Eucalyptus globulus*. Some researches explore the penetration enhancing activities of it and show its effectiveness over the other used aspenetration enhancers. Transdermal patches incorporating permeation enhancer showed much better *in-vitro* drug release for a prolonged period of time within therapeutic range. Thus the multiple dosage formulation causing several side effects could best be replaced by a single transdermal dose formulation.

**Key words:** Penetration Enhancers • Transdermal Patches • Essential Oil • Eucalyptus Oil

**INTRODUCTION**

Nowadays, utilization of natural polymers, oils and gums in drug delivery systems has been discovered [1,2]. Essential oils are volatile constituents present in the leaves, fruits, flowers and roots of several plants. These are odoriferous substances. Over 2000 years, the extraction of these essential oils from various parts of plants has been a significant work. These oils are composed of complex mixtures of unique chemical compounds. Over the past many years, medicinal plants have received the attention because of their curative value. The modified derivatives of plant constituents have shown therapeutic value. Essential oil of plants possesses numerous biological activities. In market these oils are utilized in food, flavor and perfumery. WHO suggest, about 80% of daily health care requirements are being met through plants [3]. The use of natural essential oils and polymers in drug delivery systems continues to be an area of research [4,5].

Eucalyptus oil can be obtained from numerous species of the Myrtaceae family, which includes *Eucalyptus citriodora*, *Eucalyptus dives*, *Eucalyptus globules*, *Eucalyptus polybractea* and *Eucalyptus radiata*. The oil is extracted by steam distillation from the leaves [6,7]. There are more than 700 species of Eucalyptus, mostly native to Australia and grow in different environments ranging from deserts to mountain sides. Only 15 species occur outside Australia and only 9 do not occur in Australia. In tropics and subtropics region, almost all species of eucalyptus tree are cultivated. There are so many other countries and regions where Eucalyptus is also found, these include Africa, Americas, China, Europe and India. Eucalyptus leaves are covered with oil glands. It also has insect repellent properties and is an active ingredient in some commercial mosquito repellents. Cineole is the major chemical constituent of eucalyptus oil. About 80% cineole is present in eucalyptus oil. Skin penetration study on excised rat skin showed that cineole enhanced the penetration of 5-flourouracil into skin. The skin penetration of 5-flourouracil was significantly enhanced 83 fold after application due to combined process of partition and diffusion [7-9].

In a study Williams *et al.* [10] evaluated the penetration enhancing activities of eucalyptus through excised human skin. They compared it with other essentials oils such as chenopodium, ylang and anise essential oils. 5-flourouracil was used as model drug. In their study it was investigated that eucalyptus and chenopodium oils were the most effective drug permeation enhancers.

In another study conducted by Karpanenet *et al.* [6] eucalyptus oil enhanced the penetration of chlorhexidine (2% (w/v)) in human skin. A combination of chlorhexidine, eucalyptus oil (10% (v/v)) and isopropyl alcohol (70% (v/v)) and 10% (v/v) eucalyptus oil showed significantly enhancement of penetration of the drug through the skin. This combination showed rapid penetration, that was 2 min after application as compared to a solution of isopropyl alcohol/chlorhexidine alone.
CONCLUSION

Finally it may be concluded that eucalyptus oil could be treated as an effective penetration enhancer. Eucalyptus oil and its incorporation in transdermal patch is safe and does not lead to any skin irritation or edema.

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REFERENCES