

## **Analysis on Heavy Metals Contained In Selected Ascidians**

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### **Abstract**

Ascidians are marine sedentary organisms. Chemical substances present in marine organisms are a rich source of structurally novel and biologically active metabolites. The present study was carried out to analyse the magnitude of heavy metals contamination in these animals (*Phallusia nigra*, *Phallusia arabica*, and *Eudistoma viride*) by Atomic Absorption Spectroscopy. Results indicated that heavy metals were found to be present in minor quantities and thus it is safe for dietary purposes.

**Key words:** *Phallusia nigra*, *Phallusia arabica*, *Eudistoma viride*, heavy metals

### **Introduction**

The bioactive chemical constituents have medicinal values producing definite physiological effects on human body. These natural compounds form the base of modern drugs [1]. From time immemorial, marine organisms have been closely associated with human life and are exhaustively used in numerous ways as a source of food, medicine [2, 3]. Ascidians are marine sedentary organisms. Hundreds of new compounds have been isolated from ascidians, the majority of which are amino acid derivatives. It is the biological activity associated with many of these natural products that are responsible for research focus on these marine organisms. Ascidians are renowned for their overwhelming bias towards the production of nitrogenous secondary metabolites. Continued chemical interest in this group of animals, displays an increasing number of non-nitrogen containing metabolites being isolated. One of the reasons for the ecological success of this group is their ability to synthesise secondary metabolites with important defensive roles, including antimicrobial peptides, cytosine -like compounds, lectins and antileukemic compounds [4-7].

*Phallusia nigra*, *Phallusia arabica* and *Eudistoma viride* belong to ascididae, ascididae and polycitoridae family. Review of literature revealed that pharmacological activities and some chemical investigations have been carried out in *Phallusia nigra*, *Phallusia arabica* and *Eudistoma viride* [8-23]. Hence a study on heavy metals present in these ascidians has been attempted.

## Materials and Methods

### Collection of animal material

*Phallusia nigra*, *Phallusia Arabica* and *Eudistoma viride* were collected from Thoothukudi coast by SCUBA diving. Molluscan shell, calcrete rock fragments and other epibionts attached to the colony were carefully removed. Identification up to the species level was carried out based on the key to identification of Indian ascidians [24]. A voucher specimens AS 2083, 2276 have been submitted in the ascidian collections of the museum of the Department of Zoology, A. P. C. Mahalaxmi College for Women, Thoothukudi - 628002, Tamilnadu, India

### Systematic position

*Phallusia nigra* belongs to Phylum: Chordata, Subphylum: Urochordata, Class: Ascidiacea, Order: Enterogona, Suborder: Phlebobranchia, Family: Ascidiidae, Genus: *Phallusia* and Species: *nigra*

*Phallusia arabica* belongs to Phylum: Chordata, Subphylum: Urochordata, Class: Ascidiacea, Order: Enterogona, Suborder: Phlebobranchia, Family: Ascidiidae, Genus: *Phallusia* and Species: *arabica*

*Eudistoma viride* belongs to Phylum: Chordata, Subphylum: Urochordata, Class: Ascidiacea, Order: Enterogona, Suborder: Aplousobranchia, Family: Polycitroidae, Genus: *Eudistoma* and Species: *viride*.



Plate 1: *Phallusia nigra*



Plate 2: *Phallusia Arabica*



Plate 3: *Eudistoma viride*

### Preparation of powder and extract

The collected specimen were washed several times with fresh sea water. Epibionts and other particles like sand and shell pieces adhering to the surface of the specimen were carefully removed. Brought to the laboratory and washed again. The whole colony was dried in shade and homogenized to get a coarse powder. The sample is extracted with various solvents such as petroleum ether, benzene, chloroform, methanol, ethanol and water.

## Heavy Metal Analysis

### Standard Preparation

The selected metals were copper, cadmium, lead, arsenic, zinc and mercury. For each of the selected metals a standard linear calibration curve of various concentrations ranging from 0.5000 ppm, 1.0000 ppm and 1.5000 ppm (three points) were analysed by AAS and used as the stock solutions in a quartz flask.

### Atomic Absorption Spectrophotometer - Instrumentation

Analysis of the heavy metal in the selected animal sample was performed by Varian model AA 240 FS atomic absorption spectrophotometer (AAS). Measurements were made using a hollow electron discharge lamp (EDL) for copper, cadmium, lead, arsenic, zinc and mercury at wavelengths of 220.62 nm, 228.80 nm, 283.31 nm, 193.70 nm, 240.0 nm and 253.7 nm respectively. Analysis was performed by testing samples at three different concentrations 0.5000 ppm, 1.0000 ppm and 1.5000 ppm to ensure the wide adaptability and good accuracy of this method.

### Results and Discussion

The results of the present study are given in **Table 1**.

**Table 1: Estimation of Copper, cadmium, lead, arsenic and zinc**

S. No	Species	Copper (ppm)	cadmium	lead	arsenic	zinc
1.	<i>Phallusia nigra</i>	0.216	ND	0.06	ND	0.421
2.	<i>Phallusia arabica</i>	0.312	ND	0.04	ND	0.041
3.	<i>Eudistoma viride</i>	0.218	ND	0.306	ND	0.431

ND- Non Deductable; MDL: Minimum detection limit; <sup>a</sup>n=3 (0.01 mg/kg)

Present study indicates that *Phallusia nigra* contains only copper (0.216), lead (0.06) and zinc (0.421). *Phallusia arabica* contain copper (0.312), lead (0.04) and zinc (0.041). In *Eudistoma viride* contains copper (0.218) lead (0.306) and zinc (0.431). Maximum amount of copper was noted in *Phallusia arabica*, *Eudistoma viride*, *Phallusia nigra*. Other heavy metals like cadmium and arsenic could not be detected in any of our samples. Ascidiens are not only important as food but also as tonics to cure many diseases Because of their low calorific values and very high protein contents, these ascidiens may be greater food values.. It was also supported by previous studies. This result indicates that some selected ascidiens can become important sources of compounds with health protective potential.

## Conclusion

Thus it can be concluded that the extracts of *Phallusia nigra*, *Phallusia arabica* and *Eudistoma viride* contain a small amounts of heavy metals.

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