# Indigenous knowledge, efficacy and safety of medicinal plants used in the control of chicken helminths in Uganda : a case of Soroti District

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ZIRINTUNDA-COVAB-PhD-2025.pdf (3.43 MB)

## Date

2025


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## Publisher

Makerere University



## Abstract

This study aimed at assessing the indigenous knowledge, phytochemistry, efficacy and safety of selected medicinal plants used in the control of chicken helminths in Soroti district. Indigenous knowledge was studied using focus group discussions and farmer interviews. The knowledge, attitudes and practices of ethno-veterinary utilization in chickens was done among 407 chicken owners of 20-50 years using structured questionnaires and focus group discusions. Qualitative and quantitive pytochemiical analyses were carried out using standard procedures and GC-MS, respectively. Efficacy determination of the crude extracts from selected plants was done by in-vitro adult Ascaridia galli paralysis studies and in-vivo by faecal egg count reduction (FECR) assessment in chicken. The toxicological effects of the extracts on chicken were evaluated using haematological, biochemical and histopathological evaluations. Twenty-one indigenous seven-week-old male chickens were fed on feeds from Nuvita® feeds Uganda limited and adlib tap water. They were divided into seven groups of three chicken per group. Carica papaya leaves ethanol and acetone extracts (CPLe and CPLa)), Capsicum annuum ripe fruits ethanol extract and acetone extracts (CAFe and CAFa), levamisole HCl, Piperazine citrate and phosphate buffered saline (PBS). All plant extracts were given at dose of 0.48g per bird as determined from a previous invitro experiments. Levamisole HCl was given at 25mg/kg body weight and piperazine citrate at 100mg/kg body weight. The control group received 0.2% DMSO in PBS. About 28 plant families with 39 species were mentioned. The most ranked plants were Capsicum annuum L. (PRK 65.4%) followed by Carica papaya L. (PRK 42.3%). Leaves were most used, were pounded and herbs orally administered. The mean knowledge score was 11.6/16 (SD=3.5). The mean attitudes score was 7.8/10 (SD=1.95). The mean practices score was 16.39/32 (SD= 5.58). The standardized mean scores were 72.5, 78 and 51.2 for knowledge, attitudes and practices respectively. Age was significantly related to knowledge, attitudes and practices ($p < 0.05$, $p < 0.001$, $p < 0.001$) respectively. GC-MS analysis of Carica papaya L of acetone extracts contained vitamin C (42%) and sterols (13%), whereas the ethanol extracts contained lipids (45.04%) and pyranones (20.3%). The acetone extracts of Capsicum annuum L had lipids (45.04 %) and alkanes (27.7%), whereas ethanol extracts exhibited lipids (50.16%) and alkaloids (22.73%). About 0.08g/ml of the extracts had paralyzed more than 50% of adult A. galli after 5 hours compared to the lower concentrations. On average, FECR ranked as follows: levamisole hydrochloride>CPLa>CAFa>CAFe>CPLe>piperazine citrate with the percentage reductions ranging from 98.67±2.309 -35.67±2.082, respectively. Biochemically, CPLe, CAFe and piperazine citrate caused significantly higher blood sodium than CAFa ($p=0.046$, $p=0.005$, $p=0.04$), respectively. CPLe caused more serum albumins and levamisole caused higher AST levels than CAFe ($P=0.02$, $p=0.04$), respectively. CAFe, CPLa and levamisole caused eosinophilia compared to the PBS ($p= 0.01$, $p= 0.017$ and $p= 0.001$) respectively. CAFa

and piperazine caused eosinopenia compared to PBS (p=0.000) for each. Except CPLe, all extracts caused various levels of inflammation in the kidney and liver in the order of CAFe > CPLe > CAFa. In conclusion, the extracts were effective but CPLa was more efficacious and comparable to levamisole hydrochloride. All extracts were more efficacious than piperazine citrate at its recommended therapeutic dose. All extracts were toxic except CPLe. The study shows that extracts are not safer than synthetic anthelmintics and therefore they should also be used with caution.

## Description

A thesis submitted to the Directorate of Research and Graduate Training in fulfilment of the requirements for the award of the Degree of Doctor of Philosophy, Makerere University.

## Citation

Zirintunda, G. (2025). Indigenous knowledge, efficacy and safety of medicinal plants used in the control of chicken helminths in Uganda : a case of Soroti District (Unpublished doctoral dissertation). Makerere University, Kampala, Uganda.

## URI

https://makir.mak.ac.ug/handle/10570/16185

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