ANTI-INFLAMMATORY AND WOUND HEALING ACTIVITIES OF MALLOTUS PHILIPPINESIS ON EXPERIMENTAL ANIMALS

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Abstract:
Wound healing is a complex process that recover the skin damage by several dynamic process that is fast growing global complication with severe health and economic consequences. Approximately 65% people in world in 2011 was estimated that suffered from this problem. This problem in the world need some researches in medicinal plant that show their wound healing and antiinflammatory effect of respectively these plant is Mallotus Philippinensis. Medicinal plants are important source of therapies due to their tradionally acceptance. The main aim of this study is to study Antibacterial and wound healing activities of mallotus philippinesis on experimental animals. MPE demonstrated easily wound healing than the control group in excisional wounds. Wound healing employed in cellular interactions to promote phagocytosis, chemotaxis apoptosis and other factors. Healing of wound is aglobal problem in developing countries and India and new drug development would be possibilities by the traditionally used herbs as medicine.
MPE demonstrated easily inflammation by carrageenan induce paw oedema, Histamine and serotonin release cause first phase that lasts for the first 1.5 hours. Bradykinin mediates the second phase while last from 1.5 to 2.5 hours.
The rat paw odema caused by carrageenan was considerably reduced in the current study by MPE in all stages indicated that mode of action of the MPE mat include suppression of the inflammatory mediators release in all phases.

Conclusion: The Mallotus Philippinensis possess safe significant wound healing and antibiotic effect

Key words: Antiinflammatory, Wound healing, Medicinal plant.

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INTRODUCTION

Natural source has been a good source of medicinal product for thousands of years that have been separated from natural sources [1]. The genus Mallotus Philippinensis belong Euphorbiaceae that comprises of about 150 species that has been reported from India [2].

An India ethnomedicinal herbs Mallotus Philippinensis basically known as Kaatusiruve-mbeepatchilai [3]. In India several tribal communities used its fruits for disease such as bleeding, impotency [4], Kadavul purgative [5], Rhumatism [6], Skin infection [7] and many kinds of compound have been also reported from fruits like as phenols, Flavonoids, Cardenolides, Triter-penoid and isocoumarins [8].

The biological properties of the species have antioxidant, antibacterial, anti-inflammatory cytotoxic and immunological modulatory action [9].

Mallotus Philippinensis C, D and E these three new chalcone compounds were discovered in M. Philippinensis fruit [10].

In the present study, an effort that was undertaken to carried out the in-vitro anti-inflammatory and wound healing activites of M. Philippinensis on Experimental animals that claim the traditional uses against skin infection [7]

MATERIAL AND METHOD

Plant material and preparation of extract, Mallotus Philippinensis fruits that were collected from institute of medical sciences department of microbiology, BHU, Varanasi ,India, Its botanical identity was confirmed by the another author on the behalf of herbarium specimen was prepared for future reference.

Fruit glandular hairs in extract 50% ethanol has been dried and powdered were used for further procedure. The 50% ethanol extract in different dosed were used for present evaluation [8]

EXTRACT, FORMULATION AND STANDA-RDS DRUGS USED

50% ethanol extract of M. Philippinensis glandular fruit was used for pharmacological experiments.200g of M. Philippinensis fruits powder add in 1 litre of 50% ethanol (MPE).

The ethanol extract were combined and dried in an incubator at 40º C after that final yield w/w of extract was 11.6% was found.

Vitamin E 200 mg/kg was used as standard for wound healing treatment and diclofenac sodium as anti-inflammatory.

EXCISION WOUND STUDY

Activity of wound healing was carried out by method of effect on wound contraction in rats of M. Philippinensis extract and vitamin E [11] this method followed by Morton and Malone.[12] Three group with six animals in each group.

On excision wound was in flicted by cutting away a 500mm^2 with full thickness of skin from depilated area and wound was left undressed for open environment then the drugs that is standard 200 mg/kg vitamin E and M. Philippinensis extract 400mg/kg were administered till the wound was completely healed.

This method was used to monitor contraction and wound closer timing. Contraction of wound was calculated as percentage reduction in wound area and the wound area were monitored by tracing the wound margin on graph paper [10].

ANTI-INFLAMMATORY ACTIVITY

Carragenan -induced paw oedema was introduced by winter and colleagues in 1962 [13].In this method use three group with six rats in each.

Firstly, administered carrageenan to rats and remain for faster for 18 hours. In the treatment group received MPE (200 mg/kg) and Diclofenac sodium 10 mg/kg orally. In control group used CMC concentration was 0.5%.

Paw's volume was measured by plethysmometer and volume displacement technique. The percentage inhibition of paw volume in treatment and control group were compared by formula.

GROUPING OF ANIMALS

Three groups with six animals in each group were taken after wound creation and inflammation induced model experimental rats were divided into three groups with six animals in each group.

Group 1: - Control group treated orally (0.5% CMC)
Group 2: - MPE (200 mg/kg) group treated orally
Group 3: - Standard (VIT E) group treated orally (200 mg/kg)
Group 3: - Standard (Diclofenac Sodium) group treated orally (10 mg/kg)

Result

Wound healing result were given in the table 1 that shown significant increase in the wound healing potential was observed in the animal treated with ethanol extract of M. Phillippensis compared with standard and control group of animals.

Comparing of MPE 200 mg/kg to control CMC animal and VTE 200 mg/kg shown contraction at

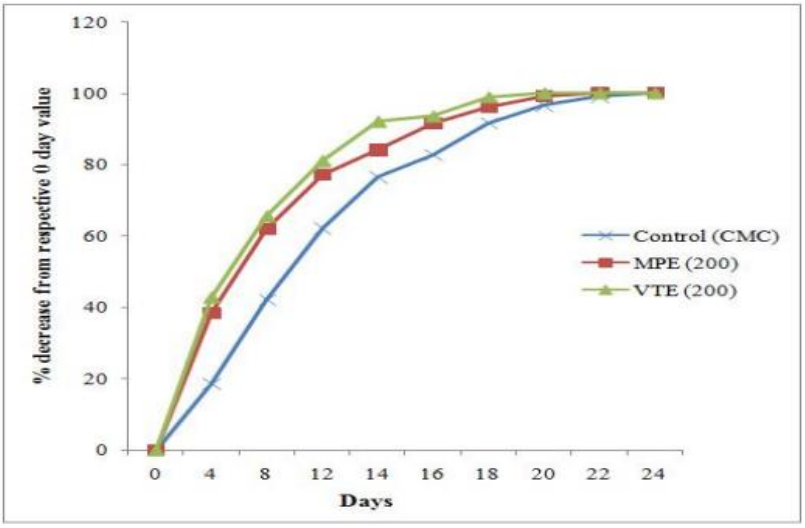
38.4 and 42.8% ,77.1 and 81.0% and 9.2% and 99.9% on days 4,12 and 20 from days 4 to 12 the concentration in the control CMC group shown 18.5% to 62.1 % while from days 14 to 20 it ranged from 76.4 to 96.5% and same as VTE -Treated group shown by the difference in AUC between those who received treatment or not.

Table 1. Effect on wound contraction in rats of MPE and VTE: Excision wound study

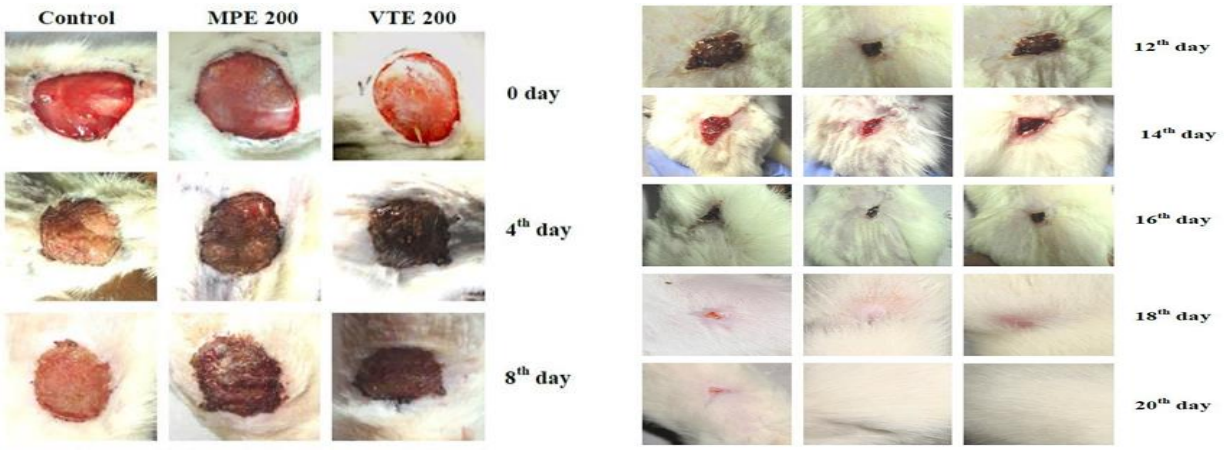
Oral treatment(mg/kg, od)	**Wound area in mm^2 /rat (% wound contraction)**									
	0 day	**4th day**	**8th day**	**12th day**	**14^{4h} day**	**16th day**	**18th day**	**20th day**	**22nd day**	**24th day**
Control (0.5% CMC)	531.2 ±7.9 (0.0)	432.8 ±8.9 (18.5)	308.1 ±15.1 (42.0)	201.3 ±11.4 (62.1)	125.2 ±9.1 (76.4)	91.7 ±4.8 (82.7)	44.7 ±2.4 (91.6)	18.7 ±2.4 (96.5)	5.5 ±0.3 (99.0)	0 ± 0 (100.0)
MPE (200)	521.7 ±7.7 (0.0)	321.5 ±4.6 ^{c} (38.4)	198.5 ±6.6 ^{c} (62.0)	114.5 ±6.7 ^{c} (77.1)	83.7 ±4.2 ^{c} (84.0)	44.2 ±3.6 ^{c} (91.5)	20.8 ±1.4 ^{c} (96.0)	4.2 ±0.3 ^{c} (99.2)	0.0 ±0.0 ^{c} (100.0)	0 ± 0 (100.0)
VTE (200)	543.7 ±9.6 (0.0)	314.0 ±8.2 ^{c} (42.8)	187.8 ±10.9 ^{c} (65.5)	103.3 ±3.9 ^{c} (81.0)	43.3 ±5.9 ^{c} (92.0)	35.3 ±3.1 ^{c} (93.5)	6.7 ±0.6 ^{c} (98.8)	0.7 ±0.1 ^{c} (99.9)	0.0 ±0.0 ^{c} (100.0)	0 ± 0 (100.0)

Values are mean ± SEM of 6 rats in each group. Values in parenthesis indicate percent decrease from respective 0 day value.

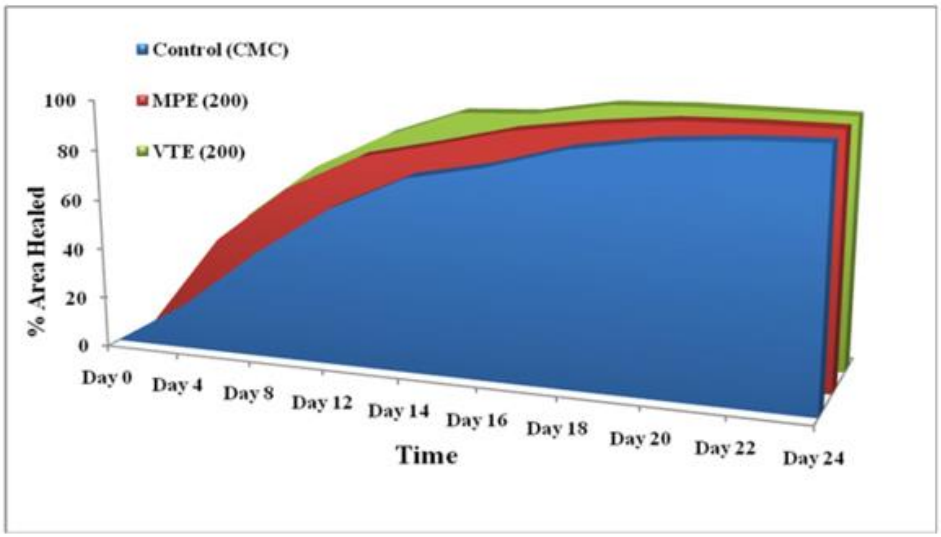
P ^{c}<0.001 compared to respective day control group (Statistical analysis was done by one way analysis of variance followed by Dunnett's test for multiple comparisons).



Effect on wound healing in rats of MPE and VTE



Photographic representation of percent wound contraction of MPE (38.4 to 99.2, P<0.001) andVTE (42.8 to 99.9%, P<0.001) on 4, 8, 12, 14, 16 and 20 post-excision days when compared with control (18.5 to 96.5%) on the same day



Time dependant healing effect on wound surface area (AUC)of MPE

Thus, the wound area was significantly reduced and the percentage of wound healing was very high in 22nd days it shows complete healing potential on 24th days itself compared to standard one at 20th day.

Anti-inflammatory result were given in the table 2 that shown significant effect on inflammation that was observed in the animals treated with ethanol extract of Mallotus Phillippensis compared with standard and control group of animals.

At the first, second third and twenty fourth hours MPE (200 mg/kg) was observed 2.9%, 32.5%, 55.3% and 65.8% compared with standard Diclofenac 33.3%,51.2%,62% and 81.6%. Thus these anti-inflammatory action was significantly reduce the inflammation that was very high at 200 mg/kg MPE) treated animals compared to standard.

Discussion

MPE demonstrated easily wound healing than the control group in excisional wounds. Wound healing employed in cellular interactions to promote phagocytosis, chemotaxis apoptosis and other factors. Healing of wound is aglobal problem in developing countries and India and new drug development would be possibilities by the traditionally used herbs as medicine.

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