RESEARCH ARTICLE

FUNCTIONAL ANALYSIS & PEPTIDE STRUCTURE MODELING OF SPHYASTATIN PROTEIN IN SCYLLA PARAMAMOSAIN

Usha.K and Shoba.K

Department of Biochemistry, D.K.M College for Women (Autonomous), Vellore, Tamilnadu, India

ABSTRACT

Mud crabs are consumed due to their high nutritional quality for marine lives as well as for human. The genetic data and morphological characters suggest that Scylla is made of four distinct species, namely, Scylla paramamosain, Scylla serrata, Scylla olivacea, etc. In addition, antimicrobial peptides present in the hemolymph of mud crab serve as humoral immunity, while antioxidants system benefits as the cellular response towards infectious diseases or pathogens. The nucleotide and protein sequence of antimicrobial protein (sphyastatin) from Scylla paramamosain is retrieved from NCBI data base in fasta format. The functional and structural analysis were done through using in silico tools like pep fold server, DLP SVM, glob plot, etc.

INTRODUCTION

The Mud crabs are sold at international market at very high prices. And due to their high price and high demand, interest in aquaculture of this species has been high. Commercial Mud crab farming business is gaining popularity day by day. They have very high flesh content, and rapid growth rates in captivity. And they also have a high tolerance to both nitrate and ammonia. The Mud crab is mainly used for food and very popular. It is generally cooked with it’s shells on. They can be served as one of many types of soft-shell crab, when they molt their shells. They can be prepared for cooking by placing them in a freezer for up to 2 hours before cooking. Hard-shells Mud crabs are generally marketed alive. But the soft-shells Mud crabs are marketed frozen. It is probably the most common crab species in many markets of Southeast Asia.

METHODOLOGY

The sequence of sphyastatin protein in scylla paramamosain is retrieved from NCBI data base. The retrieved sequence submitted to following Insilco tools, to know the functional analysis & peptide structure modeling. The retrieved sequence submitted to scan prosite to get motif of the sphyastatin protein. The retrieved sequence submitted to pcoil tool, to know the functional identification of sphyastatin protein. The retrieved sequence is submitted to Dis-EMBL tool, to know the hydrophobicity and nature of sphyastatin protein. The retrieved sequence is submitted to pep fold server, to know the 3d structural information of sphyastatin protein.

RESULTS AND DISCUSSIONS

Sequence Retrieval

NCBI

Sphyastatin [Scylla paramamosain]

Protein sequence

>AFY10070.1 Sphyastatin [Scylla paramamosain]
MRVLLLLYSLAAVGNAYNAKVPQIQLPERLDNFPGRGP
SFTRPAVVGVQTLPGVPPQTFVGVGVT
LISPPRPGFTGSTRPFQRPGOYFFTSRNCWACRPYNG
DSLCCRQYGACSTSYPVYPKG

Nucleotide sequence

>JX228177.1:34-429 Scylla paramamosain Sphyastatin mRNA, complete cds
ATGCCGCTTCTCTCCTTCTGCTCTCGCCGGCCTGT
AGGGAATGTCTACACGCGAAGGCTTCGGATCC
AGACTGCTACAGAAAAGACTCGATAAATCCTCGGGAAA
GAGGGGCTATCTGCACTACGGAGCCAGTCCAGTCTGGG
AGTCCAGACCTTCCTCCAGGAGAGGATGCACACCACGACT
TTCCCAAGGATGAAAATGTGAGTGACCCACCAAGGCC
TTGATCTCCCGCCGCGCAGCCAGGCAGTCCTCA
CGAGCCCTTCAACGCCAGACATATCTCT

Corresponding author: Usha.K
TCACCCGCAGCAACTGCTGGGACGATGCCCGGGGT
ACCCCAACGGTGACTCCTTGTGCTGCAGGCAATA
CGGTGCTTGTTGCAGCACTTCCTATCCAGTACCCTAC
AAAGGCTAG

The above result shows the fasta format of protein and nucleotide sequence of sphyastatin protein in *Scylla paramamosain*.

**Motif Analysis**

**Scan Prosise**

Hits for all PROSITE (release 2018_11) motifs on sequence AFY10070-1:

found: 4 hits in 1 sequence
AFY10070-1 (131 aa)
MRVLLLLVSLAAGNAYNAKVPIQTLPERLDNFPGRGP
STTRPAVVGQTLPGRVPQFTPGVIGV
GTKPLISPPRGFTSTRPFORPGQYSFTSRNCWARCG
YPNGDSLCCRYGACCSTSYPVYKG

ruler: | 0 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
AFY10070-1 | 123 | 131 |

The above result shows the motif analysis of sphyastatin protein.

**Peptide Analysis**

**Pep Draw**

**MOTIF REGION OF GNAYNA SPHYASTATIN PROTEIN**

The above result shows the molecular structure of motif region in sphyastatin protein.

**Domain Analysis**

DLP-SVM
RESULT OF DOMAIN LINKER PREDICTION BY DLP-SVM SERVER.

**PEP FOLD SERVER**

**MOTIF REGION OF STR SPHYASTATIN PROTEIN**
paramamosain and sphyastatin through the antibacterial activity against different strains of marine or aquatic bacteria. Meanwhile, hemolymph tends to show significant effects on the host immune response that are vital for the host's defense against invaders. The hemocyanin possesses the immune function for the purpose of maintaining the host's health and preventing possible disease in aquaculture. The above result shows the 3D structure of motif region in sphyastatin protein.

**CONCLUSION**

Antimicrobial peptides AMPs(sphyastatin) are described as a group of molecules of the host immune response that are vital in exhibiting antimicrobial activity against the invasion of intruding microorganisms. It has been reported that hemocyanin possesses the immune function for the purpose of preventing possible disease in aquaculture industry. Meanwhile, hemolymph tends to show significant effects on the antibacterial activity against different strains of marine or nonmarine Gram-positive and Gram-negative bacteria. The Mud crab is mainly used for food. It is very popular as food throughout its range and also globally. The protein sequence of sphyastatin is retrieved from the ncbi database. The functional and structural modeling of sphyastatin protein on *Scylla paramamosain* is analysed through the insilico tools. In future, sphyastatin protein will have numerous application in the field of medicine.

**References**


Shoba K., Manjuvani S., Dr. Mazher sultana, Biochemical analysis and gene expression profiling on collagenase protein in fiddler crab, World journal of pharmacy and pharmaceutical sciences, issn: 2278-4357, volume 6, issue 3, 747-756.


