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Antibacterial study of *Gymnema sylvestre* plant

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Abstract
Gymnema sylvestre is a medicinal plant found in India. The present study deals with the antibacterial potentials of ethanolic extracts from powdered leaves of *G. sylvestre* were tested against bacteria E. Coli NCIM 2065, Pseudomonas aeruginosa MTCC 424, Enterococcus hirae NCIM 2080, Bacillus subtilis NCIM 2063, Micrococcus luteus NCIM 2103, Staphylococcus aureus NCIM 2079 bacterial strains by disc diffusion method. The result of the study shows its therapeutic value and for treating the diseases caused by pathogenic bacteria.

Keywords: Gymnema sylvestre, Bacterial strains, Disc-diffusion method, Antibacterial assay

Introduction
Medicinal plants have been used since long time as remedies for human diseases because they contain components of the therapeutic potential[1]. Traditional medicine is an alternative forms of the health care and the development of microbial resistance to the concern antibiotic has led to investigate the antimicrobial activity of medicinal plants. The increasing demand of antibiotic resistance shown by pathogenic bacteria has led to screening of medicinal plants for antimicrobial activity [2].
Gymnema is a famous herbal medicine used in world-wide. The leaves of *G. sylvestre* have been used in India for the treatment of diabetes. The plant has anti- diabetic potential [3]. Anti-oxidant [4]. Anti-inflammation [5]. Insulinotropic [6]. And antimicrobial activities [7]. The purpose of this work is concern with the screening of the plant for in vitro antibacterial properties of *Gymnema sylvestre* were tested against the six bacterial strains.

Experimental
Plant Material: The leaves of *G. sylvestre* were collected in the month of September 2015, from the Government Agriculture College, Indore, India. The collected plant materials were shade dried for 10 days.
Preparation of Plant Extracts: About 25 grams of dried leaves material was crushed and blended to be used for organic solvent. The blended materials were transferred in beaker and were soaked in ethanol at room temperature. The extraction was done using rotary shaker and the extract was allowed for vaccum-dried. The extract was diluted using dimethyl sulfoxide (DMSO) before antibacterial analysis.
Test Organisms: A total six pathogenic bacterial strains E. Coli NCIM 2065, Pseudomonas aeruginosa MTCC 424, Enterococcus hirae NCIM 2080, Bacillus subtilis NCIM 2063, Micrococcus luteus NCIM 2103, Staphylococcus aureus NCIM 2079 were used in this study. All bacterial strains were procured from Himedia, Mumbai, India.
Test for Antibacterial Assay: The antibacterial activity of plant extract was tested **by** disc diffusion method**.** Minimum inhibitory concentration (MIC) was determined by the broth dilution method. A quantity of 0.6g of each extract was dissolved in 300 ml sterile nutrient broth, which yields initial concentration of 2000 µg/ml. subsequently, two-fold serial dilution was made from the stock to obtain following concentrations 1000, 500, 250, 125, 62.5, 31.5 and 15.6 µg/ml. The leaf extract in ethanol was tested separately for each bacterium and inhibition zone of microbial growth in the plates containing test solutions was judged by comparison with blank control plates. MIC is defined as the lowest concentration of test samples the result in a complete inhibition of visible growth.

Fig 1: Antimicrobial activities of gymnema extract against gram positive and negative bacteria.

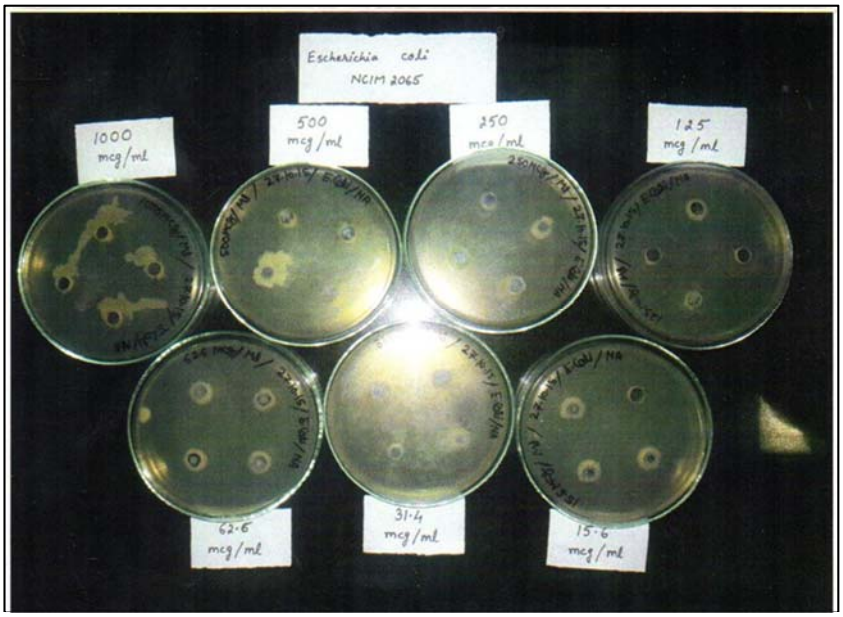


Fig 1: E. Coli NCIM 2065

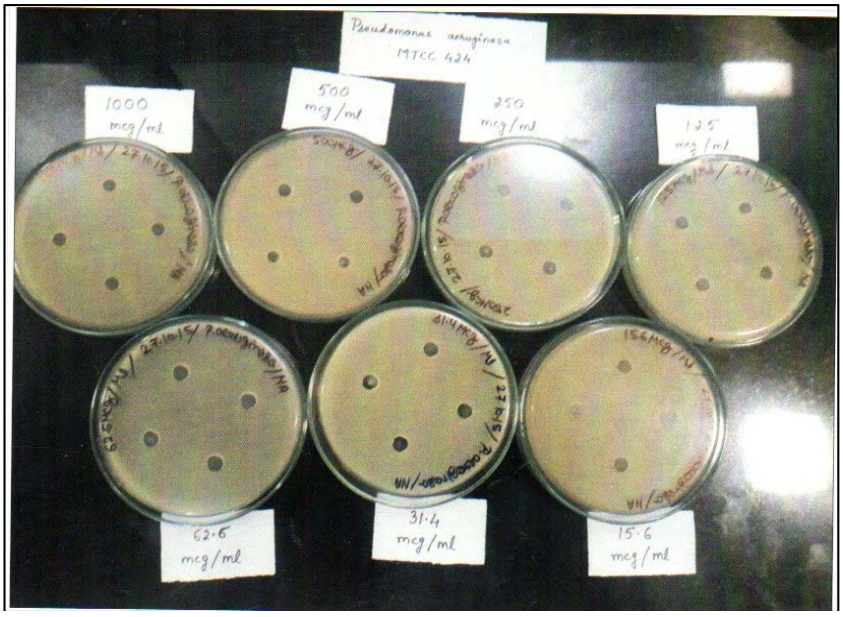


Fig 2: Pseudomonas aeruginosa MTCC 424

Fig 3: Enterococcus hirae NCIM 2080

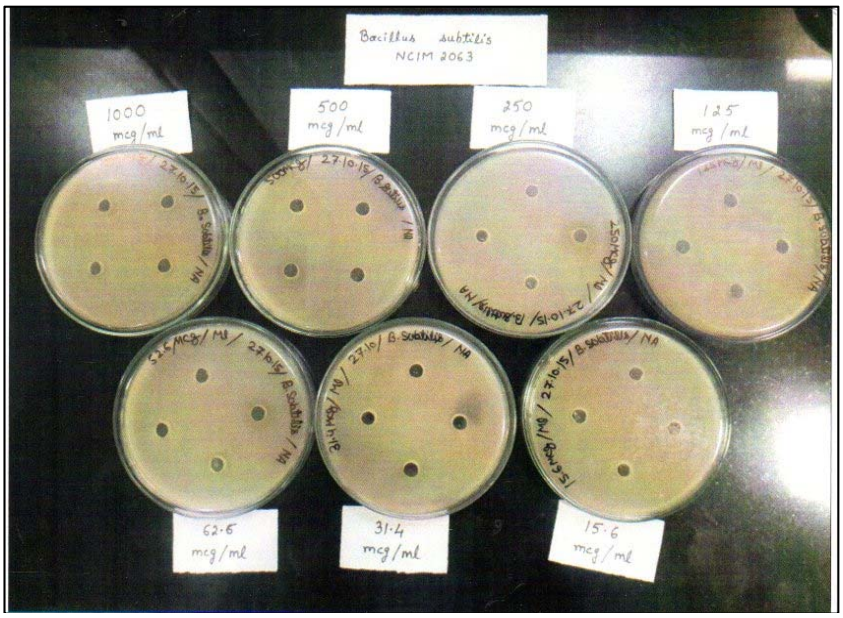


Fig 4: Bacillus subtilis NCIM 2063

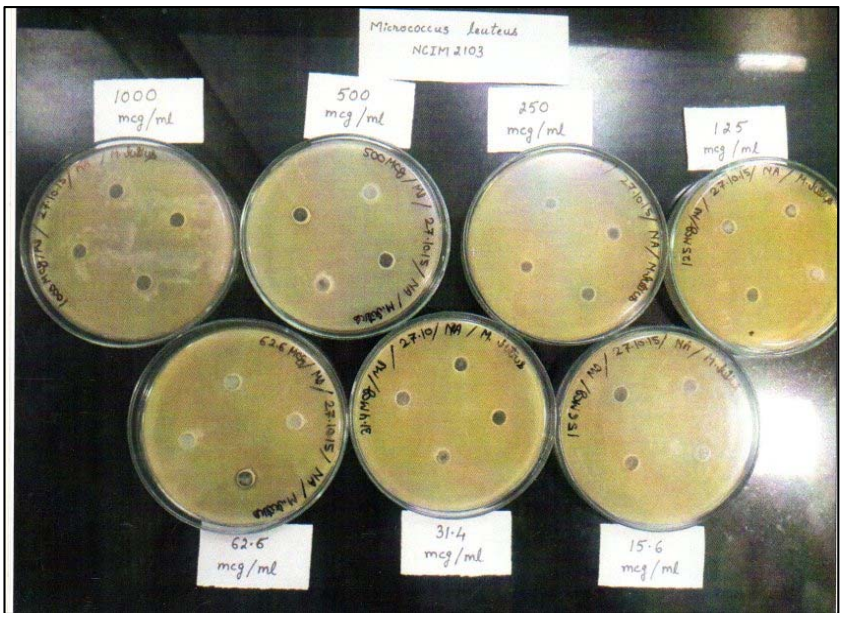


Fig 5: Micrococcus luteus NCIM 2103

Fig 6: Staphylococcus aureus NCIM 2079

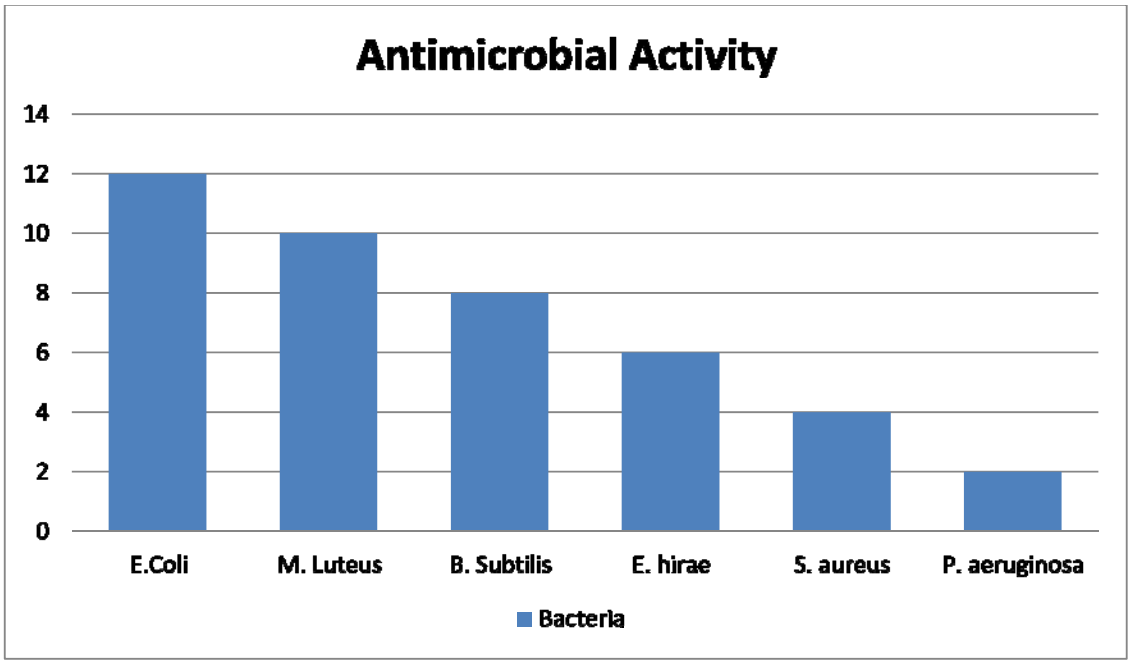
Table 1:

S. No	Concentration (µg/ml)	Gram positive & negative bacteria, MIC (mm)					
		E. coli	P. aeruginosa	B. subtilis	E. hirae	M. luteus	Sureus
1	100	++	-	-	+	+	-
2	500	+	-	-	+	+	+
3	250	+	-	+	-	-	+
4	125	+	-	-	-	-	-
5	62.5	+	-	+	+	+	-
6	31.5	-	-	-	-	-	-
7	15.6	+	+	+	-	+	-

+ = Moderate activity, ++ = Maximum activity, - = No activity

Result and Discussion

The MIC values of leaves of G. sylvestre are presented in Table no 1, E. coli exhibited good antibacterial activity with the high inhibition zones, while Bacillus subtilis and M. luteus showed mild activity and P. aeruginosa, S. aureus show less activity. Ethanol extract showed high degree of antibacterial activity against E. coli, E. hirae and M. luteus and less effective against bacteria P. aeruginosa, S. luteus.



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