Short Communication International Research Journal of Microbiology 2020
Vol.9 No.1

Clinical Microbiology 2015: Antibacterial activity of bee venom collected from Italian bees (Apis mellifera) - El-Feel M A- Agriculture Research Center

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Abstract
Aim: The aim of this study was to evaluate the antibacterial activity of collected bee venom from Apis mellifera pure Italian race against selected Gram-positive and Gram-negative bacterial strains of medical importance. Methods & Materials: Antibacterial activity of bee venom evaluated against nine pathogenic bacterial strains, including Staphylococcus aureus, Streptococcus mutans, Streptococcus pyogenes, Lactobacillus caseai, Klebsiella pneumoniae, Enterococcus feacalis, Escherichia coli, Listeria monocytogene and Pseudomonas aeruginosa. Results: The results revealed that the amount of bee venom collected from the pure Italian race during two sessions was 478Â±10.03 and 575Â±8.03 mg/colony of venom. Bee venom of bees exhibited antibacterial activity against all five bacterial strains and differs consistent with the sort. Bee venom exhibited antibacterial activity against all five bacterial strains. The minimum inhibitory concentration of BV was determined. These results indicate that BV inhibits the expansion and survival of bacterial strains which BV could also be a useful complementary antimicrobial agent against pathogenic bacteria albeit bee venom collected by different methods.

Introduction

Bee venom produced by the glands of honeybee which has been well documented. Bee venom may be a very complex mixture of active peptides, enzymes, and amines. Many factors affecting honey bee venom production and its quality such as; honey bee race, age of bees, colony strength, season of collection, feeding supplies, race, its defense behaviour and method of collection, venom secretion in honey bee worker begins just before emergence and increases slowly towards a maximum between the tenth and sixteenth day. The therapeutic application of bee venom has been utilized in traditional medicine to treat diseases. It has biological activity against arthritis, rheumatism, pain, rheumatoid arthritis and osteoarthritis, inhibit mammary carcinoma cell proliferation, cytotoxic to malignant cells both in vitro, cancerous tumors, progressive muscle atrophy and skin diseases. Antimicrobial activity on some Gram-negative bacteria. The objective of this investigation was to gauge the antibacterial activity of bee venom collected by different methods from honeybee pure Carniolan race also as its hybrid against selected Gram-positive and Gram-negative bacterial strains of medical importance.

Materials and Methods

Venom collection: This work was carried out in the Department of Apiculture, Plant Protection Research Institute, Agriculture Research Center, Dokki, Giza, during the 2013 summer season. The bee hive because the same power as indicated by many biological activities. Venom collected from the honeybee (Apis mellifera L.) workers of pure Carniolan race also as its hybrid with 1, 2, 3 and 4 week intervals in two experiment of collections by different methods (fiber and latex). The first experiment depends on collecting venom from the highest of the frames while the second depend upon collecting venom from under the frames with extension collar of a height of 20 mm extent distance between the bottom board and the brood chamber while using collector frame. The bee venom was collected by the electrical shock device, It comprises a bee venom collection frame with wire electrodes installed in parallel to each other. Electrical current goes through them in the form of impulses bee venom frames are mounted on the top or under the frames in every hive and then are connected to an electro-stimulator. Using electrical impulses to stimulate the bee workers to sting through latex or fiber sheet placed on a glass plate and picked up the dry venom using sharp scraper. Bees that inherit contact with the wires received a light electric shock and stung onto the glass sheet. The alarm odor, which evaporated from the venom, mobilized and irritated the other bees and they also started to sting. The bee venom collected dries on the glass. The frames with the fresh dried bee venom on them are carefully packed into a special container for transportation to the laboratory. The processing of bee venom is starting right after the frames are brought back within the laboratory. After that bee venom is packed up in the dark glass jars and stored in a cool and dry place Bacterial strains Fife bacterial species, including Gram positive and Gram negative were used. These bacteria were kindly provided by the Department of Zoonotic Diseases, National Research Center, Egypt and Department of Botany, Faculty of Sciences, Al Azhar University, Asut Branch, Egypt. The Gram positive bacteria were Staphylococcus aureus and Streptococcus pyogenes while the Gram negative bacteria were Klebsiella pneumonia, Pseudomonas aeruginosa and Escherichia coli.

Antibacterial assay

Staphylococcus aureus, Streptococcus pyogenic, Klebsiella pneumoniae, Escherichia coli and Pseudomonas aeruginosa

This work is partly presented at 4th International Conference on Clinical Microbiology and Microbial Genomics October 05-07, 2015 held at Philadelphia, US

were utilized in this study. The bacterial suspension was prepared and adjusted by comparison against 0.5 McFarland turbidity standard (5x10 7 organisms / ml) tubes. it had been further diluted to get a final of 5X10 6 organisms / ml. Staphylococcus aureus was enriched on polymyxin agar, as a selective media, while Klebsiella pneumoniae, Escherichia coli and Pseudomonas aeruginosa were enriched on MacConkey broth. All bacteria were subculture on nutrient broth for further bacterial propagation. The broth was inoculated by the 0.20 µl/10 ml broth with Staphylococcus aureus, Streptococcus pyogenes, Klebsiella pneumonia, Escherichia coli and Pseudomonas aeruginosa, then added 40 µl of bee venom. The tubes were incubated at 37°C for twenty-four hr. the expansion of control bacterial strains also as inhibition of the bacterial growth thanks to bee venom was measured by spectrophotometric assay as a turbidity at 420 nm wave length. The mean of inhibition was calculated from triple reading in each test.

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