

Antimicrobial activity and phytochemical analysis of *Acacia nilotica* (L.) Del.

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Abstract

In the present investigation the antimicrobial activity of ethanol, chloroform, water and methanol extracts of different parts (stem, leaf, seed) of *Acacia nilotica* (L.) Del. was observed. Only methenolic extract showed good activity against all the tested bacteria and fungi except *Aspergillus niger*. The determination of MIC value was found at the conc. of 5µl on *Escherecia.coli*. Phytochemical analysis revealed presence of alkaloids, saponin, flavonoid, tannin and glycosides in the leaf extract.

Key words : Antimicrobial, *Acacia nilotica*, leaf extract, Phytochemical.

Infectious agents like bacteria, fungi, and other microbes are becoming more resistant to medical treatment. Hence plant derived antimicrobials have received considerable attention in recent years. Several plants are indicated in folk and other traditional system of medicine as aseptic agent. *Acacia nilotica* (L.) Del. also called “Babul” and “Indian Gum Tree” belongs to the subfamily Mimosoideae of the family Fabaceae. Whole plant parts are used for medicinal purposes, such as gonorrhoea, leucorrhoea, diarrhoea, dysentery, diabetes etc¹.

Fresh disease free leaves, stem bark and seeds of *Acacia nilotica* were collected from R.D. University campus and washed thoroughly with running tap water. Dried in shade before grinding them into powder and stored in airtight containers. Each plant

material (25 gm) was soaked in 100 ml of distilled water for 48h and then filtered through muslin cheese cloth and Whatman filter paper No. 1 respectively then filtrates were subjected to low speed centrifugation (3500 rpm) for 10 min. The clear supernatant was allowed to dry at room temperature and stored in crude form at 4°C in refrigerator till further use. Methanol extract was also prepared similarly.

Three bacterial species viz., *Agrobacterium tumefaciens* MTCC 431, *Escherichia coli* MTCC 729; *Bacillus cereus*; two fungal cultures viz. *Candida glabrata* and *Aspergillus niger* procured from Microbial Type Culture Collection (MTCC), Chandigarh were used as test organisms. Antimicrobial activity was determined by agar disc diffusion method. The disc was soaked in 15µl of extract separately.

MIC of selected methanol extract of leaf was determined by using agar well diffusion method at different concentrations¹. Qualitative phytochemical test were also performed².

Table-1. Effect of methanol extract of *Acacia nilotica* leaf and bark on test organisms

Test organisms	Seed extract (ZOI in mm)	Leaf extract (ZOI in mm)	Bark extract (ZOI in mm)
<i>Escherichia coli</i>	12.00	15.30	-
<i>Agrobacterium tumefaciens</i>	-	10.60	-
<i>Bacillus cereus</i>	06.50	09.60	10.60
<i>Candida glabrata</i>	-	08.30	15.00
<i>Aspergillus niger</i>	-	-	-

The methanolic extract of different parts of *A. nilotica* showed good antibacterial activity against *B. cereus*. The highest zone of inhibition was recorded in leaf extract against *E.coli* (15.30mm) followed by bark extract against *C.glabrata* (15.00mm). Seed extract also showed antibacterial activity against *E. coli* and *B. cereus* (Table-1). Whereas, the antifungal activity was exhibited in bark and leaf extracts against *C. glabrata*.

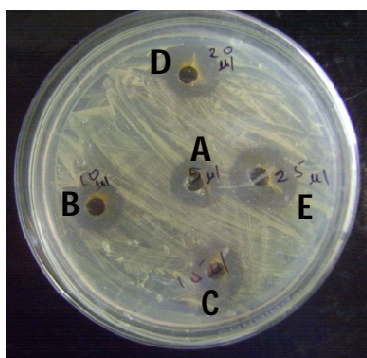


Fig.1. Minimum inhibitory concentration (MIC) of methanol extract of leaf against *E.coli*

(Different conc. of extract in well A=5µl, B=10µl, C=15µl, D=20µl, E=25µl)

The minimal inhibitory concentration of methanol extract of leaf of *A. nilotica* was found to be 5µl against *E. coli*.

Presence of alkaloid, tannin, saponin, glycoside, flavonoids and resins were observed in methenolic extract. These might be responsible for antimicrobial activity against test organisms studied.

The plant is known for folkloric uses as remedy for urinary tract infection, diarrhoea, skin diseases and other infectious diseases. The study justifies the claims about the therapeutic value of this plant as curative agent.

References :

1. Adigozel, A., M. Guluse, M. Sengul, H. Ogutcu, F. Sahin, and I. Karaman (2005) *Turk. Journal Biology* 29: 155-160.
2. Banso, A. (2009) *Journal of Medicinal Plants Research* 3(2): 82-85.
3. Deshpande S.N. (2013) *Journal of Pharmacognosy and Phytochemistry* 1(5): 23-27.