GTRP
Int. J. Biological Technology

Antibacterial activity of vermiwash of *Eisenia fetida* (Earthworm)

B. Govindarajan[1*] and V. Prabakaran[2]

[1]Department of Zoology, VHNSN College, Virudhunagar- 626001, Tamilnadu.

[2]Department of Zoology, Government Arts College, Karur – 639 005, Tamil Nadu, India.

*Corresponding Author E-mail: bgrmphilbed@gmail.com; Mobile: 919003494749

Published: 15, December, 2012; Vol. No. 3(3): 15-16; www.gbtrp.com;

Abstract

Earthworms respond to microbial infection through body fluid defense mechanisms such as antimicrobial vermiwash secretions. In the present study, vermiwash was collected from *Eisenia fetida* and tested against four bacterial strains (*Klebsiella pneumonia, Pseudomonas fluorcscence, Pseudomonas aeruginosa* and *Escherichia coli*). Vermiwash was able to inhibit the growth of pathogenic bacteria. This research may be used for vermi-medicine field.

Keywords: *Eisenia fetida*, vermiwash, antibacterial activity

Introduction

Microorganisms are known to play a major role in soil characteristics, invertebrates are believed to act as regulators of antimicrobial activity. Earthworms live in an environment filled with various kinds of pathogens. Physiologically and evolutionally speaking, earthworm survival in such an environment must have favoured the development of efficient defense mechanisms against various environmental pathogens during the course of evolution, including the production of certain anti-microbiological substances, especially active proteins and enzymes (Wenli *et al*.,2011). Earthworm vermiwash were found to have potent antimicrobial activity. Hence, in the present research study the vermiwash prepared from the earthworm *Eisenia fetida* was tested for antimicrobial potential.

Materials and methods

Experimental animal

Eisenia fetida was selected as the experimental animal. *E. fetida* was procured from Shakthi Vermicompost Farm in Vadipatti, Madurai district, Tamil Nadu and kept on mother culture tank that was moist with de-ionized water. The cow dung was added as food.

Preparation of vermiwash

Vermiwash was collected from the body cavity of *E. fetida* without causing any harm to them. In this method of collecting the fluid, three to four earthworms were taken in an approximately 10cm diameter petri plate. Holding the plate in a slanting position and keeping earthworms pointing downwards, cold shock was given to earthworms by gently moving a small beaker containing a few ice cubes over the body of worms. The vermiwash released due to cold shock drips and gets collected at the lower side of the petri plate. The fluid can be pipette out using a treated pipette with fine nozzle. This is the pure vermiwash (Radha and Kale, 2006).

Culture media

The media used for bacterial culture was Muller Hinton agar and agar agar. The antimicrobial activity of the *E. fetida* vermiwash was determined by an agar-diffusion method using discs. The details of microbes used for the testing is given in (Table - 1). The bacterial strains were obtained from Venture Institute of Biotechnology & Bioinformatics Research, Madurai-625004, Tamil Nadu, India.

Table- 1: Antibacterial activity of vermiwash of *E. fetida*

Selected bacterial strain
Klebsiella pneumonia
Pseudomonas fluorcscence
Pseudomonas aeruginosa
Escherichia coli

Result and Discussion

For antibacterial assay of four bacteria strains viz. *E. coli*, *P. aeruginosa*, *P. fluorcscence*, and *K. pneumonia* were used. The antibacterial activity of *E. foetida* directed against Gram-positive and Gram-negative bacteria was analyzed. The gut extracts of earthworms have antibacterial and antifungal activity (Shobha and Kale, 2008). The disc diffusion assay indicated to inhibit the growth of bacteria. Vermiwash was able to inhibit the growth of *Pseudomonas aeruginosa* at a maximum level at disc 3 (20mm), and less inhibited in disc 6 (10mm). In the disc assay *Escherichia coli* were highly inhibited (26mm) (Table- 2).

Table: 2 Antimicrobial activity of *Eisenia fetida* vermiwash

S. No	Bacterial Strain	Zone (mm)			
		C	D-3	D-5	D-6
1	*Klebsiella pneumonia*	NZ	NZ	NZ	NZ
2	*Pseudomonas fluorcscence*	NZ	NZ	NZ	NZ
3	*Pseudomonas aeruginosa*	NZ	20	12	10
4	*Escherichia coli*	NZ	NZ	26	NZ

Note: C-Control, D-Disc, NZ-No zone

The dried earthworm powder of two species shows a strong antibacterial activity against the *S. aureus*, *P. mirabilis*, and *P. aeruginosa* bacterial strains. *Perionyx excavatus* earthworm powder shows more activity than the *Lampito mauritii* (Prakash and Gunasekaran,2011). The present study clearly indicates that the *Eisenia fetida* vermiwash has bioactive compounds to inhibit the growth of bacteria. Hence, vermiwash has a good potential to develop a new drug.

References

Prakash, M. and Gunasekaran G. 2011. Antibacterial activity of the indigenous earthworms *Lampito mauritii* (Kinberg) and *Perionyx excavatus* (Perrier). *J. Altern Complement Med*.,17(2):167-70.

Radha, D. and Kale, R.D. 2006. Vermicompost crown jewel of organic farming. Published by N. D. Kale, Bangalore-23.

Shobha, S.V. and Kale, R.D. 2008. *In vitro* studies on control of soil- borne plant pathogens by earthworm *Eudrilus eugeniae* exudates. Green Pages. http://www.eco web.com/editorial/080106.html.

Wenli, Li., Wang,C. and Zhenjun Sun, 2011. Vermi pharmaceuticals and active proteins isolated from earthworms,*Pedobiologia*,54S, S49-S56.

Manuscript Progress Date
Received : 11.07.2012
Revised : 08.10.2012
Accepted : 09.11.2012