

Anti Inflammatory and Healing Activity of Seed Extracts of *Moringa Oleifera* Harvested In Tamanrasset (Algeria)

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Abstract—The purpose of this study is to test the anti-inflammatory and healing power of polyphenolic extracts and saponin extracts of this plant. The results of the anti-inflammatory activity shows an average efficiency for saponin and polyphenolic extracts with respective values of 28.16% and 23.61%. The results of the healing activity showed that the wounds treated with the extract of polyphenols and saponins mark improved wound healing compared with those treated with Madécassol®. Similarly, the wounds treated with the ointment prepared extract saponins exhibited well compared to the extract of polyphenols healing. In addition, the extracts of the plant *Moringa oleifera* have a significant healing power over Madecassol®.

Index Terms—Anti-Inflammatory, Healing Activity, *Moringa Oleifera*, Saponins, Polyphenols And Tamanrasset.

I. INTRODUCTION

The use of medicinal plants is part of the larger movement for the development of traditional medicine for their many properties and their ability to produce a variety of interesting substances [1].

During the last decade, the use of traditional medicine was a renewed attention and growing interest in the medical world [2] because the effectiveness of medications, such as antibiotics, considered almost universal solution to serious infections decreases. Bacteria and viruses have gradually adapted to resist drugs and their increasingly hence the importance of orienting research towards new paths, including plants that have always been a inspiring new drugs. Moreover, more than 6,000 antibiotics of plant origin have been discovered [3].

Several plant species have long been known for their biological effects. Therefore, aromatic and medicinal plants constitute an important natural asset whose valuation requires perfect knowledge of the properties to highlight [4]. In Africa, traditional medicine is the fundamental support for the practice of medicine in rural areas. The use of plant extracts containing bioactive components has become a very important approach in preventive medicine [3]. Indeed, [5], estimates that to treat 80% of the African population still uses traditional medicine for which the bulk of therapies involves the exploitation of active ingredients of medicinal plants. These plant species as important to the health of populations should be studied scientifically to better use their

Therefore, the objective of this work is the evaluation of the biological activities of polyphenols and saponins extracted a Moringaceae *Moringa oleifera*.

II. MATERIAL AND METHODS

2.1 Materials Used

Plant Material

The plant material used is composed of seeds of *Moringa oleifera* medicinal plant that has been collected in October 2012 in Tamanrasset (Abalessa).

Animal Material

Our experimentation is carried on 3 lots of 3 Wistar rats (female) body weight which is between (150-170g) for the study of the wound-healing activity. And 4 groups of 6 albino mice (male) whose weight is (19-21g) to study the anti-inflammatory activity

2.2. Test Methods

The Present Work is Based On These Two Aspects

Study of the anti-inflammatory activity with the use of extracts of polyphenols and saponins.

Study of the healing activity with the use of extracts of polyphenols and saponins

2.3. Anti-Inflammatory Activity

Method :

Build 4 groups of 6 mice each either a control group, a test lot 1, 2 A batch test, a test batch 3

At the time T_0

Control batch: each mouse received previously by gavage 0.5 ml of distilled water or physiological saline 0.9%. Batch tests 1: Each mouse pretreated by gavage of 0.5 ml of the extract of *Moringa Oleifera* polyphenols. Test lot 2: Each mouse pretreated by gavage of 0.5 ml of the extract of *Moringa Oleifera* saponins. Test lot 3: Each mouse pretreated in the same manner 0.5 ml of reference product (D-clofenal 75 mg)

At time T_0+30 min

Inject carrageenan solution (1%) in the plantar fascia of the left hind paw in a volume of 0.025 ml to all animals

T_0 time + 4h

Sacrificing animals with ether (high dose) and then cut the hind paw up to the joint and weighed on an analytical balance

Expression of results

After these operations, the arithmetic means of the weight of the left and the right paw for each batch are calculated and the percentage increase in paw weight (edema%) are calculated .

2.4. Study of The Healing Activity

The principle of this study is the application of the test product (polyphenol extract and Moringa oleifera saponin) on previously caused wounds. Applications will be daily basis until complete epithelialization of the wound (about 15 days)

This study compares the various scars and evaluation based on the modification of the surface of the wound.

2.5. 1 Experimental Protocol

The prize distribution

For the study of the healing activity, 09 male rats (Waster) are divided into 03 batch, each batch is treated with a type of product as shown in Table 1

TABLE 1
DISTRIBUTION OF BATCH CONTROL (PHARMACEUTICAL) AND TESTS.

Lot	Treatments
Lot reference	The trial wound will be treated with the reference product D-clofenal ®
Lot test1	The trial wound will be treated with the ointment prepared by saponosidique seed extract
Lot test 2	The trial wound will be treated with the ointment prepared by the polyphenolic extract ducts

these rats were fasted the night before the test.

Ointment: seed extract (saponins and polyphenols)

Mixing the extract solution having a concentration of 0.3 g / ml with 40 g of vaseline. The mixture yielded an orange ointment saponins and light yellow to polyphenols. This ointment should be in closed boxes to avoid contamination from outside.

Animal Preparation

1- Provocation Injury

The principle consists in the application of the test product and reference product on healing of wounds caused previously. Applications will be daily until epithelialization, and then compare the various scars and changes based on the change of the scar.

2- The Footprint

Take the fingerprints of surfaces (S_E) and (S_t) of each rat on the seeds during the implementation of the test on different days: d1, d5, d9, d12, d15.

3- Application of Treatments

The application of the test products is done daily for 15 days on wounds (testing) until complete epithelialization. By against the other wounds (controls) do not receive an application of the test products.

4- Distance Calculator

Wound using Auto CAD software (computer software that allows the accurate calculation of the surfaces

III. RESULTS AND DISCUSSION

3.1 Anti-Inflammatory Activity:

The anti-inflammatory activity is expressed in terms of percentage increase and reduction of edema of the hind paws of mice left by polyphenolic extracts and Saponosidique seeds of Moringa oleifera compared to the control and reference (D- Clofinal®).

TABLE I

RESULTS OF ANTI-INFLAMMATORY TEST BATCHES (CONTROL, SAPONOSIDIQUE EXTRACT, PHENOLIC EXTRACT AND REFERENCE).

Lot	WLPg	WRPg	% edema	% edema reduction
Control	0.7603	0.6054	25.586	00.00
Référence(D-clofenal®)	0.6943	0.5933	17.023	33.467
Extract polyphenols	0.7022	0.5784	19.544	23.614
Extract saponins	0.5661	0.4782	18.381	28.16

WLP=Weight of the left paw, WRP=Weight of the right paw the anti-inflammatory activity, the volume of edema increases with time, this increase is greater in the group treated by the water in the treated lots with plant extracts and reference D-clofenal ®. The plant extracts administered intragastrically, half an hour before the injection of the carrageenan, reduced the edema in the 4 hour. The percentage of inhibition at the fourth hour after carrageenin is 23.61% to 28.16% polyphenols and saponins for Moringa oleifera, under the same conditions. D-clofenal® a percentage of inhibition of 33.46% for the 4 hours. The aqueous extracts in a dose of 0.75 g / Kg; administered intragastrically, exhibit significant anti-inflammatory activity. The results obtained at the end of the anti-inflammatory tests showed that aqueous extracts from the seeds of Moringa oleifera significantly reduce edema induced by carrageenan. Inhibition of edema by the two extracts is comparable to that of D-clofenal ®. Our results are therefore consistent with those of Garima Mishra (2011) [6]. who worked on the anti-inflammatory activity of the seeds and leaves of Moringa oleifera these authors show that the extracts of the seeds have a remarkable effect on the reduction of the edema induced by carrageenan.

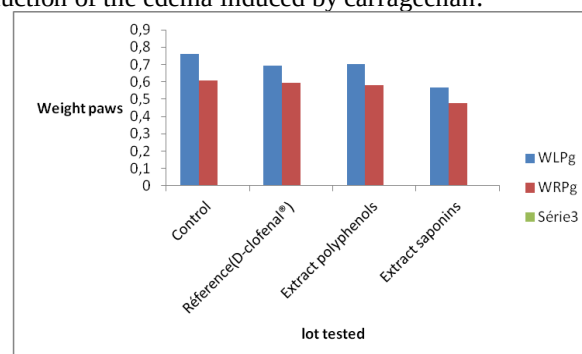


Fig. 1: The Edema Increase Percentages

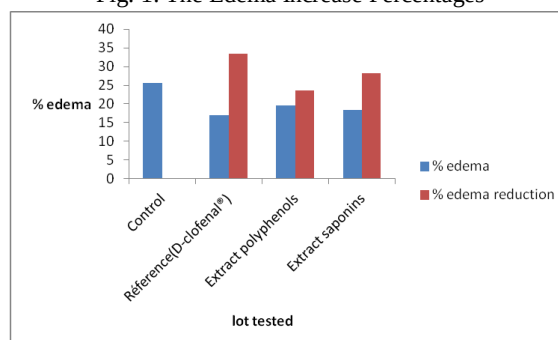


Fig. 2: The edema reduction percentages

3.2. Evaluation of wound areas

TABLE II

EVALUATION OF WOUND AREAS TREATED MADECASSOL®

Days	D ₁	D ₅	D ₉	D ₁₂	D ₁₅
Average wound trying rat 1 and 2 (cm ²)	1.8122	1.3095	1.0638	0.6897	0.2542

TABLE III
EVALUATION OF MEDIUM SURFACES WOUNDS TREATED WITH
SAPONOSIDIQUE EXTRACTED FROM THE SEEDS OF MORINGA
OLEIFERA SEEDS

Days	D ₁	D ₅	D ₉	D ₁₂	D ₁₅
Average wound trying rat 1 and 2 (cm ²)	1.921 1	1.1509	0.6180	0.472 6	0.0611

TABLE IV
EVALUATION AVERAGE AREAS OF WOUNDS TREATED WITH THE
POLYPHENOLIC EXTRACT FROM THE SEEDS OF MORINGA OLEIFERA

Days	D ₁	D ₅	D ₉	D ₁₂	D ₁₅
Average wound trying rat 1 and 2 (cm ²)	1.291 4	0.8536	0.4741	0.246 6	0.0877

III.3. Study of percentage reduction in wound area

TABLE V
EVALUATION PERCENTAGE REDUCTION IN WOUND AREA

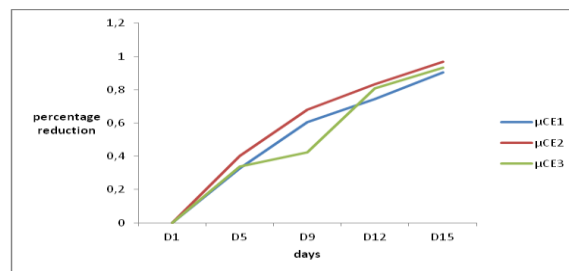
days	D ₁	D ₅ %	D ₉ %	D ₁₂ %	D ₁₅ %
μCE1	00	32.89	60.60	74.45	90.58
μCE2	00	40.09	67.83	83.20	96.82
μCE3	00	33.90	42.53	80.90	93.20

The percentage reduction in wound area for testing E1, E2 and E test show that rats treated with the ointment prepared Moringa oleifera mark of the best reduction percentages compared to that treated with Madecassol® reference.

In this study, from the five days, there is a very significant reduction in mean wound surfaces treated with the extract of saponosidique compared to the polyphenolic extract in comparison with other treatment. The rats take their final remedy from 9 that day and the disappearance of wounds is from the 12 days.

These current values are in agreement with that obtained by Dally et al., (2007) [7]. These authors show that the reduction of wound surfaces started from three days and rats take their final remedies from 8 jour and disappearance of wounds was noted from 12 days.

These values are slightly higher than in wounds treated with the reference product Madecassol®. Treatment of rats with Madecassol® showed complete healing time of 15 days, against 15 days for untreated surfaces "witness". The maximum healing time according to this protocol is 15 days



The Evaluation Of The Percentage Of Reduction In Wound Area.

IV. CONCLUSION

At the end of the experiment, the wounds treated with the extract of saponins showed better wound healing as compared to those treated with the extract of polyphenol. Moreover, the wounds treated with the reference ointment Madecassol® have poor wound healing compared to the wounds of tries. In contrast, witnessed the wounds show a very low healing. The saponin extract is more effective compared to the extract of polyphenol with a significant healing power. The results obtained show that the percentage reduction in wound area for μCE3 trial indicate that rats treated with the cream of saponin extract and polyphenol marks a better percentage reduction (96.82%, 93.20 %) compared to those treated with the reference Madecassol® (90%). These findings underscore the healing effect of the plant Moringa oleifera is therapeutically equivalent to that of Madecassol®.

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