

1 **Anti-hemorrhoid Evaluation of Selected Medicinal plants used in**

2 **North-East Nigeria for the Treatment of Hemorrhoids (Pile)**

3 **ABSTRACT**

4 *A medicinal plant is any plant in which one or more of its organs contain substance that can*
5 *be used for therapeutic purpose or which are precursors for the synthesis of useful drugs. In*
6 *this research, four(4) selected plants were screened for antihemorrhoid activities in mice.*
7 *The extracts were obtained from whole plant or part of plants such as root, stem, leaves and*
8 *seeds and include the following plants: Khaya senegalensis, Euphorbia hirta, Parkia*
9 *biglobosa , Newbouldia leavis and Prosopis africana. Hemorrhoid (pile) was induced in*
10 *group of five mice of five animals per group using Jatropa oil(Jatropa curcas,*
11 *Euphorbiaceae)(I.P) and using Pilex granule as the control drug. Group I received 5mg/kg*
12 *Pilex granule, and 200, 250, 300, 350 mg/kg b.w of A. leiocarpus, N. leavis, P. africana, and*
13 *KEP for groups II, III, IV and V respectively. A. leiocarpus and KEP(mixture of K.*
14 *senegalensis, E. hirta and P. africana) showed the best antihemorrhoidal activities in mice*
15 *than the other plants and compared with the standard drug Pilex granule. However, all the*
16 *plants' extracts showed significant rectoanal coefficient at potent levels. The study showed*
17 *that the extracts of the plants investigated possessed antihemorrhoid activities with A.*
18 *leiocarpus demonstrating the best activity in mice.*

19 **Keywords:** Anti-hemorrhoid, medicinal plants, mice, pilex granule, Jatropa oil.

20 **Introduction**

21 Hemorrhoids represent the dilation of varicose of the vessel of the superior of inferior rectal
22 plexuses of veins. They have be noted common human affliction from the down history. The
23 exact incident in population of developing countries has not been determined but in spite of
24 ascertain to the contrary. The condition is frequently encountered in developing country [1].
25 Various dilation of the internal hemorrhoids; physiological dilation present already in infancy
26 is presumed to develop into varicosities under the influence of wide range of factors. The
27 predisposing factors include hereditary, age, sex pregnancy are the prepared state and even
28 paramount. The precipitating factors comprise cathartic abuse, diarrhea, enemata,

29 constipation, infection and spasms or a tonic of the oral sphincter, obesity and arise in extra-
30 abdominal pressure [2]. There are two types of piles, internal piles and external piles. Internal
31 piles expand inside, along the anal. The common symptoms of internal piles are the painless
32 blood loss. The internal piles are the totally prolapsed. External piles extend close to the
33 anus. The colour of external piles is same as the skin. The outside piles forms thrombus. The
34 outside piles are painful. When the external pile ruptures it bleeds. The blood loss is more
35 disturbing and blood loss is typical cause for considering a doctor. Prolapsed is on the other
36 hand, oral dysfunctional special effect, and the other undeniable warning sign soreness,
37 impatient are fewer dependable problem solving criterion [3].

38 MATERIALS AND METHODS

39 Plant Collection and Identification

40 The plants species (*Parkia biglobosa*, *Prosopis africana*, *Euphorbia hirta*, *Khaya*
41 *senegalensis*, *Newbouldia leavis* and *Anogeissus leiocarpus*) were collected from Bali town
42 and were identified by Mr. Cletus A. Ukwubile of Science Laboratory Technology
43 Department, Federal Polytechnic Bali, where voucher numbers were deposited for the plants

44 Attempt has been made to expel scyballous masses from the rectal by traditional
45 medical practitioners using different plant species in either of the following preparation
46 methods: concoction, decoction and maceration. This research aims to identify the plant
47 species used for the treatment of such ailment and also to identify the plant species which has
48 the best anti-hemorrhoids properties, also the ecology, scientific names and method of
49 preparation of the drug and also to make a herbarium press of the plant species.

50 Preparation and Extraction of Plant Materials

51 The plants were air-dried for two weeks and then, plants parts were ground into powder and
52 weighed and stored for onward use. One of the plants was extracted with aqueous solution

53 (*Newbouldia leavis*) while others were extracted with absolute ethanol 99.1% (v/v), which
54 was soaked for 24 h using cold maceration technique.

55 **Grouping of Swiss albino rats**

56 The animals were grouped into five (5) groups of 5 animals according to each plant extracts.

57 **Experimental Animals**

58 Inbred male and female Swiss albino mice (18-29g weights) that were housed in standard
59 conditions of temperature ($22 \pm 3^{\circ}\text{C}$), relative humidity ($55 \pm 5\%$), and light (12h light-dark
60 cycle) before and during the study were included in the experiment. They were fed with
61 standard pellet diet (obtained from animal house of Department of Pharmacology and
62 Clinical Therapeutics, Ahmadu Bello University Zaria) and water *ad libitum*. All the
63 experimental protocols were approved by the Institutional Animal Ethics Committee (IAEC)
64 of the Ahmadu Bello University Zaria and Health Research Extension Act of 1985(Public
65 Law November 20, page 99-158) USA. The animals received humane care as per the
66 guidelines prescribed by committees for the purpose of control and supervision of control
67 and supervision of experiments on animals (CPCSEA), the Ministry of Environment and
68 Forests, Nigeria.

69 **Experimental Protocols**

70 Two sets of experiments were carried out. The first set was used to improve an existing
71 experimental model of hemorrhoids mentioned by [3], and to validate the same by using pilex
72 granules (PG), *Newbouldia leavis* extract (NE), and a combination of both extracts. The
73 protocol was designed to quantify the extent of plasma exudation and to determine the levels
74 of inflammatory cytokines such as TNF- α and IL-6 associated with hemorrhoids. In the
75 second set, the effect of PG, AL, and a combination of some plant extracts were further

76 confirmed by determining the rectoanal coefficient (RAC), severity score, and the
77 histopathological evaluation[4].

78 **Evaluation of Anti-hemorrhoid property against *Jatropha* oil-induced hemorrhoid in**
79 **mice**

80 Mice of both sexes (20-29g) were randomized based on their body weights and were divided
81 into 5 groups (G-1-G-5), with each group consisting of 5 animals (n=5). G-5 animals
82 received PG (Pilex granule) (10mg/kg) and served as positive control ; G-1 animals received
83 AL (200mg/kg):G-2 and G-3 animals received NL and KEP (200 and 400mg/kg b.w; i.p ,
84 respectively). Haemorrhoids were induced to all the groups, except normal control group, by
85 applying croton oil preparation. 24h hours after induction, all the animals were subjected to
86 respective treatment as assigned to the groups once daily for five days. On the fifth day, 1 h
87 after the treatment, all the animals were euthanized by exsanguinations under deep isoflurane
88 anaesthesia and rectoanal tissues (20mm in length) were isolated. They were evaluated for the
89 severity score, weighed, and fixed in 10% formalin solution for histological examination.

90 The RAC was calculated using the formula

$$91 \text{ Rectoanal coefficient} = \frac{\text{Weight of rectoanal tissue (mg)}}{\text{Body weight (g)}}$$

93 Histological observation of the rectoanal tissue was carried to determine the appearance
94 of inflammatory cells, congestion, haemorrhage, vasodilatation, and medium to high degrees
95 of necrosis [5].

96

97 **RESULT**

98 **Table 1: LD₅₀ Determination of *Jatropha* oil from *Jatropha curcas***

Dosage (mg/kg)	No of animal died / no of animal survive

100	0/5
200	0/5
250*	1/4
300	ND

99 LD₅₀ = 1118 mg/kg b.w (Lorke , 1983), ND (not determine), * toxic dose

100 **Table 2: Effect of Jatropha oil on the body weights of mice before and after induction**

Test groups	Weight Before (g)	Weight After (g)
Group I Control 100mg/kg	29.6	25.2
Group II 200mg/kg	28.6	24.1
Group III 250mg/kg	25.2	20.1
Group IV 300mg/kg	28.0	22.2
Group V 350 mg/kg	26.6	20.2

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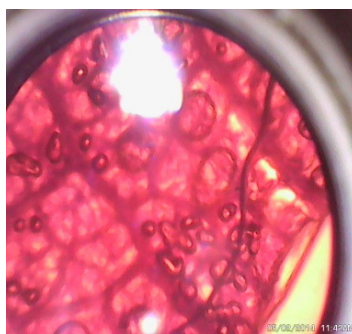
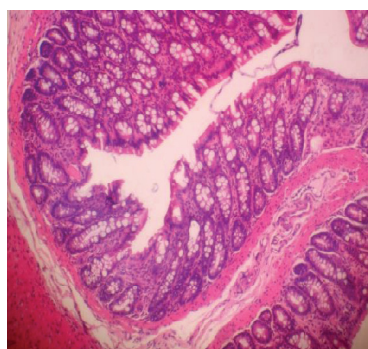
102 **Table 3: Effect of extracts on rectum after drug administration (i.p)**

Extract dose (mg/kg b.w) (n=5)	Rectoanal coefficients (g)	Inference
Group I Control Pilex (5mg)	0.6 ± 0.22	Moderate healing
Group II AL 100	0.1 ± 0.20 TM	*Strong healing
Group III NL 200	0.4 ± 0.18	Moderate healing
Group IV PA 400	0.3 ± 0.15	Moderate healing
Group V KEP 600	0.2 ± 0.10 TM	*Strong healing

103 AL (*Anogeissus leiocarpus*), NL (*Newbouldia leavis*), PA (*Prosopis africana*), KEP (*Khaya senegalensis*,

104 *Euphorbia hirta*, *Parkia biglobosa*), Results are means ± SEM. The lower the values, the more efficacy the

105 drug, TM More efficacy.

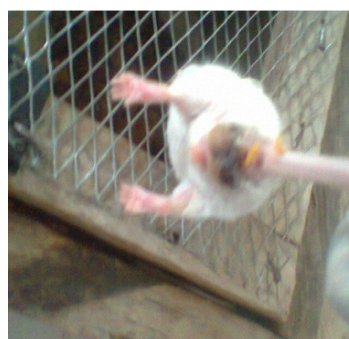


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a.

b.



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c.

d.

110 **Figure 1: Medicinal plants effects on rectoanal tissue in mice in Jatropha oil-induced hemorrhoids; a;**
 111 **hemorrhoid induced in recto anal tissue, b-c; healing of tissue after drug administration with *Anogeissus***
 112 ***leiocarpus*, d; mouse developed pile after five days of induction with Jatropha oil.**

113 **DISCUSSION**

114 **Discussion**

115 It is well proved that hemorrhoids are a pathological condition, which is characterized by a
 116 severe vasodilation at the rectoanal region, which leads to inflammation of the surrounding
 117 tissues, thus further leading to secondary complications such as extravasations of fluid into
 118 interstitial space mainly due to increased vascular permeability and migration of large
 119 quantity of inflammatory cells (granulocytes and monocytes)[6].

120 In the present study, Jatropha oil from seeds of *Jatropha curcas* (*Euphorbiaceae*) has
121 been used as inducer/phlogiston agent to induce experimental hemorrhoids. Jatropha oil
122 causes inflammation due to the release of soluble factors involving inflammatory lipid
123 metabolites [7]. These factors, alone and/or in combination, regulate the activation of resident
124 cells (Fibroblasts, endothelial cells, macrophages, and mast cells) and newly recruited
125 inflammatory cells (Monocytes, lymphocytes, neutrophils, and eosinophils) leading to
126 systemic response to inflammation [8-9].

127 The normal control group showed normal cell architecture of the rectoanal region. The
128 results showed the loss of weights in the animals after induction (Table 2), which is a
129 symptom^s of the disease. However, intraperitoneal administration of plant extracts of AL,
130 NL, PA, and KEP showed remarkable vasoconstriction of the rectum (Table 3). The greatest
131 healing of the rectum were shown by AL (*Anogeissus leiocarpus*) and KEP (*K. senegalensis*,
132 *Euphorbia hirta*, *Parkia biglobosa*), and these signify the constriction of the mucosa linings
133 of the anus in the mice by the plant extracts. These results were comparable with that of the
134 standard control drug (Pilex). All the extracts produced a better rectoanal coefficient values
135 than the first line drug (Table 3).

136 **Conclusion**

137 Medicinal plants are a source of many biological ingredient^s which cannot be ignored. The
138 study therefore showed that extracts of *Anogeissus leiocarpus*, *Khaya senegalensis*,
139 *Euphorbia hirta*, *Parkia biglobosa* and *Newbouldia leavis* possess^s antihemorrhoid properties
140 in mice, and can be use^d as medication for the treatment of hemorrhoid (pile). These plants
141 thus, represent sure source^s towards the development of orthodox medicine for the treatment
142 of piles than surgery, which normal is expensive and risky. However, the precise molecular

143 mechanism behind the antihemorrhoidal activities of these plant extracts need to be explored
144 in future studies.

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