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# Evaluation of Analgesic & Anti-Inflammatory Potential of Formulation of Essential Oils

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**ABSTRACT**
Essential oils ( Basil oil, Benzoin oil, camphor oil, vetiver oil, lavender oil ) have so many properties act as analgesia and so many anti- inflammatory activity. The aim of present study was to investigate the analgesic and anti-inflammatory activity of formulation of Essential oils using different models in rodents. The essential oils (Basil oil, Benzoin oil, camphor oil, vetiver oil, lavender oil) were undertaken for evaluating some medicinal properties including anti inflammatory and analgesic activity in albino mice and rats. The literature survey on Essential oils like Basil oil showed different activity like Anti-inflammatory activity, Antinociceptive activity, Antioxidative activity, Antimicrobial activity, Antibacterial activity, Anticandidal effect, Ameliorative effects, Sun protective activity, Anti Cataleptic activity, Antidiarrhoeal effects, Antidiabetic activity, *In vitro* cytotoxicity against HeLa and HEp-2 human cancer cell lines and NIH 3T3 mouse embryonic fibroblasts, Benzoin oil show different activity like Atopic eczema, Anti inflammatory activity, Antioxidant activities, The serum bilirubin levels in temporary jaundice, Antitumor activity, camphor oil show different activity Anti-inflammatory, Antioxidative activity, Antibacterial effect, Anti-inflammatory activity, Antifungal activity, Demodex folliculorum activity, Peroxynitrite-Induced Oxidative Processes, Lavender oil show different activity Anti-inflammatory activity, Episiotomy recovery, Antiparasitic activity, Anxiolytic effects, Anti conflict effects, Analgesic activity, Antioxidant activity, Antibacterial activity, Scavenging activity and decreases cortisol level in saliva, Antispasmodic activities, anticonvulsant, sedative, vetiver oil show different activity like Anti-inflammatory activity, Antinocicetive activity, Antioxidative activity. Essential oils were collected from shop Lucknow Uttar Pradesh. Formulation (Emulsion) of essential oils F1 was used for the pharmacological activity and compare with standard drug diclofenac sodium and essential oils mixture of formulation (Emulsion) F2. This study confirms the therapeutic potential of this plant and reinforces the validity of its use in popular medicine.

**Keywords:** *Analgesic, Anti-Inflammatory activity, Basil oil, Benzoin oil, camphor oil, vetiver oil, lavender oil*

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## INTRODUCTION

Hundreds of essential oils that have not been assessed, which continue to be major source of bio-active compounds used in pain and inflammatory conditions the present investigation was carried out. Ayurveda system is used from ancient time and it is most beneficial system. This system have less side effect. Massage from essential oils mainly most helpful in treatment of pain and inflammation[1]. Inflammation is response of body related to against body tissue damage by endogenous or exogenous stimuli. The In- inflammatory process comprises the vascular and cellular changes that aim to bring to the site of irritation the constant flux of blood and defense cells. The inflammatory response can occur in an acute and chronic form, and during this response chemical substances are produced that act as mediators inducing biochemical and molecular mechanisms that characterize clinical manifestations[2]. Basil main chemical constituent estragole presented anti-edematogenic and ant-inflammatory activities in acute and chronic inflammation[3]. Benzoin oil **(**Styrax Benzoin) benzoin resins, benzoin trees, Sumatra benzoin. Styrax in Swedish is known as benzoin. Two main varieties of benzoin resins; Sumatra benzoin and styrax benzoin contains cinnamyl cinnamate 8-14 %, methyl cinnamate 10-17 %, cinnamic acid 4-7 %, benzyl cinnamate 2-4 % and little amount of vanillin, benzoic acid, phenylpropylic alcohol. Before the use of *Styrax benzoin*, a skin test must be taken as it causes allergy. Benzoin oil is used as sedative and relaxant and relieves the tension, stress, anxiety and nervousness[4]. Camphor oil, Camphor, a natural product derived from the wood of the tree *Cinnamomum camphora*, has a long history of use as antiseptic, analgesic, antipruritic,

counter irritant and rubefacient. Vetiver oil (Chrysopogon zizanioides (L.)) syn. is a perennial plant belonging to family Poaceae (subfamily Panicoideae), popularly known as Khas, or Khus grass and is cultivated in tropical regions of India. It can also be hypothesized that the anti-proliferative action can also inhibit the T cell proliferation which can further reduce the release of inflammatory mediators and thereby the process of inflammation[5]. Lavender oil ( Lavandula augustifolia) essential oil (LEO) and its major components, (-)-linalool and linalyl acetate, also presented anti-inflammatory properties[6].

## METHADOLOGY

**Formation of emulsion:** Emulsion was prepared by a mixture of three essential oils- with non-ionic surfactant (Tween 20 and Tween 80) and distilled water. The surfactant plays a role of blending the hydrophobic and hydrophilic groups. By using each emulsifier separately, five different emulsions were prepared by varying their concentration and emulsification time[7].

Partical size of F1 is 0.3416µm and partical size of F2 is 0.478 µm.

**Compositions of Formulations**

| **S.no.** | | Test formulation 1 (F1) | Test formulation 2/rat (F2) | Test formulation 2/mice (F2) |
|---|---|---|---|---|
| **1.** | Essential oil ( benzoin oil, camphor oil, vetiver oil, basil oil, lavender oil) | **4ml** | **4ml** | **4ml** |
| **2.** | Diclofenac sodium | ---------- | 1.68mg/ml | 0.3mg/ml |
| 3. | Tween | 1ml | 1ml | 1ml |
| 4. | Span | 1ml | 1ml | 1ml |
| 5. | water | 4ml | 4ml | 4ml |
| total | | 10ml | 10ml | 10ml |

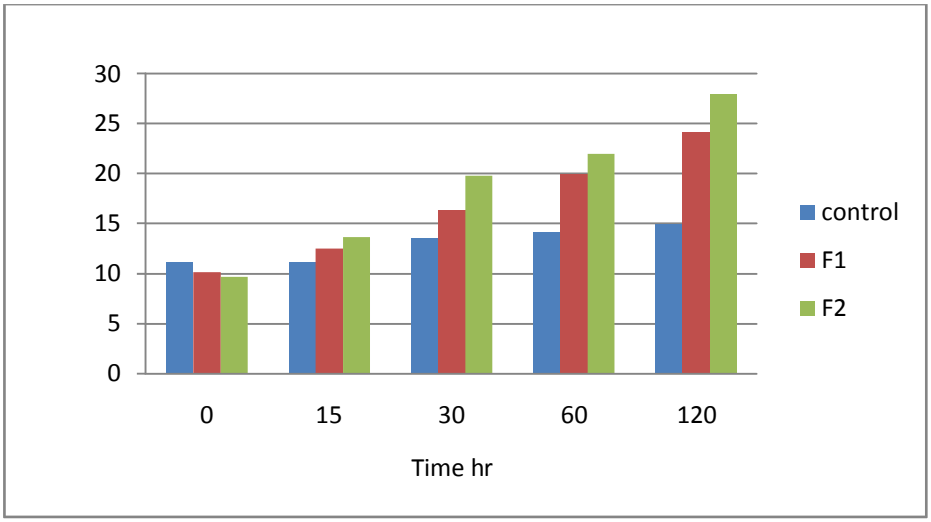
## ANALGESIC MODEL

### Eddy's Hot plate model

In the present study, Eddy's hot plate test, the result given in Table 1. Emulsion of essential oil F1 and emulsion of Essential oil and diclofenac sodium F2. F1 at 1ml (0.4 ml/ml) and F2 at 1ml of essential oil and diclofenac sodium (0.3mg/ml) applied topically to the mice paw. Mice put down on Eddy's hot plate at temperature 55 ºC for 30 minute. The formulation was applied on mice paw then recorded the reading at 0, 15, 30, 60, and 120 minute with topical application of F1 F2. Both results were significantly different from the F1 to F2 (topical application 1ml). F2 is more effective than F1.

**2-Eddy's Hot plate model**

| S no. | Treatment | 0 | 15 | 30 | 60 | 120 |
|---|---|---|---|---|---|---|
| 1 | Control | 11.16±3.868 | 11.16±1.15 | 13.5±1.08 | 14.16±0.972 | 15±2.311 |
| 2 | F1 | 10.16±2.75 | 12.5±1.78 | 16.33±2.66 | 20±3.56 | 24.16±2.22 |
| 3 | F2 | 9.66±3.128 | 13.66±2.10 | 19.83±1.71 | 22±2.31 | 28±1.41 |

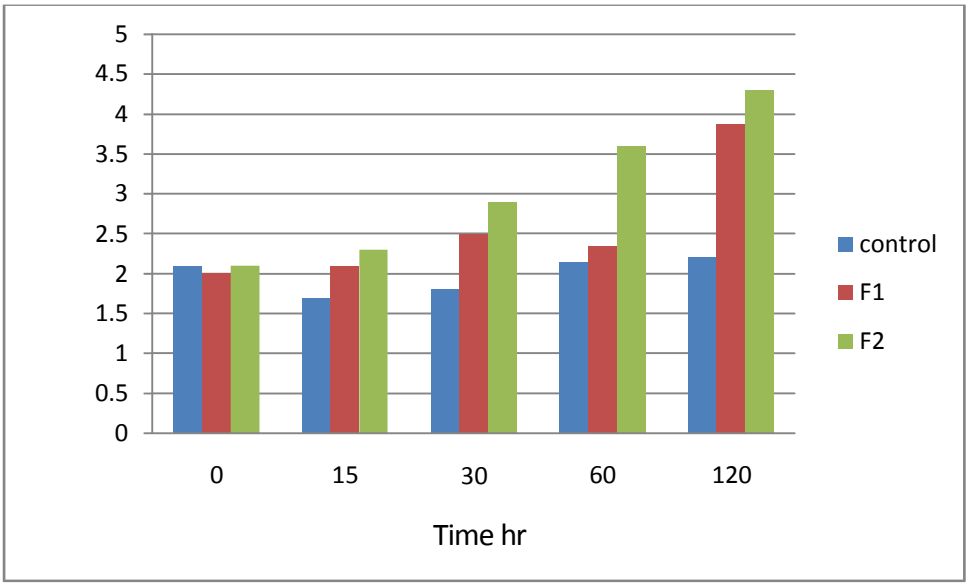



2. **Tail Immersion Model**

In the present study, Tail immersion, result given in Table 2. Emulsion of essential oil F1 and emulsion of Essential oils and diclofenac sodium F2. F1 at 1ml (0.4 ml/ml) and F2 at 1ml of essential oil and diclofenac sodium (0.3mg/ml) applied topically to the mice tail at 2 -3 cm. Mice tail dip in hot water at temperature 55±5ºC for 10 second. The formulation was applied on mice tail then recorded the reading at 0, 15, 30, 60, and 120 minute with topical application of F1 and F2. Both results were significantly different from the F1 to F2 (topical application 1ml). F2 is more effective than F2.

**3.Tail immersion test**

| S no. | Treatment | 0 | 15 | 30 | 60 | 120 |
|---|---|---|---|---|---|---|
| 1 | Control | 2.1±0.48 | 1.7±0.60 | 1.8±0.79 | 2.15±0.33 | 2.2±0.39 |
| 2 | F1 | 2±0.316 | 2.1±0.36 | 2.5±0.48 | 2.35±0.85 | 3.88±0.59 |
| 3 | F2 | 2.1±0.50 | 2.3±0.46 | 2.9±0.61 | 3.6±0.77 | 4.3±0.294 |



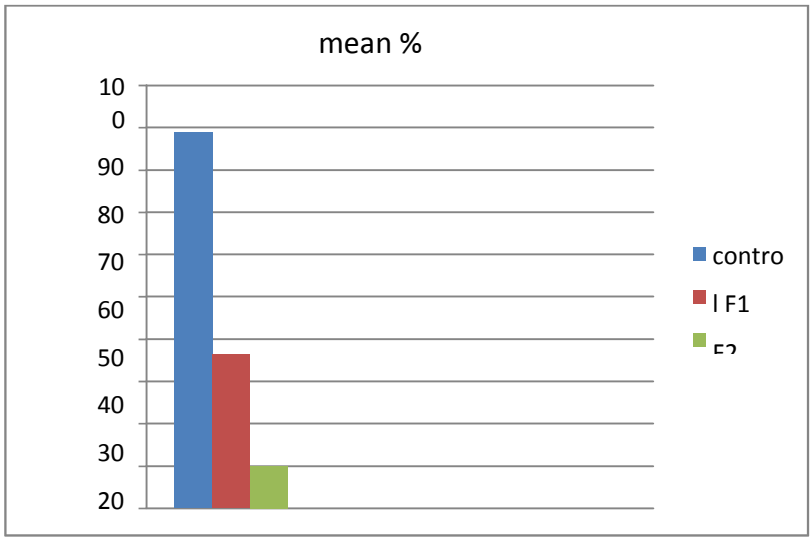
**ANTI-INFLAMMATORY MODEL**

**Carrageenan Induce Paw Edema in Rat**

In the present study, carrageenan-induced Paw edema in the dose dependent edema method shows the result given in Table 1. Emulsion of essential oil F1 and emulsion of Essential oils and diclofenac sodium F2. F1 at 1ml (4ml/ml) and F2 at 1ml of essential oil (0.4 ml/ml) diclofenac sodium (1.68mg/ml) applied topically to the rat paw edema. Carrageenan 1 %w/v induces in left paw for inflammation. After 30 minute of carrageenan injection to right paw of rat applied the formulation and evaluated at 60, 120, 180 and 24hr with topical application of F1and F2. Both results were significantly different from the F1 to F2 (topical application 1ml).

**3. Carrageenan induce paw edema in rat**

| Treatment | No. of animal | Dose | Mean % edema at 3 hr | % Inhibition |
|---|---|---|---|---|
| Control | 6 | Carrageenan1% w/v | 88.88±0.58 | |
| F1 | 6 | Emulsion of oils 1ml (o.4ml/ml) | 36.36±0.67 | 59.09 |
| F2 | 6 | Emulsion of oils & diclofenac sodium) 1ml ( 1.86mg/ml) | 10±0.11 | 88.74 |




The F1 is less effective than F2 but both show significant analgesic and anti- inflammatory activity in experimental animals.

**Result:** F1, protected mice against a thermal induced noxious stimulus which was evidenced from hot plate method. F1 produced significant analgesic effect in tail immersion model which was assayed to characterize peripheral analgesic activity. The extent of activity shown by the F1 was less than that F2 but it is more than that of control group which justifies its activity.

Carrageenan induced rat paw edema is a suitable test for evaluating anti-inflammatory drugs and has been frequently used to assess the anti-edematus effects of natural products. F1 exhibited significant reduction in paw edema volume in a dose dependent manner but not more than F2.

## CONCLUSION

F1 is less effective than F2 but both show significant analgesic and anti-inflammatory activity in experimental animals. Essential oil show synergistic effect with diclofenac sodium. The two formulation (emulsion) of different content in which first formulation have essential oils only (F1). Second one have essential oil and diclofenac sodium drug that is standard. (F2). Oils show synergistic effect, they increase the effect of diclofenac sodium. Partical size of F1 is 0.3416µm and partical size of F2 is 0.478 µm. Essential Oils (EOs) are concentrated, aromatic, volatile compounds made from plants. An essential oil is the volatile oil containing odiferous elements.

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