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Effect of Albizia Lebbeck Leaf on Some Haematologic Parameters in Fed Albino Wistar Rats

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Abstract:
AlbiziaLebbeck stem bark extract have been reported to treat bronchial asthma. The effect of dried leaf on some haematologic variables and immune response were assessed in Wistar rats treated with sensitization and booster doses in their normal diet at 5g / 100 g body weight per day for twenty one days. Blood samples were taken and analysed for WBC, differential white cell count and serum electrophoresis.The dried leaf had no significant effect (p> 0.05) on WBC and differential cell counts; there was no abnormal gamma globulin band after electrophoresis compared to the control rats. The dried leaf of the AlbiziaLebbeck leaf did not elicit an immune response and is safe to be used in the treatment of asthma and other ailments.

Keywords: *Albizialebbeck, AlbinoWistar rats, electrophoresis, haematologic variables.*

1. Introduction

AlbiziaLebbeck is a leguminous plant of the family, Fabaceae, sub-family Mimosae [vii]. It has common names given to it in many countries: it is called Sirisha in Pakistan; woman tongue in the west Indies and Dasoos by Beroms in Plateau State of Nigeria. The plant is reported to have pharmacologic properties which have been exploited in the treatment of various ailments [vi]. It is found in tropical and sub-tropical countries of Asia and Africa and has the economic potential of being used for industrial medicinal purposes [vii]. Consequently, herbal medicine has gained popularity because of its great potential to generate huge revenue [iv].

With the recognition of herbal medicine as one of nature's healing and curative measures, it thus becomes necessary to ascertain the effect of these herbs on some physiological parameters. In addition, the mortality rate in Nigeria for the adult male in 2013 was 379.67 per 1000 male adults [xiii]. It is probable that the use of herbal drugs by unsuspecting rural communities may add to this burden. Moreso that in Nigeria, AlbiziaLebbeck plant is used for the treatment of various ailments, including typhoid, asthma to mention a few and its dosage not ascertained.

While the antimicrobial properties of its leaf extract may have been determined against various microorganisms in Nigeria, it is necessary to ascertain the effect of the dried leaf on some haematological parameters such as total white blood cell count (WBC), differential white cell count as well as its ability to elicit an immune response even as patients have ended up in hospitals with renal and liver diseases secondary to treatment with herbal drugs [iv].

2. Materials and Methods

Collection of Leaves: Leaves of AlbiziaLebbeck plant were collected and confirmed by the Herbarium department of Federal College of Forestry Jos, after which they were cleaned, shade-dried and coarsely powdered and stored [xv].

2.1. Laboratory Animals

Ten (10) healthy female Albino wistar rats weighing 110±0.01 g were procured from Nigerian Institute of Trypanosomiasis Research, Vom Plateau State. Animals were housed under standard conditions as described [10] and allowed to acclimatize for one week after which they were allowed free access to food and water.

2.2. Experiment/Procedure

Animals were divided into two groups (five in each group); Group A as control and Group B as test group. After their basal weights and blood samples for basal total white blood cell count (WBC) and differential white blood cell counts were taken according to method described [x], animals in the test group were fed with 5g / 100g body weight of ground AlbiziaLebbeck leaf added to their normal feed. They were observed for seven days while they continued with their normal feed. Blood samples were collected for WBC and differential cell count while changes in their weights were monitored as well as their appetite, alertness and other changes. A second dose of 5g / 100g body weight of dried AlbiziaLebbeck leaf was added to their normal feed as booster dose. They were observed for another seven days, after which their blood samples were taken and their weights, appetite and alertness monitored. The control group were not fed with AlbiziaLebbeck leaf.

2.3. Laboratory Analysis

2.3.1. White Blood cells and Differential Count.

Total white blood cell count and differential cell count was carried out by the method described [ii] .Criteria for classifying WBC and differential values as low or elevated in wistar rats [5]:WBC 4.60 – 130.0 x 10^3 /mm^3 (normal); Neutrophil(%) 10 – 40; lymphocyte(%) 58 -90; monocytes(%) 0- 1; eosinophils(%) 0 – 6; basophils(%) 0 – 0(normal).

2.3.2. Serum Electrophoresis

Serum electrophoresis was carried out for basal samples, sensitization dose and booster dose samples respectively according to the method described by [x].

2.3.3. Statistical Analysis

The results are presented as mean ± standard deviation and the data was analysed by the Epi info System to determine their statistical significance at $p< 0.05$.

3. Results

The average total white blood cell count of the control animals was 8.9 ± 2.3 x 10^3 / mm^3 while that of the test animals was 11.6 ± 4.1x10^3/ mm^3 (details are in Table 1). In addition, the average differential count showed more lymphocytes (68.2± 7.8 %) in the test animals than the control (61.6 ± 5.1 %); there were no eosinophils and basophils in the 2 group of animals (details are in Table 1).

	Differential Count in Percent					
Group	WBC $10^3/\mu L$	Neut[a]	Lymph[b]	Mono[c]	Eos[d]	Base[e]
A_C[f]	8.9±2.3	34.2±6.3	61.6±5.1	4.2±2.6	0	[h]0
B_T[g]	11.6±4.1	30.4±7.3	68.2±7.8	1.8±10	0	0

Table 1: Mean/Standard Deviation of Haematological Parameters of Wistar Rats not treated with AlbiziaLebbeck leaves (Base line).

→ Key: [a]neutrophil[b]lympholyte[c]monocytes[d]eosinophils[e]basophils[f]control animal [g]test animal, [h]nil.

Seven days after being fed with AlbezziaLebbeck leaf, there was decrease in the average WBC (10.4 ± 4.6 x10^3/mm^3) in the test animals while there was no change in the control animals, however the differential count showed increase in the lymphocyte values(83.0 ± 4.5 %) in the test and control animals. Furthermore, animals in both groups gained weight. Details are in Table 2. There was no adverse reaction in the test animals.

Differential Count in Percent						
Doses	WBC[a] $10^3/\mu L$	Neut[b]	Lymph[c]	Mono[d]	Eos[e]	Baso[f]
Sensiti-zation	10.4±4.6	11.4±3.9	83.0±4.5	1.5±0.7	0	[g] 0
Booster	19.3±5.5	16.4±4.1	78.0±7.3	3.2±0.5	0	0

Table 2: Mean/Standard of Haematological Parameters of Test Wistar Rats treated with sensitization and Booster doses of Albizialebbeck leaf

→ Key: [a]neutrophil[b]lympholyte[c]monocytes[d]eosinophils[e]basophils[f]control animal, [g] nil.

After the administration of booster dose of Albizia leaf, the test animals showed a gain in average weight (160 ± 0.01 g) and increase in the average WBC (19.3± 5.5 $x10^3$ /mm^3). In addition, there was a drop in the neutrophils (16.4±4.1 %) and increase in the lymphocytes (78.0±7.3 %) compared to the control animals; eosinophils and basophils were absent. Details are in Table 2. The electrophoretic band was normal.

There was no significant difference in the WBC and differential cell counts in the test animals after treatment with Albizialebbeck leaf at $p > 0.05$.

4. Discussion

The effect of AlbiziaLebbeck leaf on total white blood cells, differential cell count and immune response was investigated. White blood cells are reported to fight microbial agents. Thus, an increased number of these cells are the body's response to ward-off infection. However, not all cases of increased WBC reflect presence of an invading foreign agent. Other altered physiological conditions such as stress (emotional or physical), inflammation, and immune disorders such as Crohn's or Graves' disease can cause elevated WBC [xv]. In addition, the different types of WBCs such as neutrophils, lymphocytes, monocytes, basophils and eosinophils each have their own functions. Furthermore, the presence of a foreign agent or substance can elicit an immune response leading to increased level of the gamma globulin (IgG) band.

This work showed that the healthy wistar rats (which had normal WBC and differential white cell count) prior to treatment with AlbiziaLebbeck leaf did not show reaction to an immunogen. After treatment with the leaf, there was no significant difference in their WBCs and differential cell count; these were all within normal levels [v]. This agrees with the findings of [iii]; [ix] in which the administration of AlbiziaLebbeck leaf in male Albino rats did not affect their WBC and differential counts. There was no immune response as the gamma band on electrophoresis was normal [xii]. The same result was reported after the sensitization and booster doses.

An immunogen has been described as a substance which when administered appropriately in to host cell elicits a demonstrable specific immunogenic effect which is seen in the production of antibody or changed cellular activity [xiv]. This was not demonstrated in the case of AlbiziaLebbeckleaf [x], more so that there were no abnormal changes observed in the test rats. Earlier studies on the leaf of AlbiziaLebbeck agree with these findings in which the leaf was reported toreduce the level of histamine and thus beneficial in bronchial asthma, a form of immune response [xi]; [viii]; [i].

5. Conclusion

The use of AlbiziaLebbeck leaf as alternative medicine may not have adverse side effects in those that use them; side effects and cost of drugs have been a contributing factor in the quest for alternative medicine amongst rural communities. However, the potential for prescribed drug/herbal preparation combination reaction should be properly investigated [iv].

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