



## Short Communication

# Evaluation of the Antinociceptive (Anti Pain) Activity of *Prosopis Africana* Using Formalin Test on Rats

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## Abstract

This research was conducted to evaluate the potency of *Prosopis africana* leaf extract in the treatment of pain in rats. The work investigated the antinociceptive (anti pain) activity of the leaf extract of this plant. The experimental rats were grouped into three; Group A negative control, the rats in this group were given 0.2ml of normal saline, Group B contained rats that were given 0.2ml of aspirin, this served as positive control and the last Group C were given 0.2ml of the leaf extract. At the end the rats in group A experienced the highest pain, having mean value of 2.925. But in the rats in groups B and C, there was no significant difference ( $P < 0.05$ ), having the mean values of 1.600 and 1.575 respectively. At the end of this research, it was observed that the leaf extract of *Prosopis africana* plant relieved pains in the rats studied.

**Keywords:** *Prosopis africana*, rats and anti-nociceptive.

## Introduction

Pain is an unpleasant feeling. International Association for study of Pain (IASP) defines pain as an unpleasant sensory and emotional experiences associated with actual or potential tissue damage. Pain and inflammation are associated with pathology of various clinical conditions<sup>1</sup>. Pain is initiated by stimulation of nociceptors in the peripheral nervous system or by damage to or malfunction of the peripheral or central nervous system<sup>2</sup>. Sometimes pain arises in the absence of any detectable stimulus, damage or pathology<sup>3</sup>.

*Prosopis Africana* is a leguminous crop which grows in the sub-Saharan Africa. Almost all the parts of the tree are used in medicine<sup>4-6</sup>. A medicinal plant is one whose one or more of its organs contains substances with inherent active ingredients that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs to cure diseases or relieve pain<sup>7</sup>.

Nociception is the neural process of encoding and processing noxious stimuli<sup>8</sup>. Some intense stimuli trigger reflex, withdrawal, autonomic response and pain. The specific receptors for these intense stimuli are called nociceptors, which are found in areas that can sense pain. Formalin induced nociception is one among several models of nociception in rats. The formalin test was originally developed by Dubuisson and Dennis<sup>9</sup> which was later modified by Tjolsen, et al<sup>10</sup> It is a useful model particularly for screening of novel compounds since it encompasses inflammatory, neurogenic and central mechanisms of nociception<sup>11</sup>. Experimental models of pain include tests of response threshold to high intensity stimuli and changes in spontaneous evoked behavioural responses in animals with peripheral injury or inflammation. In rats weighted

scores technique by Dubuisson and Dennis<sup>9</sup> is adequate. This is rated as 1 – no weight bearing, 2 – elevation, 3 – licking and biting. Only licking and biting of ejected paw is defined as a nociceptive response.

## Material and Methods

Fresh leaves of *Prosopis africana* were collected and shade-dried to avoid denaturing the phytochemical due to direct sun rays. The leaves were pulverized and phytochemicals were extracted using gravimetric method described by Harborne<sup>12</sup>.

**Experimental Animal:** Fifteen male albino rats of about 90 days old were used. The rats weighed approximately 180g. The rats were grouped into three, each group contained five rats. Group A was a negative control, the rats in this group was given 0.2ml of normal saline using gastrointestinal carnula. Group B contained rats that were given 0.2ml of aspirin which is a known analgesic using gastrointestinal carnula, this serve as a positive control. Group C contained rats that were given 0.2ml of plant extract using gastrointestinal carnula. 50 $\mu$ l of 2.5% formalin was injected into the dorsal surface of the paw of each rat to induce pain. Each rat was observed for behavioural changes for thirty minutes with respect to the feeling of pain on the injected paw. The observation was rated using Dubuisson and Dennis<sup>9</sup> rating techniques. The experiment was replicated three times. The results were subjected to analysis of variance, the specific differences in treatment means were determined using Least Significant Difference (LSD)<sup>13</sup>.

## Results and Discussion

Figure 1 and table 1 show that there was no significant difference ( $P > 0.05$ ) between the rate of pains experienced in

the rats in Group B and rats in Group C. But there was significant difference ( $P < 0.05$ ) rates of pains experienced in the rats in Group A and those in Group B. Also, there was significant difference ( $P < 0.05$ ) between the rates of pains experienced in rats in Group A and those in Group C.

**Table-1**  
**The treatment mean**

Group	Rate of Pain
Group A(negative control)	2.925
Group B (Positive control)	1.600
Group C (Plant extract)	1.575

From the result above it was discovered that the rats in Group A, that is negative control experienced the highest pain having the mean of 2.925 while the rats in Group B and C had no significant difference. It can be deduced that *Prosopis africana* has anti-nociceptive property. It has the ability to reduce pain as in the same way as the aspirin given to rats in Group B. This indicates that *Prosopis africana* has medicinal values, it is a medicinal plant. It coincides with Okigbo<sup>7</sup> that a medicinal plant is one whose one or more of its organs contains substances with inherent active ingredients that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs to cure diseases or relieve pain. The phytochemicals of *Prosopis africana* has to be incorporated in the production of drugs in pharmaceutical industries.

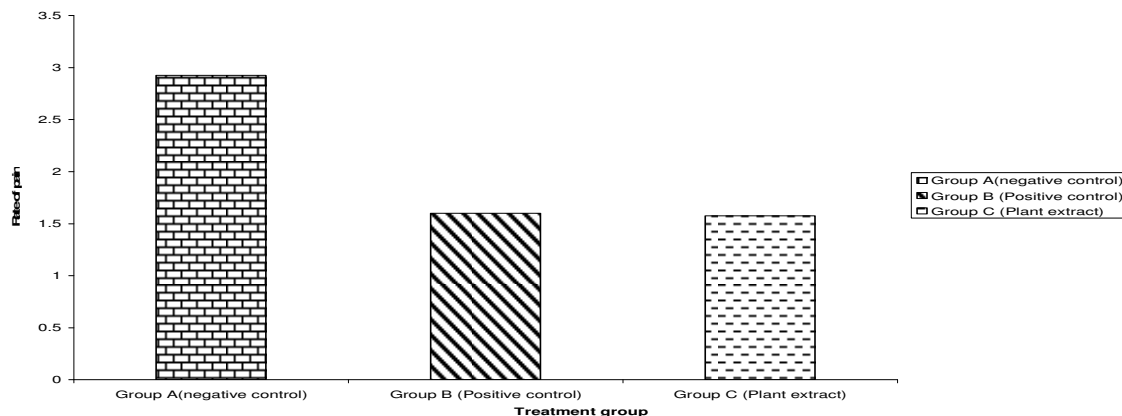
### Conclusion

It is obvious from the result that *Prosopis Africana* has medicinal values, it is wise to say that the phytochemicals of this plant has to be used in the production of drugs especially for the purpose of anesthetics.

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**Figure-1**  
**Mean of rate of pain in rats**