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RESEARCH ARTICLE

ASSESSMENT OF ANTIPYRETIC ACTIVITY OF THE MARINE GASTROPOD *BABYLONIA SPIRATA*

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ABSTRACT

An investigation was carried out to analyze the antipyretic activity of the marine mollusc *Babylonia spirata.* Methanol extract of *Babylonia spirata* was subjected to antipyretic activity on Wistar albino rats by Brewer's yeast induced pyrexia. The extract when administered at a dose of 400mg/kg body weight caused significant antipyretic activity by lowering the body temperature (37.12±0.13) at 3 rd hour compared to standard drug paracetamol (37.51±0.14). The methanolic extract of *Babylonia spirata* at the concentration of 200mg/kg and 400mg/kg showed a significant (P<0.05) antipyretic activity.

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INTRODUCTION

Throughout history, molluscs have provided a wide range of human resources including food, shells, dyes and medicines. In many cultures shelled gastropods and bivalves are regarded as a delicacy or healthy food and they also used in a range of traditional natural remedies. (Hebert *et al.,* 2003; Prabhakaran and Roy, 2009) In most cases there has been no scientific research undertaken to substantiate the health benefits of molluscs (Kristen Benkendroff, 2010). However there is increasing interest in the bioactivity of mollusc extracts and secondary metabolites (Cimino and Gavagnin, 2006). Some of the products derived from marine molluscs have been recommended in alteranative system of medicine especially Siddha medicine for treatment of several diseases (Grasian Immanuel, 2002). Currently, natural products isolated from molluscs and their structural analogues are particularly well represented in the anticancer compounds in clinical trials (Simmons *et al.,* 2005). Fever also known as pyrexia is an abnormal elevation of body temperature when a human's body temperature goes above the normal range of 36-37º c (98-100 F). It is pyrexia, a common medical sign, it is not a disease but manifestation of some hidden diseases. Antipyretic medicines are effective against fever. An antipyretic agent reduces fever. Most of the currently available antipyretic drugs like paracetamol and nimusulide cause adverse side effects. (Shanthi *et al.,).* Moreover the cost of production of synthetic drug is also high when compared to the naturally derived drugs. The materia medica of India provides a great deal of information on the folklore practices and traditional aspects of therapeutically important natural products (Yadav *et al*., 2011). For instance in traditional Indian medicines, especially Siddha and Ayush medical preparation, the opercula of gastropods are used as an ingredient to combat different diseases (Periasamy *et al*., 2012). Likewise, in traditional system of medicine the shells of gastropod *Cypraea moneta* have been used as medicine to cure various ailments related with stomach and in the treatment of dyspepsia, jaundice, enlarged spleen, liver, asthma, cough and it is externally used as caustic in various forms of ointments (Gopal *et al*., 2008, Vedhagiri *et al.,* 2012 and Grasian Immanuel *et al*., 2012). Considering the importance of the marine natural products, in the present study an attempt was made to investigate the antipyretic activity of the methanolic extract of *Babylonia spirata.*

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MATERIALS AND METHODS

The specimens of *Babylonia spirata* were collected from the Gulf of Mannar Coastal region of Thoothukudi. It was collected by trawl nets operated for capturing the crabs brought to the laboratory cleaned and washed with fresh sea water to remove all impurities. The shells were removed and dried in hot air oven at 56ºc for 48 hrs. The dried tissues was immersed with 100% AR methanol and then it was filtered with Whatman No 1 filter paper and the methanol extract was reduced by vaccum evaporation. Mature adult Wistar Albino

rats of either sex weighing between 180-200 gm were maintained in S.B college of Pharmacy Sivakasi and used for further studies. The selected animals were housed under standard environmental condition (temperature 22±1ºc) maintained by giving uniform pellet and water ad libitum with an alternating 12 hrs of light and dark cycle and relative humidity of 60±5%. Prior approval of Institutional Animal Ethics Committee (IAEC) was obtained. Four groups of healthy pre-acclimatized albino rats, each with six rats with mean weight of 180-200 gm were selected and made hyperthermic by sub-cutaneous injection of a 15% aqueous suspension of Brewer's yeast, *Saccharomyces cerviseae* at a dose of 10mg/100gm of body weight. The animals developing 0.5ºc and more rise in rectal temperature 18 hrs after were selected for further studies. Group – I rats received water (5ml/kg) alone and Group-II rats received paracetamol 10mg/kg p.o. The other two group of rats were treated with crude methanolic extract of *Babylonia spirata* at 200mg/kg and 400mg/kg p.o respectively. The rectal temperature was recorded at 0,1,2 and 3 hrs after the administration of test drugs,by using clinical thermometer (0.01ºc accuracy).

Statistical analysis

All the data were assessed statistically by the method of one way ANOVA followed by Dunnett's t - test. $P < 0.05$ were considered as statistically significant.

Where N – number of observation in each group
Error Sum of square = Total SS – Group SS
Considering the degrees of freedom for each source of variance, mean square was calculated.

RESULTS

The reduction in body temperature was proportional to the concentration of the drug (Table-1). The body temperature (about 36ºc) returned to normal within 2 to 3 hours in groups II, III and IV respectively. The temperature of the control rat was still high (about 39.7ºc) even after 3hrs. The statistical analysis (ANOVA) on changes in antipyretic effect as a function of different groups of methanolic extract of *Babylonia spirata* and time intervals revealed that these were statistically significant ($P<0.05$).

DISCUSSION

Fever is the primary feature of disease right from the very beginning of human civilization. The febrile response is synchronized by the central nervous system through endocrine, neurological, immunological and behavioural mechanisms (Xu *et al.,* 2012). The inhibition, manifestations and regulation of the febrile response are dependent on the pyrogenic and antipyrogenic properties of various exogenous and endogenous substances. Medical experts believe that fever is based on consistent rise in body temperature above normal daily fluctuations originating in combination with an elevated thermoregulatory set point (Muhammad *et al*., 2012 and Muhammad *et al*., 2013). These neurons are sensitive not only to changes in blood temperature but also to cold and warm receptor located in skin and muscle, thus maintaining an appropriate balance between the heat production and loss (Udddin *et al.* and Abdul Rauf, 2014). The methanolic extract of *Babylonia spirata* showed profound antipyretic activity against yeast evoked hyperthermic mice when administered sub-cutaneously during various assement times. Pyrexia was recovered in a dose dependent manner and remained significant upto 3rd hour of drug administration. Most of the antipyretic drugs inhibit the enzymatic activity of cyclooxygenase and consequently decrease the level of prostaglandin (PGE_2) within the hypothalamic region. (Rajani *et al.,* 2010) Over a period of time after thorough investigation, it is believed that non-steriodal anti-inflammatory drugs inhibit prostaglandin synthesis via cyclooxygenase pathway (Blandizzi *et al*., 2009). The methanol extract of *Babylonia spirata* might contain active principle that exhibited inhibitory action on cyclooxygenase. As a result, they produced antipyretic activity by preventing the formation of prostaglandins or by increasing the concentration of body's own antipyretic components (Okokon and Nwafor, 2010). Our

Table 1. Antipyretic activity of methanolic extract of *Babylonia spirata*

Group	Treatment Dose mg/kg p.o	Initial Temperature	Temperature after 18 hours of yeast administration	Mean Time reduction in temperature and SE			
				0hr	1hr	2hr	3hr
I	Control	36.7±0.25	39.62±0.25	39.62±0.25	39.65±0.25	39.77±0.19	39.7±0.17
II	Standard Paracetamol 10 mg/kg	37.02±0.10	39.6±0.25	39.6±0.25	38.9±0.26	38.17±0.24	37.51±0.14
III	*Babylonia spirata* 200 mg/kg p.o	37.07±0.14	39.77±0.23	39.77±0.23	39.32±0.20	38.56±0.22	37.23±0.15
IV	*Babylonia spirata* 400 mg/g	37±0.07	39.35±0.15	39.35±0.15	38.7±0.17	38.2±0.10	37.12±0.13

One way ANOVA	F	0.1	14.28	22.03	23.95
	DF	3,12	3,12	3,12	3,12
	P	NS	<0.05	<0.05	<0.05

Mean

The average ($\bar{x}$) is calculated as follows.

$$\bar{X} = \frac{(\sum x)}{N}$$

Where,
X=data obtained
∑x=sum of all the values
n=total number of sample

Standard Error (S.E$\bar{x}$)

S.E$\bar{x} = S/\sqrt{n}$

Analysis of variance (ANOVA)

Sum of X for all the values was squared and a correction factor 'C' was obtained.

$$C = \frac{(\sum X)^2}{N}$$

Total sum of squares = $(\sum X)^2$- C where X^2 represents the sum of squared values.
Group sum squares = $(\sum x)^2$ - C

findings of the antipyretic activity of methanol extract of *Babylonia spirata* is in similar to the report of Grasian Immanuel *et al*., 2012 who emphasized the antipyretic activity of the shell powder of *Cypraea moneta* lower the yeast induced pyrexia raised rectal temperature on wistar albino rats. The present study also corroborates well with the study of Shanthi *et al.* (2012) who investigated the 100% chloroform purified extract of the marine gastropod *Purpura persica* reduced the yeast induced pyrexia raised body temperature in abino rats and Shankar *et al* who reported the antipyretic activity of marine Bryozoan *Zoobotryon verticellatum.* In support of the result of the present study Joselin and Thilaga (2016) observed the antipyretic activity of the methylene chloride extract of the two Sponges *Axinella donnani* and *Clathria procera* decreased the yeast induced pyrexia raised body temperature in albino rats and Devanathan *et al.* (2002) in *Cypraea moneta.* The similar result was also noticed by Kumar (2003) in *Cypraea aerrrones,* and *Cypraea arabica*.

Conclusion

The methanolic extract of *Babylonia spirata* showed significant activity in antipyretic test. In Conclusion the result of the present study verify the use of gastropod in the treatment of febrile condition. However further investigation is necessary not only to isolate and characterize the active principle of the marine gastropod responsible for antipyretic activity, but also to elucidate the exact mechanisam of action.

REFERENCES

Abdul Rauf, Ghias uddin, Bina S. Siddique, Naveed Muhammad and Haroon Khan, 2014. Antipyretic and antinociceptive activity of *Diospyros lotus* in animals Asian Prac. *J.Prop.Biomed*., 4(1) S 382-S386

Bandizzi C, Tuccori M, Colucci R, Fornai M, Antonioli L, Ghisu N. 2009. Role of Coxibs in the strategies of gastrointestinal protection in patients requiring chronic non-steriodal anti-inflammatory therapy, *Pharmacol Res*., 59;90-100

Cimino G. and Gavagnin M. 2006. Molluscs; Progress in molecular and subcellular Biology Subseries marine molecular Biochemistry, Springer-Verlag Berlin Hiedelberg. pp 387.

Devanathan, DR., Prema S, Saraswathy J, Pharmacological studies on *Cypraea moneta*, Proc 5th Inter. *Cong.Tradi. Asian Medici*., 2002; pp10

Gopal, R.,Vijaya Kumaran, M.,Venkatesan, R., Kathiroli, S., 2008. Marine organisms in Indian medicine and their future prospects, *Nat.Prod.Radi*., 7(2): 139-145.

Grassian Immanuel, Berkmans Jude Thaddaeus, Muthusamy Usha, Ramasamy Ramasubramaniyan, Santhiyagu Prakesh, Arunachaam Palavesam., 2012. Antipyretic, wound healing and Antimicrobial activity of processed shell of the marine mollusk, *Cypraea moneta*, *Asi.Pac.J.Trop.Biomedi*., 643-646

Hebert, D.G., Hamer, M.L., Mander, M., Mkhie, N. and Prins, F. 2003. Invertebrate animals as a component of the traditional medicine trade in Kwazulu-Natal, South Africa. *African Invertebrates*, 44,327-344.

Joselin, P.J and Thilaga, R.D. 2016. Antipyretic activity of methylene chloride extracts of two marine Sponges *Axinella donnani* and *Clathria procera* from Thoothukudi coast *Ind.Str.Res.J.,* 5 (12) 1-5.

Kristen Benkendroff, 2010. Molluscan biological and chemical diversity, Secondary metabolites and medicinal resources produced by marine molluscs. *Biol.Rev*., pp 000-000.

Kumar, S.S. 2003. Studies on the Cowries (Mollusca: Gastropoda: Cyprinidae) of Gulf of mannar South east coast of India. Ph.D., Thesis submitted toManonmaniam Sundaranar University, Tirunelveli. pp;1-186.

Muhammad, N., Saeed, M., Gilani, AH., Muhammad, N., Haq, IV., Ashraf N. 2013. Antipyretic activity and anticonvulsant activity of *Polygonatumn verticellatum.* Comparision of rhizome and aerial parts. *Phytother.Res*., 27 (3); 468-471.

Muhammad, N., Saeed, M., Khan, H. 2012. Antipyretic, analgesic and anti-inflammatory activity of *Viola betonicifolia* Bmc. *Complement Altern Med*., 12(1) :59.

Okokon, JE. and Nwafor, PA. 2010. Anti inflammatory, analgesic and antipyretic activities of ethanolic root extract of *Croton zambesicus*. *Pak.J.Pharm Sci*., 23;385-392.

Periasamy, N., Srinivasan, M., Bala Krishnan, S. 2012. Antimicrobial activities of the tissue extracts of *Babylonia spirata* Linnaeus, 1758 (Mollusca-Gastropoda) from Thazhanguda, South east coast of India. Asian *Pac.J. Tropical Biomed*., 36-40.

Prabhakaran, A. and Roy, S. P. 2009. Ethanomedical uses of some shell fishes by people of Kosi River Basin of North Bihar, India. Ethanomedicine, 3,1-4.

Rajani, G.P., Deepak Gupta, Sowjanya, K. and Sahithi, B. 2011. Screening of antipyretic activity of aerial parts of *Nelumbo nucifera gaertn* in yeast induced pyrexia. *Pharmacologyonline*, 1: 1120-1124.

Sankar, R., Murugan, A. and Sivakumar, V. 2013. Anti inflammatory antipyretic activities, anti-ulcer analgesic and CNS stimulant activities of marine Bryozoan *Zoobotryon verticellatum, Pharmacologia*, 4:15 -21,(2013).

Shanthi, V., Sivakumar, V., Thiaga, RD., and Thangathirupathi, A. 2012. Analgesic Antipyretic and Anti-inflammatory activities of column fraction of *Babylonia zelanica* (Bruguiere,1789) in abino rats. *Int.J. Phar.Bio.Sci*., 2:151-159.

Simmons, TC., Andrianasolo, E., Mcphail, K., Flatt, P. and Grewick, W.H. 2005. Marine natural products as anticancer drugs. *Molecular Cancer Therapeutics,* 4, 333-342.

Uddin, G., Rauf, A., Siddique, BS., Shaw, SQ. 2011. Preliminary comparative phytochemical screening of *Diospyros lotus* tewart middle- *East. J. Sci. Res*., 10(1): 78-81.

Vedhagiri, SJ., Ganesan, K. and Jobe Prabhakar, PC. 2012. Spectroscopic investigation of Palakari (Cowrie shell) Parpam, *J. Res.Edu.Indian Med*., 8(1);27-32.

Xu, B, Descalzi, G., Ye, H., Zhuo, M., Wang, YM. 2012. Transitional investigation and treatment of neuropathic pain. *Mol.Pain*., 8;15.

Yadav, S., Kulshrestha, M., Goswami, M., Rao, CV., Sharma, V. 2011. Elucidation of analgesic and antipyretic activities of Ficus bengalensis linn. Leaves in rats. *J. App. Pharma. Sci*., 01.38-41.

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