



ANTIMICROBIAL ACTIVITY OF ETHANOLIC ROOT EXTRACT OF *BETA VULGARIS*

Krishnaraj R^{1*}, Murugan R², Premlal KR³

¹Division of Prosthodontics, ²Division of Oral Maxillofacial Surgery, Rajah Muthiah Dental College & Hospital, Annamalai University, Chidambaram, Tamilnadu, India.

³Division of Oral Pathology & Microbiology, Indira Gandhi Institute of Dental Science, Sri Balaji Vidyapeeth University, Puducherry, India.

ABSTRACT

The present study was conducted to evaluate the antimicrobial potential of ethanolic root extract of *Beta vulgaris* against gram negative and positive bacteria. The well diffusion technique was adopted for the antimicrobial activity. The plant extract 50 µl was used and the streptomycin 10 µg was used as reference control. The root extract of *Beta vulgaris* exhibited significant antimicrobial activity by inhibiting the microbial growth by sufficient zone of inhibition and the effect was comparable with reference control. From the result it was concluded that ethanolic root extract of *Beta vulgaris* exhibits antimicrobial activity against gram positive and negative bacterias.

Keywords: *Beta vulgaris*, Antimicrobial activity and Streptomycin.

INTRODUCTION

Medicinal Plants are rich in wide variety of secondary metabolites, such as tannins, terpenoids, alkaloids, flavonoids, phenols and quinines [1] which have been used worldwide in traditional medicine to treat several diseases and infections [2]. Many studies all over the world have been showed that these plants and their extract have multi-antimicrobial properties [3]. While 25 to 50 % of current pharmaceuticals are derived from plants, none is used as antimicrobials [4]. Moreover, a large number of plant species have not been studied for potential antimicrobial activity or described. *Beta vulgaris* commonly known as beet root belongs to family Amaranthaceae, has been used in folk medicine to treat a wide variety of ailments like fever, constipation, cancer, wound healing and diabetes. Modern research is investigating in further detail how beet extracts could be used to control fever, inflammation and heals the wound, however no systemic scientific study is available on its effect as antimicrobial potential. Phytochemical studies of *Beta vulgaris* root reveal the presence of flavonoids, carbohydrate, betain, neobetain and anthocyanin pigments. The present study is aimed to evaluate the

antimicrobial activity of ethanolic root extract of *Beta vulgaris* against gram negative organism like *Escherichia coli* and gram-positive organism like strains *Bacillus subtilis*.

MATERIALS & METHODS

Plant Material

The roots of *Beta vulgaris* was collected from the local market of Chidambaram, the plant samples were identified and authenticated by the botanist, agricultural college Botanical Survey of India, Annamalai University. The voucher specimen (53588) has been deposited in Herbarium for further reference.

Preparation of Extract

The roots were washed with water and dried in sunlight for one hour and then it was dried under shade. By the help of grinder the dried roots were powered to get coarse. Dried course powders of the roots were extracted with 70% ethanol by using soxhlet apparatus. The extracts were then concentrated, dried and stored in desiccators. Obtained alcoholic extract of *Beta vulgaris* were used for the antimicrobial activity.

Micro Organisms

Two bacterial species, Gram-positive *Bacillus subtilis* and gram-negative *Escherichia coli* were used for the study. These microbes were obtained from the microbiology department of Rajah Muthiah Dental College & Hospital, Annmalai University, Chidambaram.

Screening of Antibacterial Activities

The well diffusion assay technique of Chung *et al.*, 1998 was used adopted for antimicrobial study⁵. 500 µl of microbes cultures age 18 - 24 h were add to Petri plates and nutrient agar were poured. After media were solidified, holes were made by using 5 mm cork borer each hole was filled with 50 µl of plant extract.

The inoculated agar plates were left in refrigerator for one hour for proper diffusion then plates were incubated, at 37 °C for the bacteria for 24 h. Negative and positive controls were used. The zones of inhibition were then recorded in millimeters.

Determination of Minimum Inhibitory Concentrations (MIC)

The antimicrobial activity of the plant extract, that shows antimicrobial activity, were determined by 2-fold dilution methods as described by Omura *et al* ⁶. MICs were read in µg/ml after over night incubation at 37°C. All experiments were made in replicate.

RESULT

Table 1. Antimicrobial effect of ethanolic root extract of *Beta vulgaris*

Test Samples	Diameter of Zone of Inhibition (mm)	
	Gram Negative	Gram Positive
	<i>Escherichia coli</i>	<i>Bacillus subtilis</i>
Vehicle Control (Ethanol 70%)	0.9 ±0.003	0.7±0.002
Streptomycin (10 µg)	7.34±0.06	8.69±0.07
<i>Beta vulgaris</i> Root Extract (50µl)	6.94±0.03	6.23±0.04

Values are represented as mean ±SEM

CONCLUSION

The antimicrobial activity of ethanolic root extract of *Beta vulgaris* was studied by using gram negative and gram positive species. 70% Ethanol was used as vehicle control and streptomycin 10 µg was used was reference control. The extract of *Beta vulgaris* 50 µl was used to assess the antimicrobial potential against *Escherichia coli* and *Bacillus subtilis*. The zone of inhibition for reference control streptomycin was 7.34±0.06 mm and 8.69±0.07 mm for Gram negative and Gram positive species respectively. The zone of inhibition for *Beta vulgaris* root extract was 6.94±0.03mm and

6.23±0.04 mm for Gram negative and Gram positive respectively. The antimicrobial effect produced by the *Beta vulgaris* root extract was comparable with that of the reference control streptomycin. From the above it may conclude that, the *Beta vulgaris* root extract exhibited antimicrobial property against *Escherichia coli* and *Bacillus subtilis*.

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CONFLICT OF INTEREST:

The authors declare that they have no conflict of interest.

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