

# Short Communication

Pak. j. sci. ind. res., vol.36, nos 11-12, November-December, 1995

## Antibacterial and Phytochemical Studies on

### *Dicoma tomentosa*

S. KHALID, N. AFZA, H.A. RIZVI, AND Y. BADAR

PCSIR Laboratories Complex, Off University Road,  
Karachi-75280, Pakistan

(Received July 6, 1992; revised November 21, 1996)

*Dicoma tomentosa*, a member of the compositae family, is an annual shrub and widely grows in Pakistan, India and Tropical Africa [1]. The shrub is strongly bitter and used as a fabrifuge [2]. Sesquiterpene lactones, triterpenes, sterols and long chain hydrocarbons were isolated from the whole plant [3,4], but no systematic biological and chemical study has so far been carried out on various parts of this plant. The present work describes the screening of antibacterial activity of its roots, leaves and flowers. Some important chemical constituents like alkaloids, flavonoids, terpenoids, steroides, coumarins and saponins were also determined qualitatively in order to locate and identify the possible class of compounds which is responsible for biological activity.

The plant was collected from the suburbs of Karachi. Its roots, shoots and flowers were separated, washed to remove extraneous matters, dried in shade and extracted with 95% ethanol by percolation method. The extracts were evaporated to dryness under reduced pressure and tested for antibacterial activity against 13 different pathogenic bacteria by agar dilution streak method [5]. The extracts were also qualitatively tested for various chemical components like alkaloids, flavonoids, steroids/triterpenoids, sponins and coumarins.

TABLE 1. MINIMUM INHIBITORY CONCENTRATION OF *DICOMA TOMENTOSA* AGAINST DIFFERENT STRAINS OF PATHOGENIC BACTERIA.

Sr. No.	Organisms	Minimum inhibitory concentration (µg/ml.)								
		Flowers			Leaves			Roots		
		1000	500	100	1000	500	100	1000	500	100
a. Gram Positive										
1.	<i>Bacillus subtilis</i>	-	-	-	+	-	-	-	-	-
2.	<i>Staphylococcus aureus</i>	+	+	+	-	-	-	+	+	-
3.	<i>Streptococcus faecalis</i>	-	-	-	-	-	-	+	-	-
b. Gram Negative										
4.	<i>Salmonella typhi para B</i>	-	-	-	-	-	-	-	-	-
5.	<i>Salmonella typhimurium</i>	-	-	-	-	-	-	-	-	-
6.	<i>Shigella boydii</i>	+	-	-	-	-	-	+	-	-
7.	<i>Shigella flaxneri</i>	+	-	-	-	-	-	+	-	-
8.	<i>Shigella sonnei</i>	+	-	-	±	-	-	+	-	-
9.	<i>Shigella dysenteriae</i>	+	-	-	-	-	-	+	-	-
10.	<i>Citrobacter freundii</i>	+	+	-	-	-	-	-	-	-
11.	<i>Escherichia coli</i>	+	+	+	+	-	-	-	-	-
12.	<i>Pseudomonas aeruginosa</i>	+	+	-	-	-	-	+	+	-
13.	<i>Proteus vulgaris</i>	-	-	-	+	+	-	-	-	-

+= 100% Inhibition, - = No inhibition, ± = 50% Inhibition.

The results represented in Table 1 indicate that a mild broad spectrum antibacterial activity was found in the extracts of flowers and roots of *Dicoma tomentosa*. Both flowers and roots at 1000 µg/ml conc. have completely inhibited all the tested strains of *Shigella* but have not shown activity against any *Salmonella* species. Significant activity was only found in the flowers where 100 µg/ml crude extract was sufficient to inhibit completely the growth of *S.aureus* and *E. coli*. Leaves have relatively low activity against only few organisms. It is interesting to note that the extracts of leaves inhibit *B.subtilis* and *P. vulgaris* which are not inhibited by the extracts of flowers and roots. As given in Table 2, the whole plant is rich in alkaloids and flavonoids while the concentration of steroids/triterpenoids, saponins and coumarins are very low. The biological activity of this plant may be attributed to its alkaloids or flavonoids fractions.

TABLE 2. QUALITATIVE DETERMINATION OF CHEMICAL CONSTITUENTS OF *DICOMA TOMENTOSA*.

Chemical Constituents	Flowers	Leaves	Roots
<i>Alkaloids</i>			
(a) Meyer's Reagent	+++	+++	+
(b) Dragendroff's Reagent	+++	+++	+++
(c) Wagner's Reagent	+++	+++	+++
(d) TLC	+	+	+
<i>Flavonoids</i>			
(a) Et OH/KOH	+++	+++	+++
(b) Mg/HCl	+++	+++	+++
<i>Steroids/Triterpenoids</i>			
(a) Salkowski's Test	+	+	+
(b) Libermann Buchardts Test	+	+	+
<i>Saponins</i>			
(a) Foam Test	-	-	-
(b) 4-hydroxybenzaldehyde Test	++	+	++
<i>Coumarins</i>			
	++	-	-

+++ = high amount, ++ = relatively less, + = very little, - = absent.

**Key words:** *Dicoma tomentosa*, Antibacterial, Phytochemical

## References

1. S. M. H., Jafri, *Flora of Karachi*, Special Edition for Export (The Book Corporation, Karachi, 1966), pp.343.
2. Hakim M. Said, *Hamdard Pharmacographia, Indica*, Special Issue (The Institute of Health and Tibbi Research, Hamdard National Foundation, Pakistan, 1972), P. II, pp320.
3. R. Mehta, O.P. Arora and M. Mehta, *Indian J. Chem. Sect., B.*, **20 B** (9), 834 (1981).
4. F. Bohlman, P. Singh and J. Jakupovic, *Phytochemistry*, **21** (8), 2122 (1982).
5. L. A. Mitscher, R. P. Leu, M.S. Bathala, W. N. Wu, K. L. Beal and R. White, *Lloydia*, **35**, 157, (1972)