

**HISTOLOGICAL
STUDY OF THE EFFECT OF EUCALYPTOL
OIL VAPOUR ON THE DEVELOPMENT OF
THE PALATE AND TOOTH GERM
(EXPERIMENTAL STUDY ON RATS)**

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Abstract

Background

Eucalyptol is a natural organic compound, which is a colorless liquid. It is a cyclic ether and a monoterpenoid. Eucalyptol is also known by a variety of synonyms: 1,8-cineol, 1,8-cineole, limonene oxide, cajepitol, 1,8-epoxy-p-menthane, 1,8-oxido-p-menthane, eucalyptol, 1,3,3-trimethyl-2-oxabicyclo [2,2,2] octane, cineol. In 1870, F.S. Cloze identified and ascribed the name *eucalyptol* to the dominant portion of *Eucalyptus globules* oil. The synthetic eucalyptol oil is an **essential oil** and is a concentrated, hydrophobic liquid containing volatile aroma compounds from plants. Essential oils are also known as **volatile, ethereal oils** or **aetherolea**, or simply as the "oil of" the plant from which they were extracted, such as *oil of clove*. Essential oils are generally extracted by distillation. Other processes include expression, or solvent extraction. They are used in perfumes, cosmetics, soap and other products, for flavoring food and drink, and for scenting incense and household cleaning products. In higher than normal doses eucalyptol is hazardous via ingestion, skin contact or inhalation. It can have acute health effects on behavior, respiratory tract and nervous system. The acute oral toxicity (LD50) is 2480 mg/kg. It is classified as a reproductive toxin for males and females. Eucalyptol has a fresh camphor-like smell and a spicy, cooling taste. It is insoluble in water, but miscible with ether, ethanol and chloroform used in the treatment of nasal blockage and in dentistry. The boiling point is 176 °C and the flash point is 49 °C.

Aims of the study

To evaluate the effect of the eucalyptol oil vapour on the palate and tooth germ development of rats embryos histologically and histomorphometrically .

Materials and Methods

In this study thirty pregnant albino Wistar female rats(2-3 months of age, 200-250 gm of weight) were divided into two groups: Control group: consisted of 15 pregnant rats, not subjected to the synthetic eucalyptol oil inhalation vapour but subjected to boiling water inhalation vapour ; and experimental group: consisted of 15 pregnant rats, subjected to the synthetic eucalyptol oil inhalation vapour(120 µl eucalyptol oil in 250 ml boiling water) ; for half an hour from day zero of gestation and for one week . The embryos of rat were obtained at different period of gestation. The embryos at 16,18 day of intrauterine life and one day old were histologically studied for the development of palate and molar tooth germ, sagittal sections through the head of the embryos which were separated from the body . The specimens were prepared for processing and staining with haematoxylin and eosin, and examined under light microscope.

Results:

The results demonstrated a retardation of the palate and tooth germ development of 16th and 18th intrauterine life embryos of experimental groups in comparison to control. Immature enamel , wide predentin and interglobular dentin were detected in the tooth germ of embryo (one day old) from pregnant rats exposed to the eucalyptol oil vapour .

Conclusions :

Eucalyptol oil vapour of 120 µl in 250 ml boiling water can affect on the palate(Failure of fusion of palatine shelves) and tooth germ development (mineralization and maturation process of dentin and enamel respectively showing immature enamel and interglobular dentin with wide predentin) .