The study was conducted to extract Eucalyptus oil, identify its chemical

components, identify the average lethal dose (LD50) in mice, determine

histological, hematological, weight, and behavioral changes in each

method of administration, as well as reveal the safe and non-toxic method

(orally, inhalation, mixing). Eucalyptus essential oil was extracted from

the leaves of Eucalyptus camaldulensis by hydro-distillation method,

Clevenger- type apparatus, for 3-4 hours.

In the experiment, (170) male and female mice were used, (50) mice

were used to calculate the mean lethal dose (LD50) when eucalyptus oil

was administered orally for 14 days. The mice were divided into 5

groups, in each group (10) mice each a control group, received a normal

saline, and 4 groups were treated with Eucalyptus oil at a doses of

1200,1600, 2000, 2400 mg/kg. The karber method was used to calculate

LD50 in mice and its average was 1820 mg/kg.

Then (120) male and female mice were used to determine the

histological, hematological changes due to Eucalyptus oil. The mice were

divided into 4 groups, a control, orally, an inhalation, and mixing group,

(20) mice each group, the orally group was given Eucalyptus essential oil

orally by gavage at a dose of 1000mg/kg for 4 weeks. The inhalation

group was exposed to eucalyptus oil inhalation for 15 minutes in a closed

cage, and the mixing group give orally and inhaled Eucalyptus oil at the

same dose.

During the study period, weights were measured every week, clinical

symptoms were recorded in each group, then euthanasia of mice, blood

withdrawal every week, and excision of the trachea, lung, esophagus,

stomach, small intestine, liver, kidney, and heart. Two types of dyes were

used for histological studies hematoxylin and eosin and periodic acid

Schiff (PAS).

The results of the current study showed that eucalyptus oil extracted

from the leaves of Eucalyptus camaldulensis has 98 chemical

compounds, and the most important of these compounds are Ledene, β-

Eudesmol, Aromandendrene, and Cineole.

: Clinical signs appeared, including dizziness, loss of appetite, lethargy,

and slow movement in the orally and mixing group, but in the inhalation

group, no clinical signs appeared when compared with the control group,

and there is a significant decrease (P<0.05) in body weight for the orally

and mixing group, while in the inhalation group, it continued to grow

during the experimental period. The results indicate changes in

hematological parameters, there was a significant increase (P<0.05) in

WBCs and a significant decrease (P<0.05) in RBCs, HGB, HCT, PLT in

the orally and mixing group, but in the inhalation group, no changes in

hematological parameters occurred.

Histological changes occurred in the esophagus of mice in the orally

and mixing group, such as the congestion in sub mucosa, erosion and

sloughing in mucosa, as for the inhalation group, no histological changes

occurred. There was a decrease in the thickness of the mucosa and an

increase in the thickness of the sub mucosa in the orally and mixing

group. Also, the mucosa interacted strongly with PAS in the orally and

mixing group and the inhalation group, the results were similar to the

control group.

Histological changes occurred in the stomach of mice in the orally and

mixing group, such as hemorrhage in the mucosa layer, errosin and sever

sloughing of epithelial layer, edema in the mucosa between gastric glands

and in the muscularis propria, while inhalation group, no histological

changes occurred. There was a decrease in the thickness of the mucosa

and an increase in the thickness of the sub mucosa in the orally and

mixing group. Also, the mucosa interacted strongly with PAS, in the

orally and mixing group, and the inhalation group, the results were

similar to the control group.

Histological changes occurred in the small intestine of mice in the

orally and mixing group, such as hyperemia in the villi, dilation of blood

vessels in the sub mucosa, infiltration of inflammatory cells, sloughing

of the villi, as for the inhalation group, no histological changes were

occurred. There was a decrease in the thickness of the mucosa and an

increase in the thickness of the sub mucosa in the orally and mixing

group. Also, the mucosa and the sub mucosa interacted strongly with

PAS, in the orally and mixing group and the inhalation group, the results

were similar to the control group.

Histological changes occurred in the Trachea of mice in the orally and

mixing groups, such as congestion in the mucous, erosion and removal of

epithelial cells and loss cilia of the mucosa, expansion sub mucosa,

inflammatory cell infiltration, shatter trachealis muscle, while in the

inhalation group, no histological changes were seen. There was an

increase in the lumen of the trachea in the orally and mixing, inhalation

group, decrease in the thickness of the mucosa in the orally and mixing

group. Also, the mucosa, submucosa interacted strongly with PAS in the

orally and mixing group. In the inhalation group, the results were similar

to the control group.

Histological changes occurred in the lung of mice in the orally and

mixing groups, such as hyperemia in the bronchioles, severe hyperemia in

the alveoli wall, deformities of the epithelium bronchioles, increased

thickness of the epithelium of the bronchioles and alveoli, accumulation

of inflammatory cells, rupture wall alveoli. As for the inhalation group,

no histological changes occurred. There was an increase in the lumen of

the alveoli in the orally and mixing, inhalation group, and decrease in the

lumen of the orally and mixing group. Also, bronchioles had a strong

reaction with PAS, interalveolar septum had a strong reaction with PAS

in the orally and mixing group. In the inhalation group, the results were

similar to the control group.

Histological changes occurred in the liver of mice in the orally and

mixing group, such as hyperemia central vein, severe fatty degeneration,

sinusoid spaces, partical degradation nuclei, disfiguration hepatocytes.

While in the inhalation group, no histological changes occurred.

Histological changes occurred in the kidney of mice in the orally and

mixing group, such as hyperemia in the glomerular, atrophy of Bowman's

capsule, destruct in the renal tubules blood vessels, decrease in the size

and number of epithelial cells in the renal tubules, renal tubular cast.

While in the inhalation group, no histological changes occurred.

Histological changes occurred in the heart of mice in the orally and

mixing group, such as hyperemia in the muscle fibers, roughness in the

heart muscle. While in the inhalation group, no histological changes

occurred.