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Haemostatic & Wound Healing Activity of *Mikania micrantha* Using N- Tranexamic Acid & Fusidic Acid Induced Model

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Abstract: The haemostatic and wound healing activity of *Mikania micrantha* Leaves was investigated on wistar rats. Place and Duration of Study: The study was carried out between October 2020 and February 2021 in the Pharmacology, Bharat Technology, West Bengal, India. The aquous extract of *Mikania micrantha* was prepared. The doses of the aquous extract administered to the wistar rats was 70 mg/kg body weight respective, and wound healing was induced with fusidic acid (15mg/kg; b.w.), N-Tranexamic acid (5 mg/kg; b.w.). The haemostatic and Wound Healing activity was assessed by the *Mikania micrantha* extract. The aquous extract of sample showed a significant wound healing activity of aquous extract on excision wound model also showed a significant(10-12days) where Fusidic acid completely cure the wistar rats approximately 11 days for haemostatis activity N-Tranexamic acid work approximately(2-3minutes) where aquous extract work 3-4 min.

Keywords: *Mikania micrantha* leaves, Haemostatic, Wound healing, Fusidic acid, N-Tranexamic acid.

I. INTRODUCTION

Haemostasis is a process to prevent and stop bleeding, meaning to keep blood within a damaged blood vessel (the opposite of haemostasis is haemorrhage). It is the first stage of wound healing. This involves coagulation, blood changing from a liquid to a gel. Intact blood vessels are central to moderating blood's tendency to form clots. The endothelial cells of intact vessels prevent blood clotting with a heparin-like molecule and thrombomodulin and prevent platelet aggregation with nitric oxide and prostacyclin [1]. Haemostasis has three major steps: 1) vasoconstriction, 2) temporary blockage of a break by a platelet plug, and 3) blood coagulation, or formation of a fibrin clot. These processes seal the hole until tissues are repaired. It includes mainly two types. They are:--

Primary haemostasis:- This term is used for platelet plug formation at the site of injury. Itis an immediate phenomenon appearing within seconds of injury and is responsible for cessation of bleeding from microvasculature.

Secondary haemostasis:- This involves plasma coagulation system resulting in fibrin plug formation and takes several minutes for completion[2].

Wound healing refers to a living organism's replacement of destroyed or damaged tissue by newly produced tissue. . This process is divided into predictable phases: blood clotting (haemostasis), inflammation, tissue growth (cell proliferation), and tissue remodeling (maturation and cell differentiation). Blood clotting may be considered to be part of the inflammation stage instead of a separate stage [3].

Mikania micrantha is a tropical herb known as "Jarmany Lota" in Bangladesh [4]. Different parts of this plants are greatly effective as poultice for blood clotting and wound healing[5].It grows expeditiously as a perennial weed in Bangladesh and this sub-continent[6].Many pharmaceutical laboratories have accepted plant from the Mikania family as a source of natural medicine[7].This plant possess high antioxidants such as phenolic compounds[8].Tannins and flavonoids have been reported into activate collagen production and increment in the number of granulation tissue,which increase the wound healing rate also[9].Extracts from seeds and leaves of *Mikania micrantha* have the ability to repel the ear inflammation in rodent in response to the application of 12-0 tetradecanoylphorbol-13-acetate[10] and significant anti-bacterial and anti-inflammatory properties[11].An extensive range of biological activities have been done on *Miknia micrantha* and isolation of the potential compounds has been conducted.There is no scientific evidence of concluding experiments on the Haemostatic and Wound Healing effects from *Mikania micrantha* and is dermal toxicity [12]. Therefore, work was carried out to identify the efficiency and escalation rate of Haemostatic and Wound Healing activity from *Mikania micrantha* leaf extract.

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II. MATERIALS AND METHODS

Plant material collection:

The leaves of *Mikania micrantha* collected from the rural belt of Purba Medinipur, West Bengal, India in the month of September,2020.After collection of plant, it was identified and authenticated by head of the department, department of Pharmacognosy, Bharat Technology, Banitabla, Uluberia, Howrah, West Bengal, India. The plant materials were separated from undesirable materials, cleaned, washed by distill water and shaded dried at room temperature and powdered.

Preparation of extract:

The shade dried leaves were powdered using a mechanical grinder and passed through 40 mesh sieve. Powder (300 g) was successively extracted with 1.5 L of petroleum ether, chloroform and ethanol, in simple distillation process at 60−70˚C until concentrated drug is not obtained.Then removed the solvents and after removation of solvents ,it was subsequently partitioned with chloroform.The drug was collected carefully,poured into eppendorf and stored in refrigerator until it use.

Experimental animal:

Adult male and female, nulliparous and non-pregnant wistar rats (average weighing 165 to 200 gm respectively) were used in this study. The animals were obtained from the department of pharmacology of Bharat Technology, Uluberia, Howrah, West Bengal, India. They were maintained under standard environmental condition (24 ± 1°C, 60 to 70% relative humidity, 12 hour dark/light cycle[13-15] in animal House approved by the committee for the purpose of control and supervision on experiments on animal (CPCSEA) and fed with commercial pellet diet and water ad libitum[16]. They were taken out to the laboratory environment for at least two weeks before the experiment. The Institution animal ethics committee, Bharat Technology, Uluberia, Howrah, West Bengal, India approved the experimental protocol and following the guidelines and procedures of the "Principle of laboratory animal care" (National institute of Health-NH publication number 85- 23).

Dose selection and mode of administration:

All animals are sensitive of skin. They are responses in hot, cold, itching, cutting or any other sensation. So, for this purpose we prepared the cream formulation and it applied to the animal skin.

Experimental design:

For haemostasis:
Group I- No Drug Applied
Group II- Standard drug N-Tranexamic acid (5 mg/kg).
Group III- Test drug aquous extract (70 mg/kg)

For wound healing:
Group I- No drug
Group II- Standard drug Fusidic acid (15mg/kg).
Group III- Test drug aquous extract (70 mg/kg)

III. RESULTS AND DISCUSSION

Mean haemostatic time of normal group is = 28.05 minutes
=4 minutes 7 seconds.

And mean haemostatic time of test group is = 20 minutes/6
=3 minutes 33 seconds.

And mean haemostatic time of standard group is = 17.9 minutes/6
=2 minutes 55 seconds.

Table 1: Wound Healing activity (wound diameter)

DAYS	NORMAL GROUP	TEST GROUP	STANDARD GROUP
1	6±0.02	6±0.02	6±0.02
3	8±0.3	5±0.2	5±0.2
5	7±0.41	2±0.39	1.7±0.32
10	5±0.27	1±0.22	0.9±0.13

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Haemostatic is associated with multi pathogenic factor and could be due to imbalance between the intrinsic factor (Factors:XII,XI,IX,VIII,X,II,I) and extrinsic factor (Haemophilia or any types of disease,Accidental haemorrhage).
Now, N-Tranexamic acid is the anti-fibrinolytic drug,which works by preventing the lyse of fibrin by inhibit the conversion of plasminogen to plasmin .so, fibrin also stable and bleeding also stopped.
Now, the *Mikania micrantha* is the test drug which also prevent the lyse of fibrin.So, it also contais haemostatic and wound healing action same as Tranexamicacid and Fusidic acid.
Our result comply with previous reports, where N-Tranexamic acid was found to enhance haemostasis and Fusidic Acid was found to enhance wound healing. Some important leukotrienes and prostaglandins also act this place for this function. Our results agree with reports of Kawano et al[17]. Okabe et al[18]. and Ruwart et al[19].
In preliminary phytochemical screening, the plant extract has been shown the presence of flavonoid, alkaloid, tannins, glycoside, carbohydrate may accounts antioxidant and haemostatic and wound healing potential. However, the test drug is show the activity for this purpose is efficiently due to presence of coumarin glycosides. Flavonoids have been reported to offer some haemostatic and wound healing effect[20].
It also helps to wound healing purposes by maturation the cells and block the ruptured of cells. So, they are grow normally and wound healed approximately about14-21 days[21].

IV. CONCLUSION

The present study reveals that the Phyto-constituents present in ethanolic leaf extract of *Mikania micrantha* significantly improves haemostatic and wound healing effect in Wistar rats. If we see the both table of result,then it is crystal clear that the test drug acts efficiently by standard drug.Thus, it can be concluded that the ethanolic extract of leaves of *Mikania micrantha* has the potential to haemostatic and wound healing effect.

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