



Estimation of Antibiotic Residues in Cultured Shrimp *Litopenaeus vannamei* from the Coastal Districts of Andhra Pradesh, India

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ABSTRACT

The incidence of antibiotic residues in farmed shrimp *Litopenaeus vannamei* from eight different stations i.e. Nellore, Prakasam, Guntur, Krishna, East Godavari, West Godavari, Visakhapatnam and Srikakulam were determined in the present study during the year 2020. In this study we have studied about the incidences of important antibiotics such as chloramphenicol, tetracyclines, sulphonamides, β -lactam, streptomycin and erythromycin. It is evident from the present findings there is no presence of β -lactam, streptomycin and tetracycline antibiotic residues in all the study areas. However the remaining three antibiotic residues such as chloramphenicol, erythromycin and sulphonamides in different proportions at different stations were recorded.

Keywords: Antibiotic residues, *L. vannamei*, Farmed Shrimp.

Received 08.06.2021

Revised 26.07.2021

Accepted 04.08.2021

INTRODUCTION

Shrimp farming is a profitable sector but its economic prospective is confrontation with many issues and concerns that considerably delayed sustainable growth and development. In 20th century the growth of population rapidly increased which contributed to an increased demand for seafood in both national as well in international markets [1]. Malnutrition due to lack of protein rich food is one of the global problem for many diseases [2]. Nearly 20% of the world population depends on proteinaceous food which is contributed only from finfish and shellfish [3]. Hence the continuous production of seafood is very much essential to supply protein rich food for growing population [1]. Shrimp diseases caused by bacteria and virus are among the commonly associated limiting factors of a successful shrimp aquaculture.

The use of antibiotics is a common plan of action to prevent and control disease outbreaks. According to Mohapatra *et al.*, [4] indiscriminate use of antibiotics in aquaculture systems and this practice is still continued in spite of several precautionary standards set in a number of countries and politico-geographical regions. One of the biggest issues was the development of drug resistance and multiple antibiotics resistance in bacteria which was made in resistance transfer and reduction of efficiency of antibiotic treatment as reported by Tendencia and de la Pena, [5].

In addition to that the occurrence of antibiotic residues in the pond was serious issue; the indiscriminate use of antibiotic as disease control components in shrimp farming has been reduced and attempts in searching strategies were motivated. The investigation of alternative strategies paved the way to the development and application of probiotics as confined aspect of health and welfare management in shrimp farming. Taking into consideration of nutrients towards eco-friendly aquaculture production, assurance of probiotics was appreciated with positively as evidenced by several studies and advancing their beneficial properties [6-9]. Keeping in view of above aspects the survey was conducted for the estimation of antibiotic residues from the culture ponds of east coast of Andhra Pradesh, India.

MATERIAL AND METHODS

The present research work is carried out in coastal districts of Andhra Pradesh in India. A wide survey was conducted in all the areas of the shrimp culture all along the coast of Andhra Pradesh. During the survey the data on antibiotic residues in farmed shrimp *L. vannamei* was investigated. For this study the shrimps were procured from the commercial shrimp farms of Nellore, Prakasam, Guntur, Krishna, East Godavari, West Godavari, Visakhapatnam and Srikakulam. The samples were placed in ice box and were

brought to the laboratory of Department of Marine Living Resources, Andhra University for the analysis and were stored in refrigerator until further analysis. Before performing the experimentation the samples were thawed and washed thoroughly with deionized water. The exoskeleton was carefully removed and the meat was homogenized. The homogenized meat sample was subjected to analysis by following the method of USFDA[10] using charm II analyzer.

RESULTS AND DISCUSSION

Table 1. Antibiotic residues in cultured shrimp *Litopenaeus vannamei* from the coastal districts of Andhra Pradesh (n = 10) (mean values were expressed in ppb)

S.No.	Study Area	CHL	SULF	ERY	β -lactam	STR	TET
1	Nellore	0.093	3.52	2.70	ND	ND	ND
2	Prakasam	0.087	2.67	1.58	ND	ND	ND
3	Guntur	0.071	3.01	2.22	ND	ND	ND
4	Krishna	0.083	2.92	3.87	ND	ND	ND
5	East Godavari	0.092	3.22	2.65	ND	ND	ND
6	West Godavari	0.099	4.01	2.10	ND	ND	ND
7	Visakhapatnam	0.075	5.21	1.78	ND	ND	ND
8	Srikakulam	0.063	3.88	1.24	ND	ND	ND

CHL: chloramphenicol; SULF: sulfonamides; ERY: erythromycin; β -lactam; STR: streptomycin; TET: tetracycline. ND: Not detectable.

It is evident from the present results that the chloramphenicol content was ranged from 0.063 to 0.099, sulfonamides was ranged from 2.67 to 5.21, and erythromycin content was ranged from 1.24 to 3.87 (Table 1). Swapna *et al.*, [11] studied about the antibiotic residues of chloramphenicol, erythromycin, sulfonamides, β -lactam, streptomycin and tetracycline in fish farms from Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. The present study findings are well in agreement with the findings of Swapna *et al.*, [11]. They have reported that there no presence of β -lactam, streptomycin and tetracycline except in one area in Andhra Pradesh i.e. at Bhimavaram. They also recorded that the concentration of remaining three antibiotic residues were recorded at a level of < 100 ppb. The present study findings with reference to chloramphenicol, erythromycin and sulfonamides are very less when compared to Swapna *et al.*, [11].

CONCLUSIONS

In this study we have screened six different antibiotic residues in farmed shrimps (*L. vannamei*). β -lactam, streptomycin and tetracycline were not identified in the study areas provided in the table 1. However the remaining three antibiotic residues were recorded at lowest concentrations in different study stations and all the concentrations were below the permissible limits. Maximum concentration of chloramphenicol was recorded at West Godavari; maximum concentration of sulfonamides was recorded at Visakhapatnam. Similarly maximum erythromycin concentration was recorded at Krishna. The lowest levels of antibiotic residues may be due to the use of different probiotics in culture in recent days is routine practice. Hence the usage of antibiotics in shrimp farming reduced drastically since last decade with the existence of various new brands of useful probiotics.

RECOMMENDATIONS

The antibiotic residues in shrimp meat are of serious concern in view of human health risk. Different brands of commercial probiotics are available which works effectively from seed stocking to harvesting the crop. There is no need of antibiotics in shrimp farming instead, use probiotics to promote the eco-friendly aquaculture practices.

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CITATION OF THIS ARTICLE

Jhansi Rani, Ch. and Ramesh Babu, K. Estimation of Antibiotic Residues in Cultured Shrimp *Litopenaeus vannamei* from the Coastal Districts of Andhra Pradesh, India. *Bull. Env.Pharmacol. Life Sci.*, Vol10[9] August 2021 : 22-24

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