Nutritional values and Chemical Constituents of ***Anadara brughtonii*** (Schrenck, 1867) and ***Crassostea gigas*** (Thunberg,1793) used in Traditional Medicine in Myanmar

Thein Gi Naing[1], Hnin Hnin Htun[1], Win Soe[1], Than Tun[1], Maung Maung Thet[1], Khin Mya Mya[2], Thant Zin[2], Thein Zaw Lin[1]

1 University of Traditional Medicine, Mandalay ,
2 Department of Zoology, Mandalay University

INTRODUCTION

- Myanmar used animals and their products as medicinal substances since ancient times.
- Most of Myanmar traditional drugs are derived from sources of plants and animals.
- Wild and domestic animals and their by-products (e.g., hooves, skins, bones, feathers, milk and tusks) form important ingredients in the preparation of curative, protective and preventive medicine.

- According to the World Health Organization (1993), about 80% of the world people rely primarily on animal and plant-based medicines.
- About 20 % of Myanmar traditional medicine is based on animal-derived substances.

LITERATURE REVIEW

Anadara broughtonii

- species of Ark clam.
- In the Myanmar costal water it had been recorded from Ngapali, Maungmagan, KyaukKalat., Cocos Island.
- The species is distributed in Far East, from Russia down to Korea, Mainland China, Japan and Taiwan(Cho et.al.,2007)

Traditional medicine in Myanmar

- shell of ***Anadara broughtonii*** was also used by rulers of early Myanmar dynasties.
- The ash form of Jau thwa khone has given to remove toxin from the body,
- increased energy power, salty and cool in nature.

- It also used in the treatment of
- indigestion,
- certain gastric and intestinal disorder,
- cough,
- asthma,
- chest injuries,
- mouth disease,
- oliguria,

- dysentery,
- hotness of urine,
- piles,
- bowel disorder,
- blood vomiting and menstrual disorders in Myanmar traditional medicine (AshinNagathein, 1972).

Crassostrea gigas

- The Pacific oyster ***Crassostrea gigas*** is a marine invertebrate
- belonging to the family Ostreidae (Mollusca, Bivalvia)
- worldwide distribution from Japan to occidental countries in Europe and America (Guoet al., 2008)

Traditional medicine in Myanmar

- Shell of ***Crassostrea gigas*** was used by rulers of early Myanmar dynasties.
- Traditional medicine, As the In terms of Myanmar Traditional Medicine, taste of ka nu ka mar is sweet and cool in nature.
- Recommended dosage is 1 to 2 grams of ash.
- The ash of ka nu ka mar has been given promote digestive power and stimulate appetite

- It is also used in the treatment of
- indigestion,
- hepatitis,
- certain gastric and intestinal disorder,
- cough, asthma,
- chest injuries,
- mouth disease,
- oliguria,
- dysentery, bowel disorder, blood vomiting and menstrual disorders in Myanmar traditional medicine (AshinNagathein, 1972).

Traditional Medicine Formulae

- which are commonly used in Myanmar Traditional Medicine formulation (TMF).
- Jau thwa khone pyar (Ash) is the ingredient of TMF6 (Ha Leik da Sonna Ngan Hsei).
- Ka nu ka mar is the ingredients of TMF-24 Na Ga Ra (Lei;Hnjin;KaLa'Hsei;).

- Though these samples are commonly in Myanmar Traditional Medicine much work has not been reported on the proximate and chemical compositions.
- Therefore these crude animal's products were selected for chemical and pharmacological investigation

OBJECTIVES

- to identify the two species of shells that are used in Myanmar Traditional Medicine
- to investigate the nutritional values and chemical constituents of two species of shells used in Myanmar Traditional Medicine

METHODOLOGY

Study Design

- Zoological identification of crude drugs.

Study Area


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UNIVERSITY OF TRADITIONAL MEDICINE
UNIVERSITY OF TRADITIONAL MEDICINE

Study Period

- from July 2018 to February 2019.

Materials and Methods

- Extraction of samples is one of the procedure of Association of Official Analytical Chemistry (A .O. A. C).
- Determination of elements by Energy Dispersive X-ray Fluorescence Spectrophotometer (EDXRF).

Statistical Analysis

- The results were expressed as mean ± standard deviation (SD).

Samples Collection

- Shells of *A. broughtonii* and *C. gigas* were purchased locally from Baja Hsei: zain(traditional medicine shop)
- it had been recorded from Ngapli, Maungmagan, KyaukKalat, Coco Island locations in Myanmar Costal water
- Specimen were identified according to the Abbott, R.T. (1991).

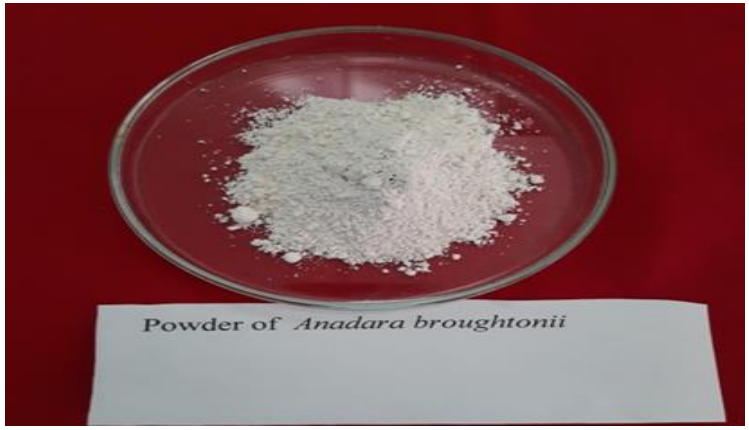
Samples Preparation

Samples Preparation

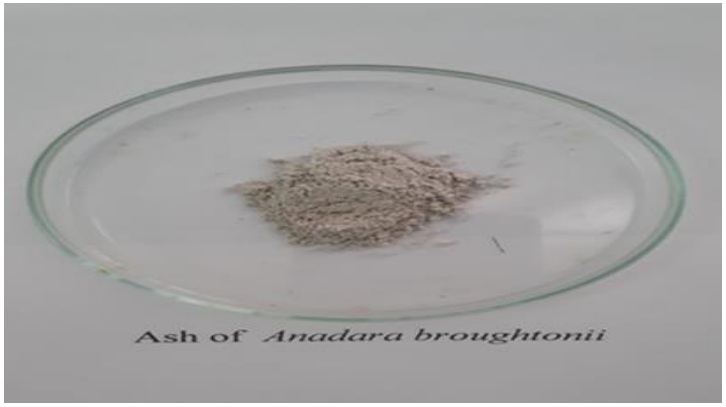
- The samples 150g shells of ***Anadara broughtonii*** and ***Crassostrea gigas*** were first washed thoroughly with distilled water
- washed with sterile water mixed with 3cc lime juice
- washed with sterile water to remove foreign matters
- sample is dried at drying condition in oven.

- One hundred and fifty grams of samples were crushed into smaller pieces and then make powder by blender.
- The powder was sieved using a stainless steel sieve to get fine powder and
- then sterilized for an hour in the oven at 105ºC and stored in bottles prior to analysis.
- Proximate analysis, mineral composition and pharmaceutical product were carried out on dried powder.

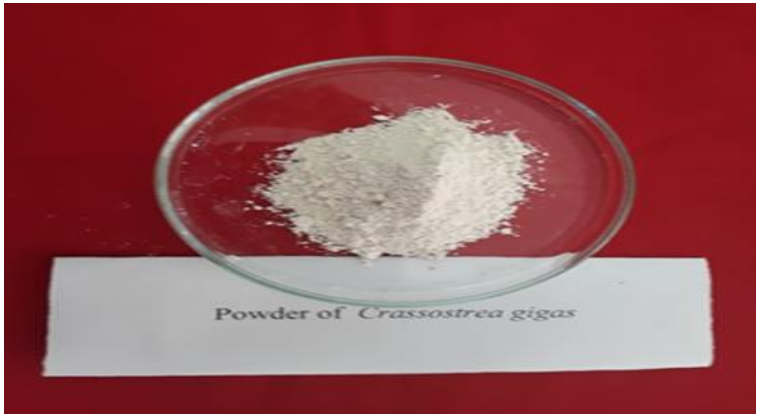
Preparation of Powder and Ash form



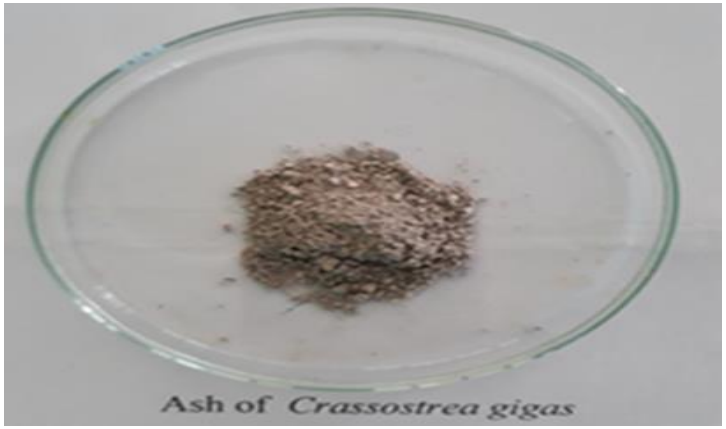
A. Powder of *Anadara broughtonii*



B. Ash of *Anadara broughtonii*



C. Powder of *Crassostrea gigas*



D. Ash of *Crassostrea gigas*

RESULTS

Systematic Position of the Studied Species

Phylum	-	Mollusca
Class	-	Bivalvia
Order	-	Arcida
Family	-	Arcidae
Genus	-	***Anadara***
Species	-	***A.broughtonii***
Order	-	Ostreoida
Family	-	Ostreidae

Genus - ***Crassostrea***

Species - ***C. gigas***

Crassostrea gigas

Synonym

Magallana gigas (Thunberg,1793)

Anadara broughtonii (Schrenck, 1867)

Description of Study Species

1. Shell of *Anadara broughtonii*

- Scientific name - *Anadara broughtonii*
- Local name - Jau thwa khone
- Common name - Sea mussel

A.Dorsal view of shell of

Anadara broughtonii.

B.Ventral view of shell of

Anadara broughtonii .

- Shell of ***Anadara broughtonii*** - 6 to 9 cm length
- It is thick, shell equivalve, solid, ovate, strongly inflated, slightly longer than high and feebly in equilateral.
- About 18 radial ribs (15 to 20) with wide interstices at each valve.
- Ribs stout and distinctly rugose, bearing regular, often rectangular nodules.

- Internal margins with strong crenulations corresponding with the external radial ribs.
- Outside of shell white under the yellowish brown periostracum.
- Inner side white, often tinged light yellow towards the umbonal cavity (Plate 3).

2.Shell of *Crassostrea gigas*

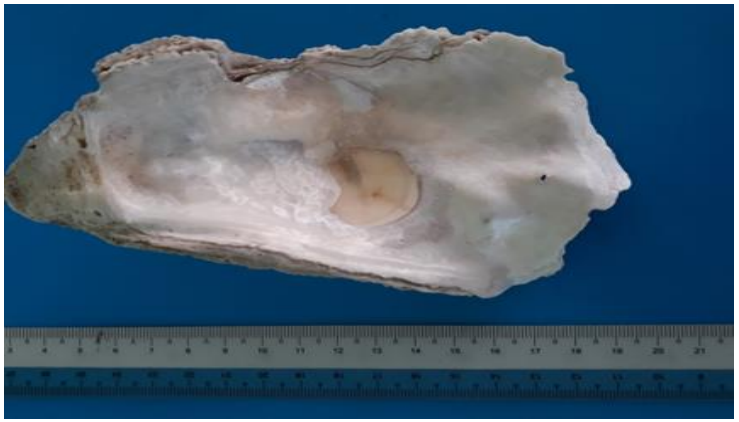
- Scientific name - *Crassostrea gigas*
- Local name - ka nu ka mar
- Common name - Oyster
- The shell of *Crassostrea gigas* is large, rounded, radial folds are often extremely rough and sharp.

- The two valves of the shell are slightly different in size and shape, the right valve being moderately concave.
- Shell colour is variable, usually pale white or off-white. Mature specimens can vary from 80 to 400 mm long (Plate4).

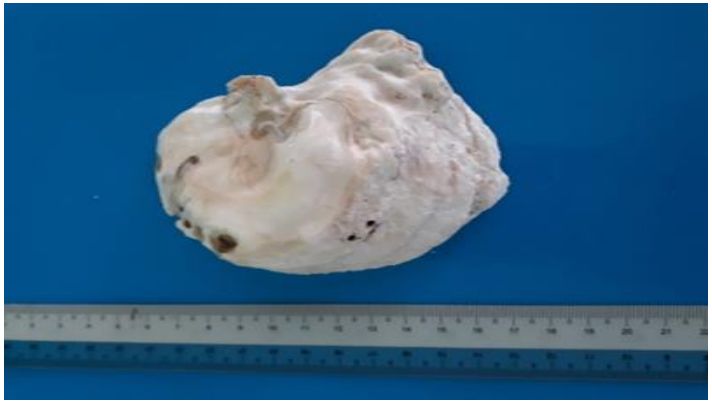
. Ventral view of right valve of *Crassostrea gigas*

Ventral view of left valve of *Crassostrea gigas*

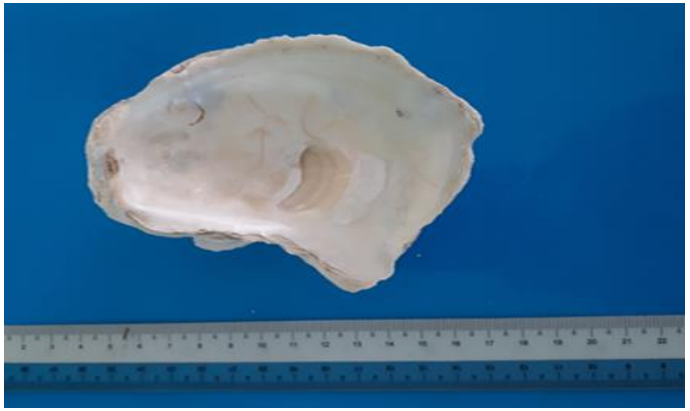
A. Dorsal view of right valve of ***Crassostrea gigas***



B. Ventral view of right valve of ***Crassostrea gigas***



C. Dorsal view of left valve of ***Crassostrea gigas***



D. Ventral view of left valve of ***Crassostrea gigas***

Table 1 Proximate composition of powder of shells of *Anadara broughtonii*

No	Parameters	Value 1 (%)	Value 2 (%)	Value 3 (%)	Value 4 (%)	Value 5 (%)	Mean ±SD (%)
1	Moisture	0.28	0.27	0.26	0.28	0.28	0.28±0.01
2	Ash	97.65	97.75	97.65	98.45	98.45	97.75±0.04
3	Carbohydrate	0.00	0.00	0.00	0.00	0.00	0±0.00
4	Protein	0.16	0.17	0.19	0.5	0.5	0.2±0.01
5	Fiber	2.48	2.46	2.47	2.47	2.48	2.47±0.01
6	Fat	0.73	0.72	0.73	0.72	0.73	0.73±0.01

Table 2 Total ash, water soluble ash and acid insoluble ash content of powder of shells of *Anadara broughtonii* .

No.	Parameters	Quantity (%)
1	Total ash	97.75±0
2.	Water soluble	3.7 ±0
3.	Acid insoluble	76.75±0

Table 3 Percentage of macroelements involved in powder of shells of *Anadara broughtonii*

No	Elements	Quantity 1 (%)	Quantity 2 (%)	Quantity 3 (%)	Mean±SD (%)
1	Magnesium (Mg)	1.09	1.09	1.09	1.1±0.1
2	Sodium (Na)	0.00	0.00	0.00	0.00±0
3	Calcium (Ca)	52.75	52.75.	52.75	52.75±0
4	Chlorine (Cl)	0.00	0.00	0.00	0.00±0
5	Potassium (K)	0.00	0.00	0.00	0.00±0
6	Sulfur (S)	0.00	0.00	0.00	0.00±0

Table 4 Percentage of microelements involved in Powder of shells of *Anadara broughtonii*

No	Elements	Quantity 1 (%)	Quantity 2 (%)	Quantity 3 (%)	Mean±SD (%)
1	Aluminium (Al)	-	-	-	-
2	Silicon (Si)	0.2	0.2	0.2	0.2±0
3	Manganese (Mn)	0.1	0.1	0.1	0.1±0.01
4	Iron (Fe)	0.01	0.01	0.01	0.1±0
5	Copper (Cu)	0.0002	0.0002	0.0002	0.0002±0
6	Zinc (Zn)	0.01	0.01	0.01	0.01±0

Table 5 Percentage of heavy metals involved in powder of shells of *Anadara broughtonii*

No	Elements	Quantity 1 (%)	Quantity 2 (%)	Quantity 3 (%)	Mean±SD (%)
1	Arsenic (As)	-	-	-	-
2	Cadmium (Cd)	0.0003	0.0003	0.0003	0.0003±0
3	Mercury (Hg)	-	-	-	-
4	Lead (Pb)	0.0008	0.0008	0.0008	0.0008±0

Table 6 Proximate composition of powder of shells of *Crassostrea gigas*

No	Parameters	Value 1 (%)	Value 2 (%)	Value 3 (%)	Value 4 (%)	Value 5 (%)	Mean ±SD (%)
1	Moisture	0.27	0.25	0.24	0.24	0.24	0.24±0.01
2	Ash	97.15	97.16	97.25	97.15	99.36	97.16±0.1
3	Carbohydrate	0	0	0	0	0.17	0±0.00
4	Protein	0.58	0.57	0.56	1	1	0.58±0.24
5	Fiber	1.92	1.93	1.95	1.93	1.93	1.93±0.01
6	Fat	0.54	0.56	0.55	0.09	0.09	0.54±0.3

Table 7 Total ash, Water soluble ash and Acid insoluble ash Contents of powder of shells of *Crassostrea gigas*

No.	Parameters	Quantity((%)
1.	Total ash	97.16±0.014
2.	Water soluble	1.75±0
3.	Acid insoluble	72.44±0

Table 8 Percentage of macroelements involved in Powder shells of *Crassostrea gigas*

No	Elements	Value 1 (%)	Value 2 (%)	Value 3 (%)	Mean ±SD (%)
1.	Magnesium(g)	3.2311	3.2311	3.2311	3,2311±0
2.	Sodium (Na)	0.00	0.00	0.00	0.00±0
3.	Calcium (Ca)	54	54	54	54 ±0
4.	Chlorine (Cl)	0.00	0.00	0.00	0.00±0
5.	Potassium (K)	0.00	0.00	0.00	0.00±0
6.	Sulfur (S)	0.00	0.00	0.00	0.00±0

Table 9 Percentage of microelements involved in Powder of shells of *Crassostrea gigas*

No	Elements	Value 1 (%)	Value 2 (%)	Value 3 (%)	Mean ±SD (%)
1	Aluminium (Al)	0.00	0.00	0.00	0.00±0
2	Silicon (Si)	0.1	0.1	0.1	0.1±0
3	Manganese(Mn)	0.2	0.2	0.2	0.2±0
4	Iron (Fe)	0.13	0.13	0.13	0.13±0
5	Copper (Cu)	0.0004	0.0004	0.0004	0.0004±0
6	Zinc (Zn)	0.2	0.2	0.2	0.2±0

Table10 Percentage of heavy metals involved in Powder of shells of *Crassostrea gigas*

No	Elements	Quantity 1 (%)	Quantity 2 (%)	Quantity 3 (%)	Mean±SD
1	Arsenic (As)	0.0001	0.0001	0.0001	0.0001
2	Cadmium(Cd)	-	-	-	-
3	Mercury (Hg)	-	-	-	-
4	Lead (Pb)	0.0005	0.0005	0.0005	0.0005

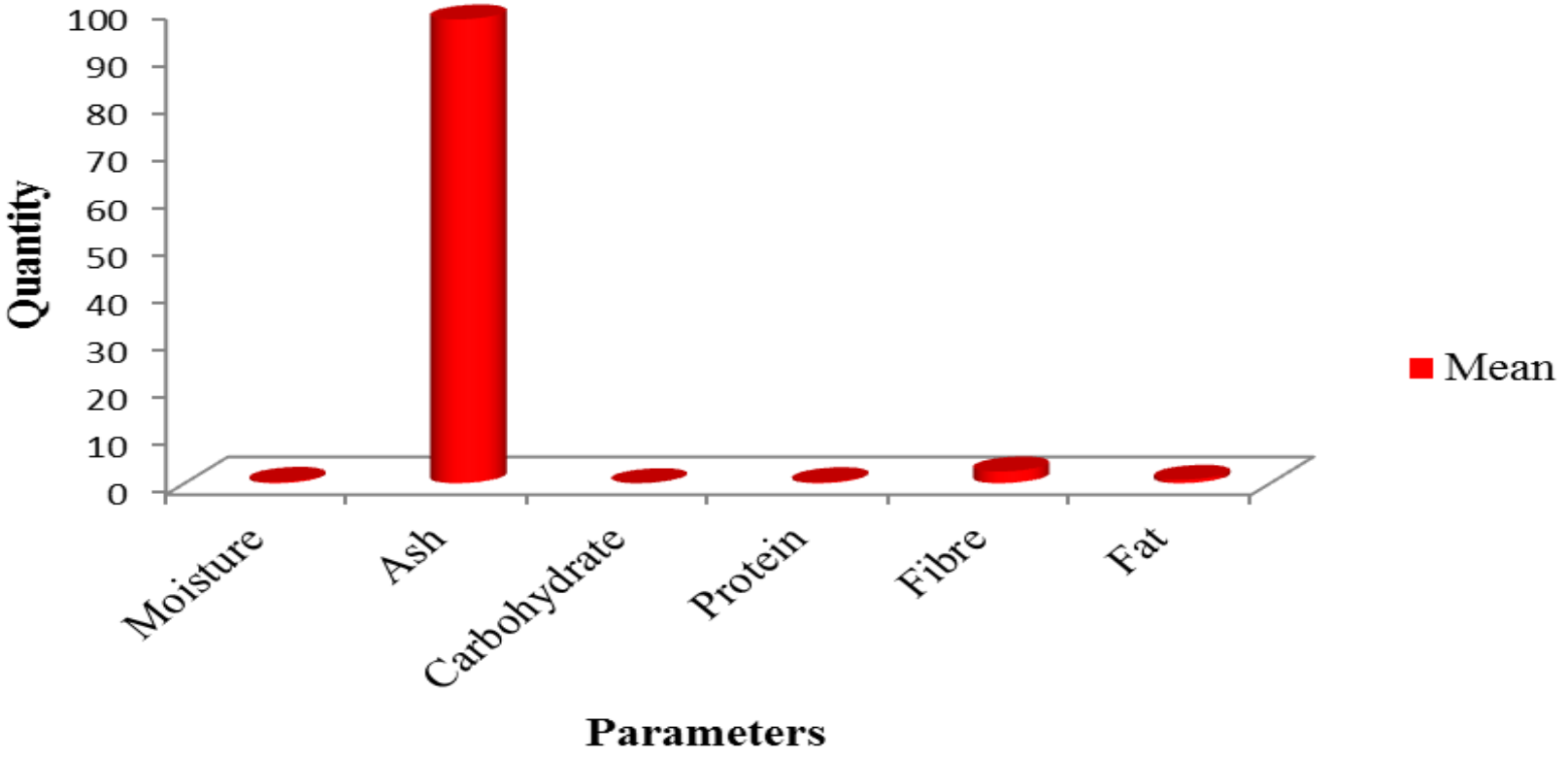


Fig. 1 Proximate Composition of Powder of shells of *Anadara broughtonii*

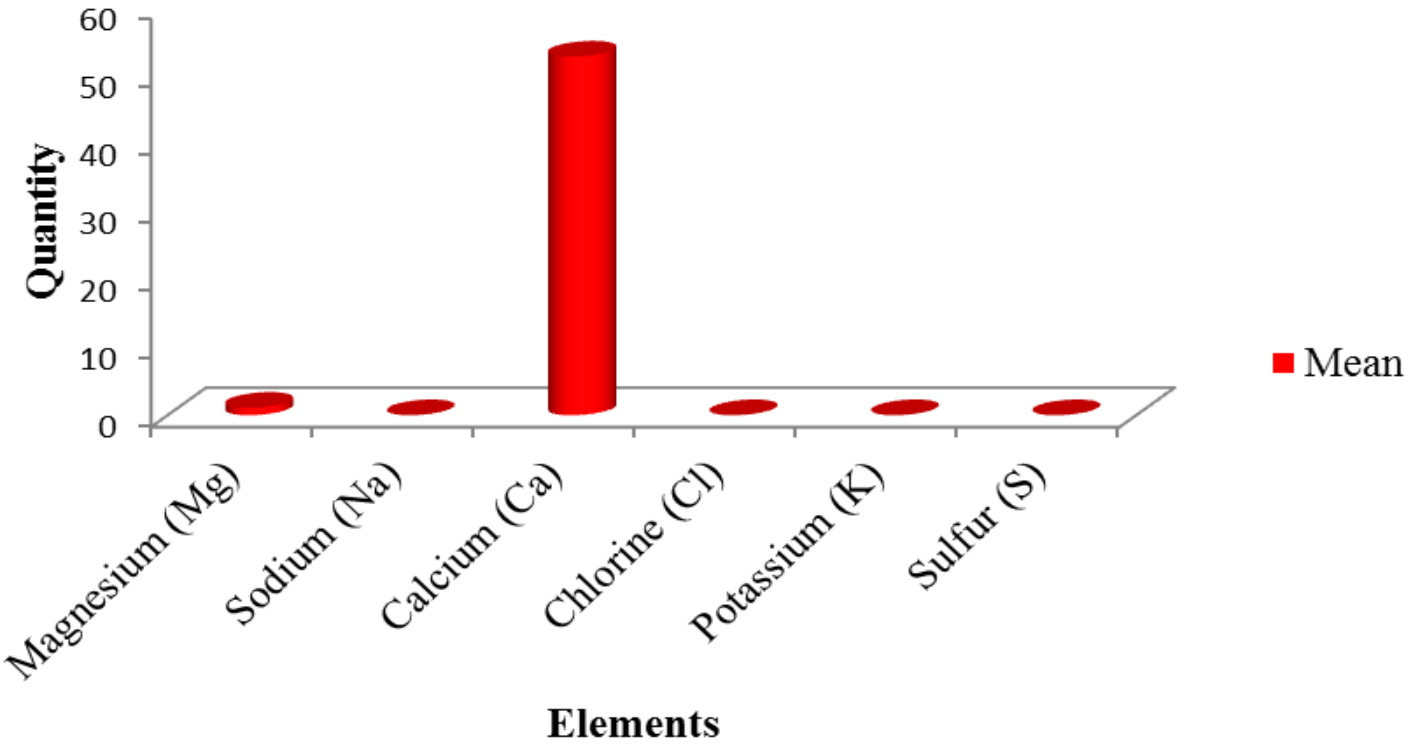


Fig.2 Percentage of macroelements involved in powder of shells of *Anadara broughtonii*

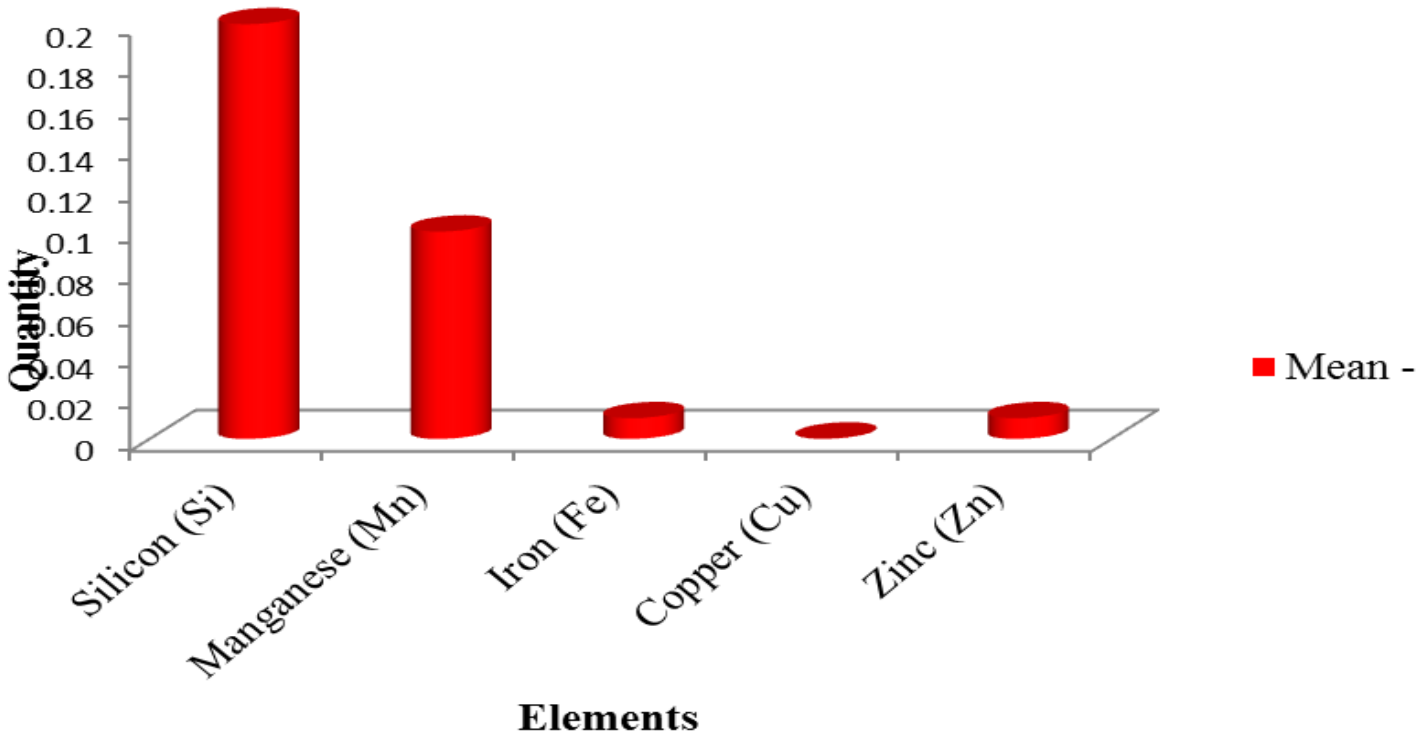


Fig. 3 Percentage of microelements involved in Powder of shells of *Anadara broughtonii*

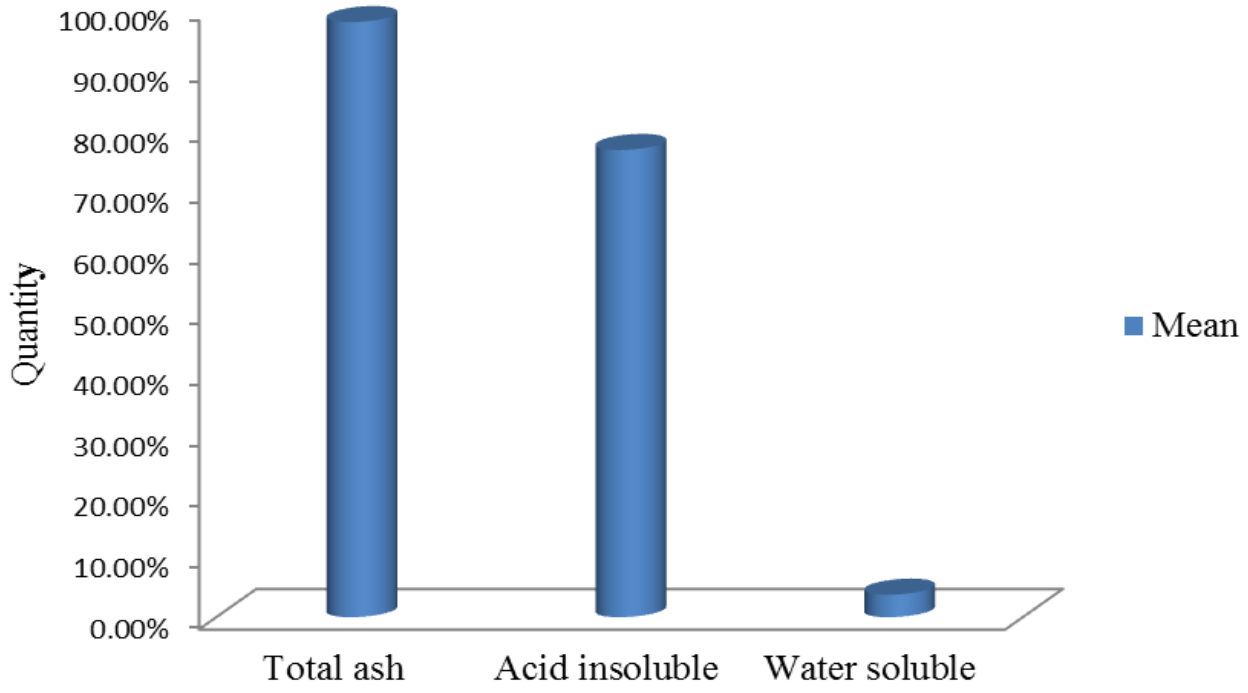


Fig.4 Total ash, water soluble ash and acid insoluble ash content of powder of shells of *Anadara broughtonii*

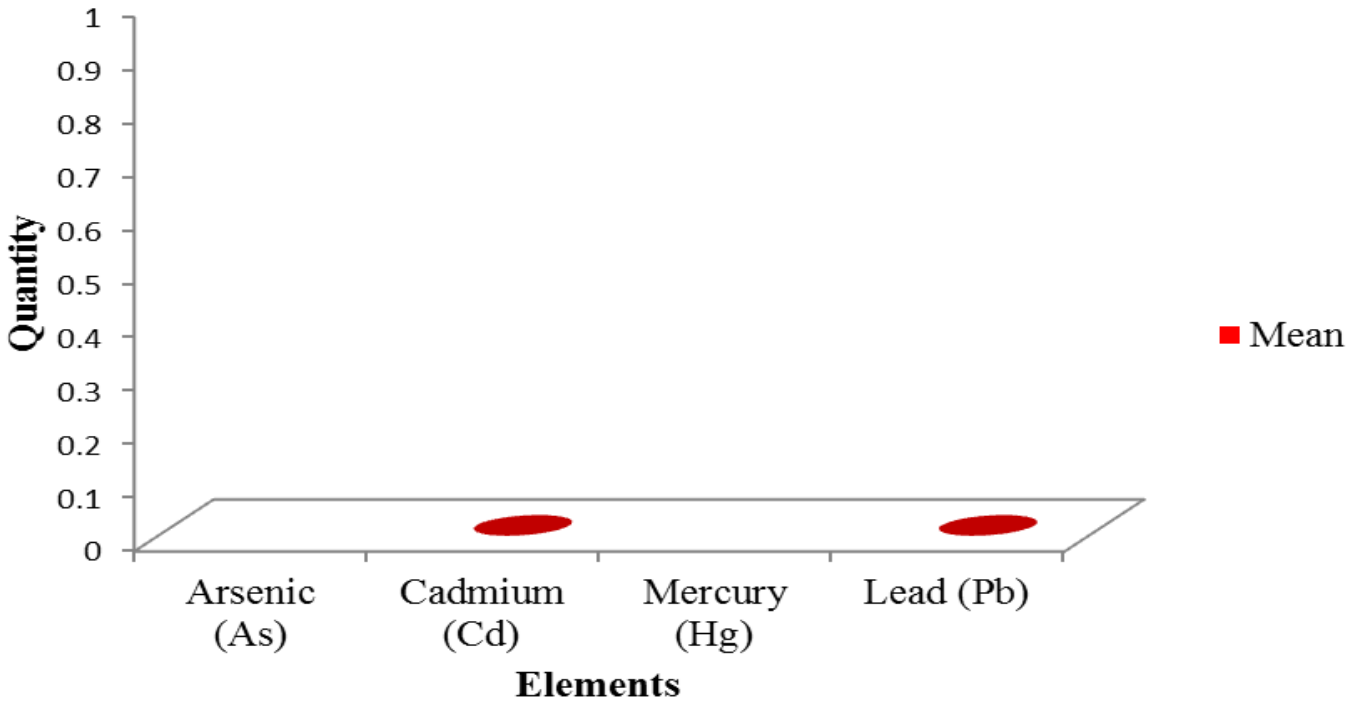


Fig. 5 Percentage of heavy metals involved in powder of shells of *Anadara broughtonii*

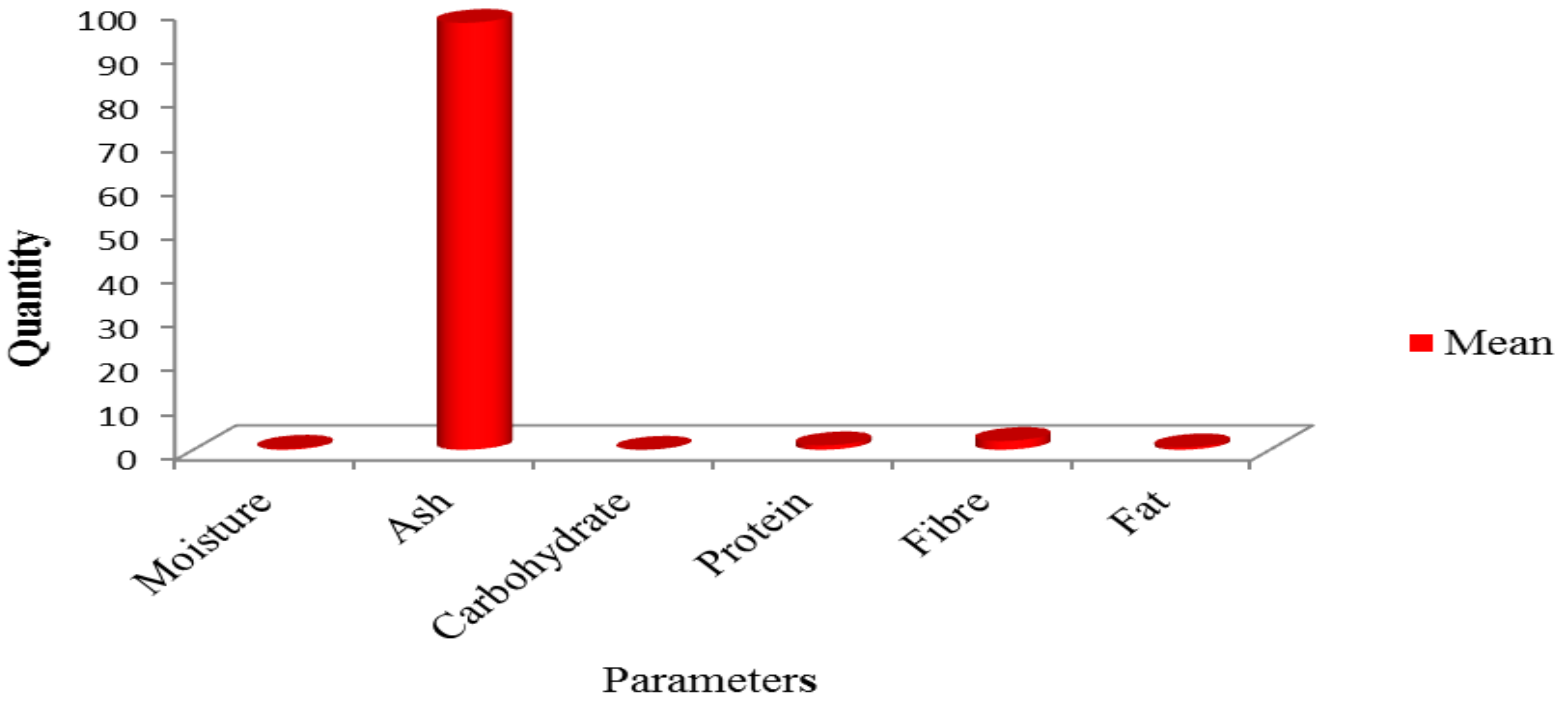


Fig. 6 Proximate composition of powder of shells of *Crassostrea gigas*

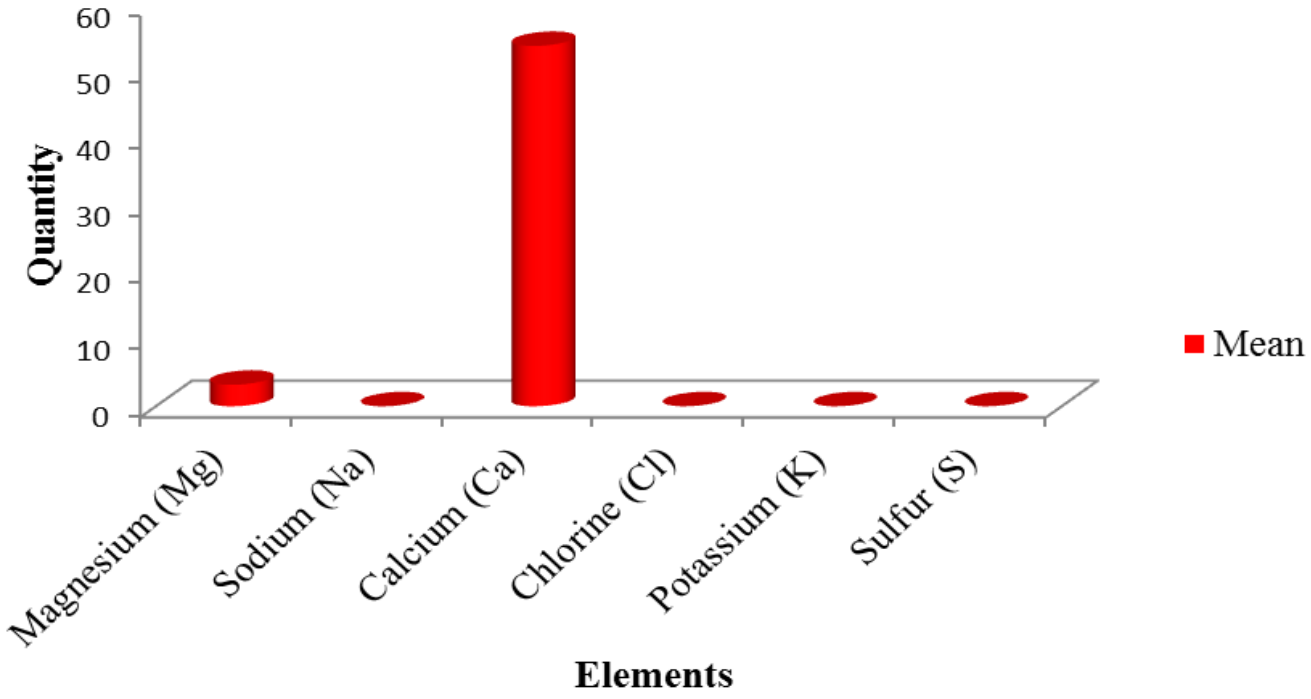


Fig.7 Percentage of macroelements involved in powder of shells of *Crassostrea gigas*

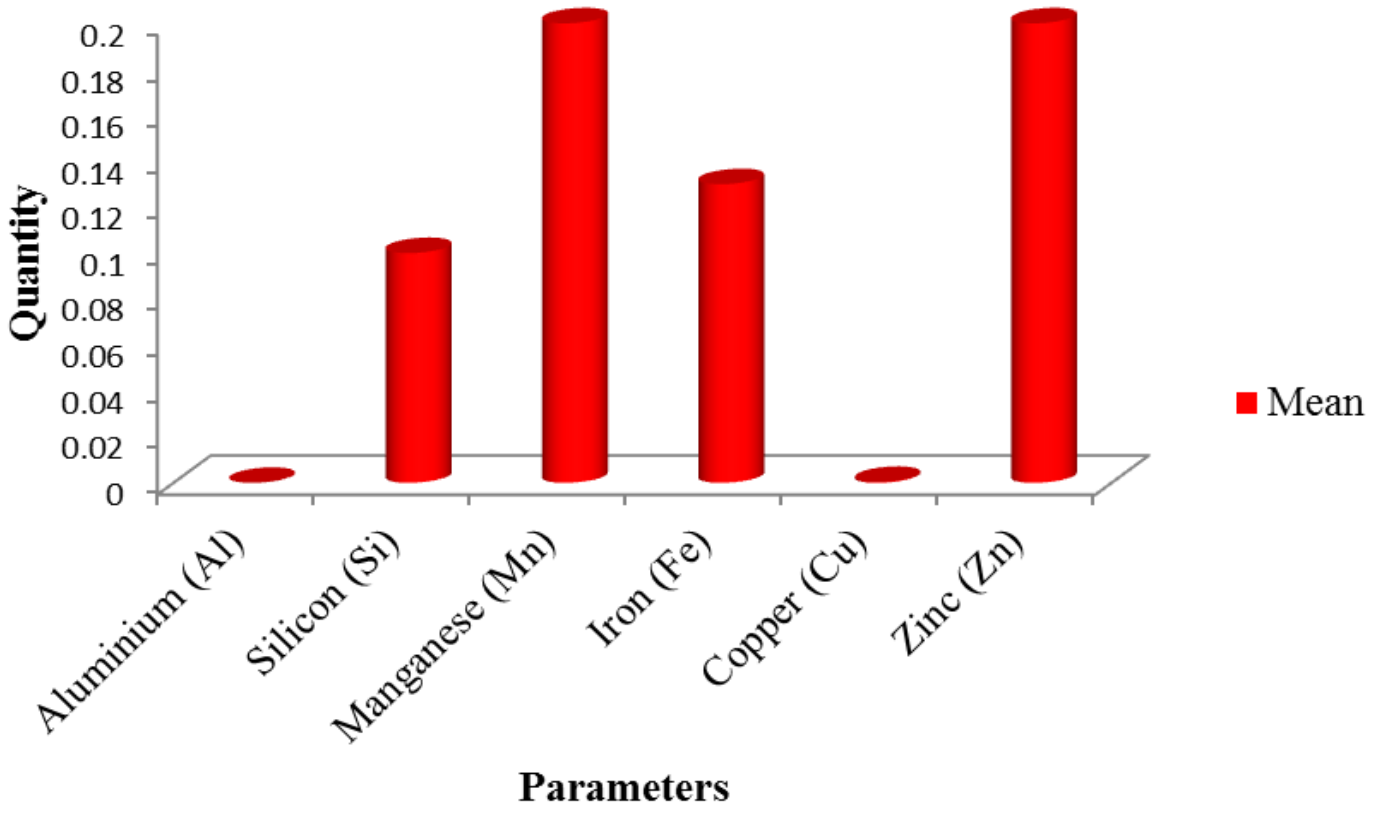


Fig. 8 Percentage of microelements involved in powder shells of *Crassostrea gigas*

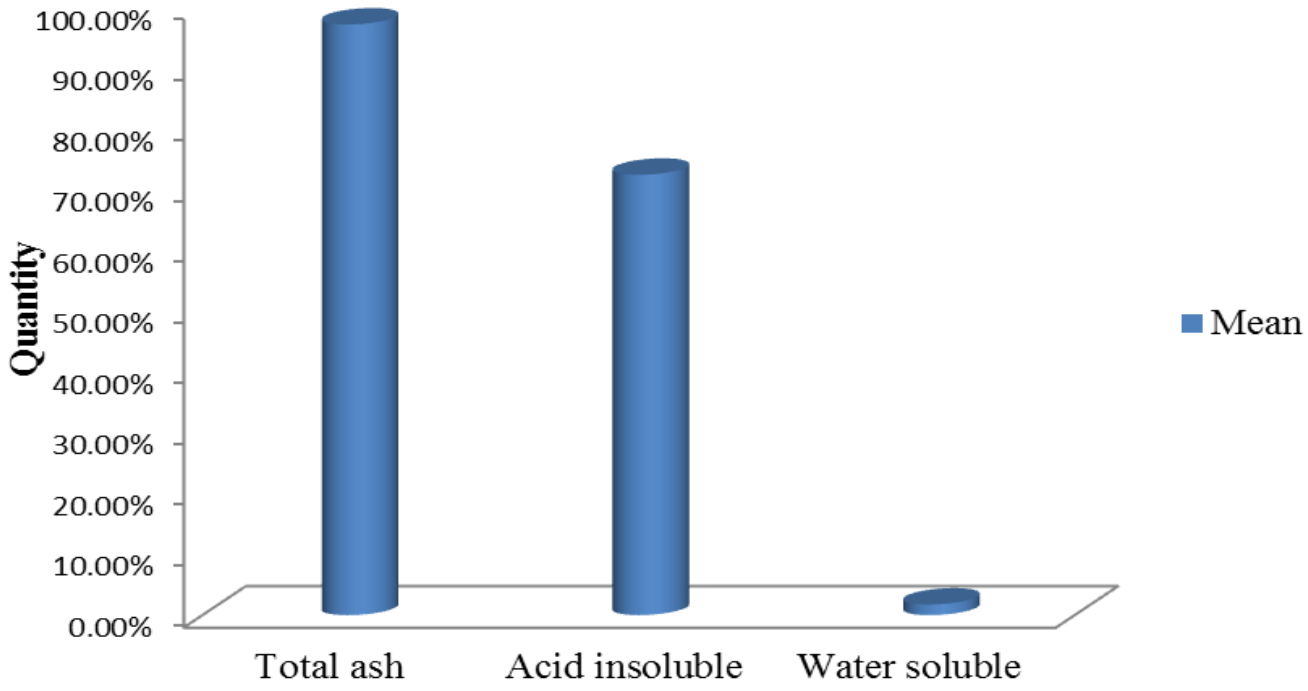


Fig. 9 Total ash, water soluble ash and acid insoluble ash contents of *Crassostrea gigas*

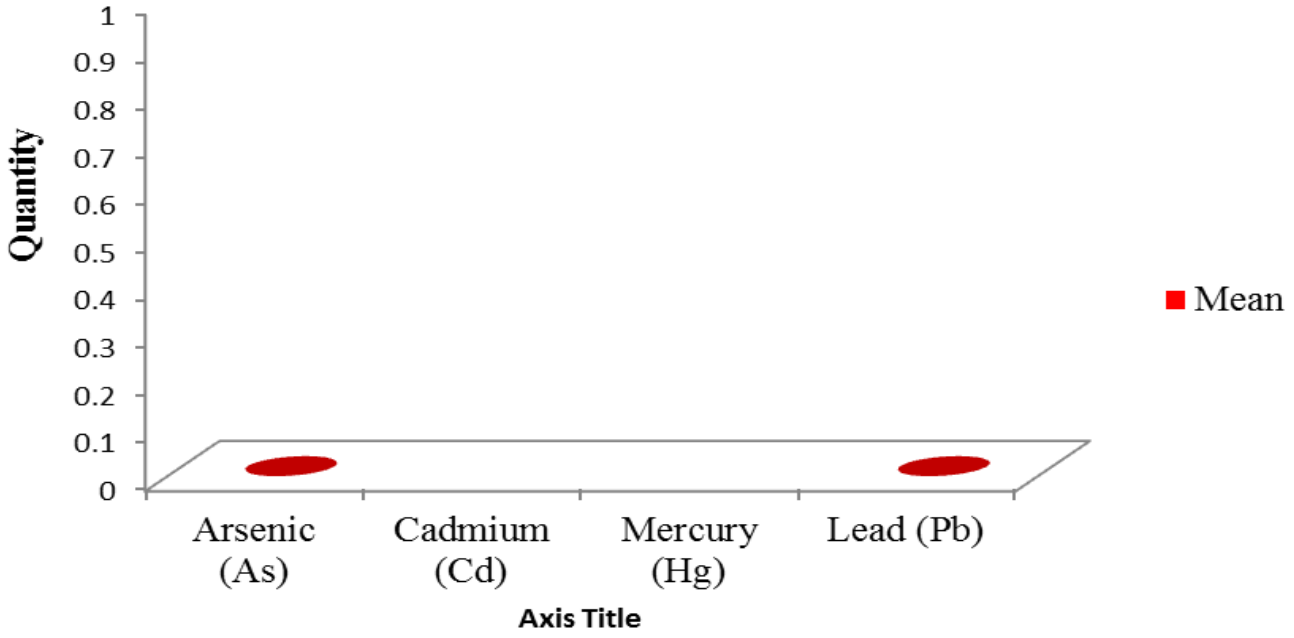


Fig. 10 Percentage of heavy metals involved in powder of shells of *Crassostrea gigas*

DISCUSSION

- The Proximate Composition of shells Powder of *Anadara broughtonii* and *Crassostrea gigas* revealed that these contained reasonable amounts of moisture, carbohydrate, fiber, protein and fat.
- Carbohydrate and fat contents were found to be very low in these samples. This confirms that sample is not a good source of fat.

- The contents of fiber were found to be considerable amount in these samples.
- Mixtures of soluble and insoluble fibers improve diabet-ic glucose control and lower serum triglycerides (Anderson 1990).
- Protein provides essential amino acids, particularly important during growth and development, and it is a source of energy (Thomas *et al*., 2004).

- The content of ash was found to be highest in these samples (Table 1,6 and Fig 1,6).
- It is a reflection of total inorganic matter present in these samples and also indicates that they possess the most abundant mineral like calcium, which are essential for good health (Oloyede, 2008).

- In this study cadmium, lead and mercury were found to contain below levels according to the WHO guideline values of cadmium, lead and mercury.
- Arsenic and mercury were not found in powder of *Anadara broughtonii*.
- Cadmium and mercury were not found in powder *Crassostrea gigas* .
- This finding indicated that these animal parts may be used safety in the traditional medicine.

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THANK YOU