WWJMRD2017; 3(10): 133-135
www.wwjmrd.com
International Journal
Peer Reviewed Journal
Refereed Journal
Indexed Journal
UGC Approved Journal
Impact Factor MJIF: 4.25
e-ISSN: 2454-6615

Arpita Bhakta
(Research scholar), Shri J.J.T University, Chudela, Jhunjhunu, Rajasthan, India

Rajarshi De
(Research scholar), Shri J.J.T University, Chudela, Jhunjhunu, Rajasthan, India

Kartik Maiti
(Research scholar), Shri J.J.T University, Chudela, Jhunjhunu, Rajasthan, India

Correspondence:
Arpita Bhakta
(Research scholar), Shri J.J.T University, Chudela, Jhunjhunu, Rajasthan, India

Antibacterial activity of the whole body extract of marine mollusca (*Cypraea sp*.) and edible oyster (*Saccostrea cucullata*)

Arpita Bhakta, Rajarshi De, Kartik Maiti

Abstract
The present study was carried out to the antibacterial properties of the whole body extract of two species Cyparaea sp. And Saccostrea cucullata against five enteric human pathogen collected from Frazergunj,Sundarban,Fish herber area of West Bengal and Digha. The marine environment is an exceptional reservoir for bioactive natural products. The marine environment comprise of complex ecosystem with a plethora of organisms and many of these organism are known to possess bioactive compounds as a common means of defense. The marine natural products have been investigated predominantly for their antimicrobial, cytotoxic antitumor and anti-inflammatory properties. The present study based on the following – 1.To ascertain the antibacterial activity of extract from locally available edible oyster (Saccostrea cucullata from Frazergunj,Sundarban,Fish herber) against five pathogen. 2. To ascertain the antibacterial activity of extract from marine mollusca (Cypra sp from Digha) against five human pathogen. 3. To determine the nature of bioactive compounds of the whole body extract from marine mollusca and edible oyster.

Keywords: Antibacterial activity, Cyparaea sp. Saccostrea cucullata

Introduction
Ocean offers a large biodiversity of fauna & flora which is estimated to be over 50,000 species more than double of the land species. There are approximately 5,000 species of sponges,11000 species of cnidarians, 9,000 species of annelids, 66,535 species of mollusks, 50,000 species of gastropods, 15,000 species of bivalves and 600 species of cephalopods have been reported to occur. Oyester are bivalve (two shelled) soft bodies mollusks. The Indian Sundarban is broadly divided into three salinity regions, out of which the high saline zone supports the oyster bed in the intertidal regions. In India, common oyster species are Saccostrea cucullata,Crassostrea madrasensis, Crasstreosa gryphoides, Crasstreosa rivulasis and Crasstreosa discoidea. Out of these five dominant species the first three species are very common in the Indian Sundarban.

Materials and methods
1. Sample collection – Marine mollusca (Cyparaea sp.) and Edible Oyster (Saccostrea cucullata) samples were collected from Digha and Frazergunj,Sundarban,Fish herber
2. Extraction - Saccostrea cucullata was collected from Frazergaunge & bought to the laboratory. The shells were broken and tissue sample were washed with distilled water. Extraction of bioactive compounds from the tissue sample was done with water,ethanol,methanol,acetone,hexane,butanol,ethyl acetate and and dichloro methane. To 5g of tissue sample, 5ml of water and solvent extract were centrifuged well with mortar and pestle. Water and solvent extract were centrifuged at 15,000 rpm for 30 min and supernatant were stored at – 20˚ C.
3. Antibacterial activity of Edible oyster extract (Saccostrea cucullata) – Five species of pathogenic bacteria namely Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus, Shigella dysentery, Streptococcus faecalis were used to screen the antibacterial activity of the edible oyster extracts. Pathogenic bacterial stains were inoculated in

sterile nutrient broth and incubated at 37˚ C for 24 hours. Culture of the strains was added to the mixtures in such way the total inoculam load was ca. cells / ml. The pathogens were swabbed on the surface of the Muller Hinton agar plates and dics (Whatman No. 1 filter paper with 6mm diameter). The plate were 37˚ C for 24 h and antibacterial activity was measured accordingly best on the inhibition zone around dics impregnated with oyster extract (Saccostrea cucullata).

4. Extraction of antibacterial compounds from marine mollusca (Cypraea spp.) Cypraea spp collected from digha brought to the laboratory. The shells were broken and the tissue samples were washed with distilled water. Extraction of bioactive compounds from the tissue sample was done with water,ethanol,methanol,acetone,hexane,butanol, ethyl, acetate and dichloro methane. To 5g of tissue sample, 5ml of water and solvents were added and ground well with mortar and pestle. Water and solvent extracts were centrifuged at 15,000 rpm for 30min and the supernatants were stored at -20˚c until use.
5. Antibaterial activity of Marine mollusca extract (cypraea sp.) - Five species of pathogenic bacteria namely Escherichia coli,klebsiella pneumonia,Staphylococcus aureus, Shigella dysentery,Streptococcus faecalis were used to screen the antibacterial activity of the marine mollusca extracts.Pathogenic bacterial strains were inoculated in sterile nutrients broth and incubated at 37˚ C for 24h. Culture of the strain was added to the mixtures in such way the total inoculam load load was ca.10 cells/ml.The pathogens were swabbed on the surface of the Muller Hinton agar plates and discs impregnated with the 20µl of marine mollusca extracts were placed on the surface. The plates were incubated at 37˚C for 24h and the antibacterial activity was measured accordingly best on the inhibition zone around disc impregnated with oyster extract (Cypraea sp.)

Results & Discussion

Antibacterial activity of extracts from Crypaea sp. And Saccostrea cucullata are present in table 2 and 3 respectively.Antibacterial activity of different solvent (control) are presented in table 1. A comparatively account (%) of elevation of antibacterial activity of extract from Crypreae sp. And Saccostrea cucullata against control are presented in table 4&5 respectively.

Table 1: Antibacterial activity (mm) of different solvent (control)

Name of pathogen	Zone of inhibition (mm)							
	W	E	M	A	H	B	EA	DM
E.coli	6	7.3	6.3	7.3	6	9.3	8.3	6
S.aureus	6	8	10	6.3	6.3	8.3	7	6
S. dysentry	6	7.7	7	7.9	6.3	8.4	8	6
k.pneumoniae	6	8.6	8.5	6.3	6	9	6.3	6
S.faecalis	6	8	6.3	8.5	6	8.5	7.2	6

[w –Water,E – Ethanol,M – Methanol,A-Acetone,H-Hexane,B-Butanol,EA- Ethyl acetate,DM- Dichloro methane]

Antibacterial activity of extracts from marine mollusca (Cypreae sp.)

Effect of extract from Crypreae sp. On tested pathogenic bacteria revealed that the highest activity was noticed against K.pneumoniae (12.3mm) with acetone extract. Only butanol extract showed antibacterial activity against five pathogen but other solvent have no similar type of activity. As noticed in Cypreae sp. Both water and ethanol extract showed no activity against five pathogen expect E.coli.The lowest activity (Trace) was found with dichloromethane, hexane extract against S.aureus and E.coli. Among the bacteria tested S.dysentry was highly resistant to most of the solvent extract expect butanol

T**able 2:** Antibacterial activity of marine mollusca (Cypreae sp.)

Name of pathogen	Zone of inhibition (mm)							
	W	E	M	A	H	B	EA	DM
E.coli	-	10.6	11	10	7	12	11	10.6
S.aureus	-	-	10	12	9	11	11	8
S. dysentry	-	-	7	-	-	10	-	-
k.pneumoniae	-	-	10	12.3	10.3	10	11.3	-
S.faecalis	-	-	10	10	-	10	-	-

[w –Water,E – Ethanol,M – Methanol,A-Acetone,H-Hexane,B-Butanol,EA- Ethyl acetate,DM- Dichloro methane]

Antibacterial activity of extracts from edible oyster (Saccostrea cucullata)

Antibacterial activity of Saccostrea cucullata (edible oyster) revealed that butanol and acetone extract showed highest activity against Escherichia coli (12mm) respectively.Only butanol extract showed antibacterial activity against maximum pathogen expect S.dysentery,compare to other solvent extract showed no activity against five pathogen.The lowest activity(Trace)was found with,ethanol,methanol and hexane against E.coli (8mm),Shigella dysentery (8mm) and Streptococcus faecalis (9mm) respectively. Among the bacterial tested Klebsiella pneumonia was highly resistant to most of the extract expect butanol (table3).

Table 3: Antibacterial activity Edible oyster (Saccostrea cucullata)

Name of pathogen	Zone of inhibition (mm)							
	W	E	M	A	H	B	EA	DM
E.coli	-	8	11	-		12	-	-
S.aureus	-	-	-	12	-	10	-	-
S. dysentry	-	10	-	-	-	-	-	-
k.pneumoniae	-	-	-	-	-	10	-	-
S.faecalis	-	-	-	-	7	10	9	-

[w –Water,E – Ethanol,M – Methanol,A-Acetone,H-Hexane,B-Butanol,EA- Ethyl acetate,DM- Dichloro methane]

Comparative account (%) of elevation of antibacterial activity of Cypreae sp. against control

It was showed that antibacterial activity acetone extract elevated by 37%, 90%, 95%, 18% against E.coli. S.aureus, k. pneumonia,S.faecalis respectively copmpared with control (table4). On the other hand antibacterial activity of dicholoromethane,acetone,butanol,ethyl acetate and methanol Extract were elevated as 76%,90%,79% and 58% against
E.coli,S.aureus,S.dysentery,K.pneumoniae,S.faecalis respectively compaired with control (table4).

Table 4

Name of pathogen	Solvant (%)							
	W	**E**	**M**	**A**	**H**	**B**	**EA**	**DM**
E.coli	-	42.20	74.60	36.98	16.66	29.03	32.53	76.66
S.aureus	-	-	-	90.47	42.85	32.53	57.14	33.33
S. dysentry	-	-	-	-	-	19.04	-	-
k.pneumoniae	-	-	17.64	95.23	71.66	11.11	79.36	-
S.faecalis	-	-	58.73	17.64	-	13.63	-	-

[w –Water,E – Ethanol,M – Methanol,A-Acetone,H-Hexane,B- Butanol,EA- Ethyl acetate,DM- Dichloro methane]

Comparative account (%) of elevation of antibacterial activity of Saccostrea cucullata against control

After solvent extract treatment it was showed that maximum antibacterial activity of (butanol,ethanol,acetone,ethyl acetate)extract were elevated by 29%,25%, 96%,25%, against E.coli, S.faecalis, is respectively compared with control (table5). On the other hand antibacterial activity of ehanol,hexen,butanol,were elevated significantly as 9.5%,5%,16.5%,11%,20% and 13% against E.coli, S.faecalis,K.pneumoniae,S.aureus.

Table 5

Name of pathogen	Solvant (%)							
	W	**E**	**M**	**A**	**H**	**B**	**EA**	**DM**
E.coli	-	9.58	-	-	-	29.032	-	-
S.aureus	-	-	-	96.47	-	20.48	-	-
S. dysentry	-	25	-	-	-	-	-	-
k.pneumoniae	-	-	-	-	-	11.11	79.36	-
S.faecalis	-	-	-	-	16.66	13.63	25	-

[w –Water,E – Ethanol,M – Methanol,A-Acetone,H-Hexane,B- Butanol,EA- Ethyl acetate,DM- Dichloro methane]

Discussion

In the present investigation,distinct antibacterial activity was observed against almost all the pathogenic bacteria. Butanol extract of Cypreae sp. Showed highest activities against five pathogens.Acetone and Butanol extract of Saccostrea cucullata showed highest activity against five pathogens.It was showed that maximumantibacterial activity of Butanol extract of Cypreae sp were elevated by against E.coli, S.aureus,K.pnumoniae,S faecalis respectively(table4).From the discussion, we conclude that the solvent extract of marine mollusca(Cypreae sp.) have much more antibacterial activity than edible oyster (Saccostrea cucullata).Through commercial production antibiotics are highly effective to kill the bacteria used in the present study showed significant antibacterial activity compare with other solvent extraction.

Conclusions

Commercial antibiotic are highly effective to kill bacteria involved common infection.Acetone,Butanol,extract of marine mollusca and edible oyster used in the present study showed significant antibacterial activity compare with other solvent extraction. Butanol extract of Cypreae sp. Showed highest activity against five enteric human pathogen.Therefore Butanol is an ideal solvent to purify the antibacterial compound.Acetone extract and Butanol extract of Saccostrea cucullata showed highest activity against five enteric human pathogen.Therefore Butanol and Acetone is an ideal solvent to purify the antibacterial compound from Saccostrea cucullata.Antibacterial activity of marine mollusks (Cypreae sp.) is much more than that of edible oyster(Saccostrea cucullata).It is worthy to use the natural products by the costal people because it has antibacterial activity against enteric human pathogen.

References

1. Allusp A New antibiotics discovery,novel screens,novel target and impact of microbial genomics,current opinion micro.1998,530-534
2. Anand,T.P and J.K Patterson Edwerd,Screening of antibacterial active in the opercula of gastropods.Phuket Mar.Biol.Centre Spl. Publ 2001;215-217
3. Bearman GM,Wenzel RP. Bacteremia:a leading cause of death.Arch Med Res2005;36:646-659
4. Bernder JW,Hughes WT,Ftal Staphylococcu epidermidis species following bone marrow transplantation,Johns Hopkins Med J 1980;146:13-15
5. Biard J F,Guyot S, Roassaki C & Verbist J F,Lepadiformine,a new marine cytotoxic alkoid from Clavelina lepadiformis,Tetrahedron letters 1994;35:2691-2694
6. Callazghan RP. Cohen SJ.Stewart GT. Septicaemia due to colonization of Spitz- Holtewr valves by Staphylococci.Brit Med J 1961;1:8670-863