

Study of antibacterial activity of *Cucurbita pepo* pollen extract

GEETANJALI KAMBLE¹, ALKA MISHRA²,
RAJENDRA SHAH³ and SUREKHA KALKAR²

¹Pulses Research Unit, Dr. Panjabro Deshmukh Krishi Vidyapeeth, Akola - 444104 (India).

²P.G Department of Botany, Government Institute of Science, Nagpur - 440 001 (India).

³Department of Microbiology, J.M.Patel College, Bhandara - 441 904 (India).

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ABSTRACT

The methanolic extract of the pollen of *Cucurbita pepo* was tested for its antibacterial activity against *Staphylococcus aureus*, *Proteus vulgaris*, *Bacillus cereus* and *Escherichia coli*. Results showed that of these four human pathogens, *Proteus vulgaris* and *Escherichia coli* exhibited significant sensitivity against the pollen extract whereas the remaining species showed resistance.

Key words: *Cucurbita pepo*, Antibacterial activity, Pollen extract.

INTRODUCTION

Application of medicinal plants by man for the treatment of various infection is well known since long time. A large proportion of village population worldwide depends on this. The indigenous system of medicine namely Ayurveda and Unani have been in existence from ancient times. The medicinal value of plants and herbal drug is attributed to the presence of some chemical components in them such as glycosides, resins, alkaloids, essential oils, gum, mucilage etc. ^{4,11,13}.

From time to time study has been conducted on different medicinal plant product and their antimicrobial activity has been reported^{9,9,15}, Antimicrobial activity of leaf extracts of medicinal plants has been studied and the antibacterial and antifungal action has been demonstrated^{1,8,12,14}. Reports on antimicrobial activity of plant pollen extract are scanty. Recently in Turkey, antibacterial activity of Turkish pollen and propolis extracts against some common plant pathogen was conducted by Esin Basima *et al.*, (2006) whereas Solang Teresinha Carpes *et al.*, of Brasil in 2007 has made studies on antibacterial activity of ethanolic pollen extracts against some pathogenic bacteria like *Pseudomonas aeruginosa*, *Bacillus cereus*, *Staphylococcus aureus*, *Klebsiella spp.* etc. Alike their work other workers have reported the therapeutic importance of pollen and propolis extracts^{6,7,10}. In India work on evaluating antimicrobial activity of any pollen extract has no been reported yet. Therefore in the present study an attempt has been made to investigate antibacterial activity of

methanolic extract of *Cucurbita pepo* pollen against some human pathogenic bacteria. The test bacteria in our study were *S. aureus*, *Proteus vulgaris*, *Bacillus cereus* and *Escherichia coli*.

MATERIAL AND METHODS

All the bacterial species viz.. *S. aureus*, *P. vulgaris*, *B. cereus* and *E. coli* used for testing were obtained from Disha Institute of Bio-Technology and Research Pvt. Ltd Nagpur. Microbiological methods were used for identification of these bacteria which included studying their morphological, cultural and biochemical characteristics. Various culture media needed for the study were obtained from Hi-media Laboratory, Mumbai, Culture media, reagents and glassware used were sterilized by the recommended standard methods. Anthers of *Cucurbita pepo* (Cucurbitaceae) were carefully collected from the fields located near Nagpur and Bhandara and their identity was confirmed through literature. Two grams of fresh pollen powder was grounded in 8 ml methanol to get alcoholic extract. The alcoholic macerate were kept for 24 hr. at room temp.¹¹ Macerates were centrifuged at 10,000 rpm for 15-20 min. The supernatant was filtered by using Whatmann no. 1 filter paper and sterilized by bacteriological membrane filter technique. This 2.5% filter sterilized methanolic extract of *C. pepo* pollen was used for *in vitro* study.

Disc diffusion method² was employed for testing antibacterial activity of methanolic pollen extract. About 25ml Muller-Hinton Agar poured into

petri plate was cooled at room temperature for setting. 0.1 ml of fresh Nutrient Broth of the test bacterial culture was surface spread on Muller-Hinton Agar. Sterile Whattmann no. 1 filter paper discs of 5 mm diameter soaked in pollen alcoholic extract were placed on the inoculated media and incubated at 37°C for 24hr.

RESULTS AND DISCUSSION

Results of antibacterial activity of methanolic extract of *Cucurbita pepo* pollen is shown in Table 1. Out of four bacterial human pathogens tested in our study *Staphylococcus aureus* and *Bacillus cereus* have shown resistance towards the pollen extract while *Escherichia coli* and *Proteus vulgaris* have exhibited marked sensitivity. Our results thus clearly indicate the presence of antibacterial action possessed by plant pollen extract alike the extracts of plant leaves, stems roots seeds which is shown by earlier workers^{1,8,9,11,12,13,15}. More over work done by Isla *et al.*, (2001), Proestos *et al.*, (2005) and Carpes *et al.*, (2007) have revealed the antimicrobial activity in pollen extract to be associated with the presence of several phenolic and flavonoid compounds in them.

Ethanollic pollen extract used by Carpes *et al.*, (2007) in their study have shown antibacterial activity against *Bacillus subtilis*, *Bacillus cereus*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Klebsiella* Spp. Studies conducted by Esin Basim *et al.*, (2005) have shown the inhibition of growth of plant pathogenic bacteria such as *Agrobacterium tumefaciens*, *Pseudomonas syringae* pv tomato, *Xanthomonas axonopodis* pv vesicatoria, *Erwinia amylovora* etc. Thus the result in our study clearly reveals the antimicrobial activity of pollen extract. This is the first report on antibacterial activity of methanolic pollen extract of *Cucurbita pepo* against human bacterial pathogens.

Table 1: Antibacterial activity of methanolic pollen extract of *Cucurbita pepo*

S. No	Bacterial Species	Dia. of zone of inhibition (mm)
1.	<i>Proteus vulgaris</i>	16
2.	<i>Escherichia coli</i>	10
3.	<i>Staphylococcus aureus</i>	ND
4.	<i>Bacillus cereus</i>	ND

ND – Not detected

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