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Piscicidal effect of *Polygonum hydropiper* on *Catla Catla*

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ABSTRACT

Piscicidal effect of *Polygonum hydropiper* leaf was examined in *Catla catla* fish collected from local fisherman of Madhepura. LC_{50} value was recorded as 12mg/l extract of *Polygonum* leaves. Percent mortality response of fishes in extract was recorded during 24H, 48H, 72H and 96H. Percent mortality response during 96H was recorded as 10%, 20%, 40%, 40%, 60%, 70%, 80% and 100% in concentration of 11mg/l, 11.5mg/l, 12mg/l, 12.5mg/l, 13mg/l, 13.5mg/l, 14mg/l, 14.5mg/l and 15mg/l respectively. In concentration of 14.5mg/l and 15mg/l of extract death of fish occurred within 24Hrs. While in concentration of 14mg/l, death of fish occurred during 48Hr. Physicochemical analysis of different concentration of extract was examined. It was observed that temperature of extract in different concentration remain constant (27°C) but pH and DO gradually decrease from lower concentration to higher concentration. E.C. gradually increased from lower concentration to higher concentration. Fish behavior was observed in LC_{50} concentration at every 12 hours.

Key Words - Piscicidal effect, physicochemical analysis, Polygonum.

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INTRODUCTION

The use of Piscicidal plant for fishing in an old traditional method practiced by many communities. Piscicidal plants are used to catch fishes and to eliminate undesired fishes from the water bodies (Bokolial and Nath, 2014). The piscicidal plants contain saponins, tannins, rotenone, alkaloids etc. which are toxic substances. The use of plant derived toxins are environment friendly, easily available, biodegradable and cost effective (Singh *et al.,* 2006). In healthy aquaculture, use of piscicidal plants is helpful as they eliminate unwanted fishes. Local fisher man uses piscicidal plants to catch fishes (Dutta *et al.,* 2019). Traditional knowledge of plants used for fishing by local communities is reported by several authors. Cheon *et al.,* (2015) reported use of piscicidal plants by local people of North Jeolla province of Korea. Raha and Mallick, (2016) reported use of 21 piscicidal plants by Santhal tribe of Panchkot hills in Purulia district of West Bengal. Prasad and Raveendran, (2011) reported used of 28 different plants belonging to 23 genera and 16 families. Joshi and Joshi, (2006) reported use of 79 piscicidal plants belonging to 35 families out of which 11 species belong to family Fabaceae. Basumatary and Khangembam, (2023) reported use for 9 plants species for fishing Bodo fishers of Kokrajhar, Assam. *Polygonum hydropiper* is an aquatic herb belonging to family Polygonaceae. It grows near river banks, ponds, chours and ditches where stagnant water is present. Height of plant ranges from 20-70 cm. Leaves are simple with short hairs at the leaf margin. Ochreate stipules. Flowers are pink to white. Parianth of each flower consists of 4-5 segments. Whole plant is

used for its Piscicidal effect, polygonum hydropoper is used as piscicidal plant for fishing activity in ponds or lakes where water is stagnant. The mode of utilization includes direct mixing of whole plant in water or by preparing aqueous extract and mixing it with water. Fish present in water body move to the surface from where they are collected. The extract of plant seems to have sedating effect on fishes due to which they come up on the margin of water. *Polygonum hydropiper* is generally used for fishing during summer and monsoon seasons.

MATERIAL & METHODS

Collection of experimental fishes:

Catla catla were obtained from local fisherman of Madhepura. Weight of fishes varied in between 1kg to 1.5kg. Collected fishes were brought to laboratory in plastic jars covered with nylon net. Fishes were transferred in holding tanks and acclimatized for 15 days. Test fishes were fed twice daily during the period of acclimatization.

Collection of test plants:

Test plants of *Polygonum hydropiper* were collected from local wetland area.

Preparation of test media:

Fresh leaves of test plants were cut into small pieces and homogenized in electric blinder. Aqueous content was filtered through Whatmann filter paper and collected in clean glass bottles.

Test for piscicidal effect of test plants:

Different concentrations were prepared (10mg/l, 10.5mg/l, 11mg/l, 11.5mg/l, 12mg/l, 12.5mg/l, 13mg/l, 13.5mg/l, 14mg/l, 14.5mg/l and 15mg/l. Separate plastic containers were filled with each concentration of extract. One container was filled with water without extract. In each container 10 test fishes were randomly placed. The water containing container was considered was control. Fish behavior and mortality were recorded at 24 hours, 48 hours, 72 hours and 96 hours. LC_{50} value of extract was calculated using Probit analysis method (Finney-1971).

Physicochemical analysis of extract and control containing test fishes were recorded for pH, temperature, DO and electrical conductivity.

RESULT

Physicochemical analysis of medium supplemented with extract and control was examined. pH value of control (water without extract) was observed as 7. pH value of medium supplemented with extract gradually decreased with the increase in concentration in concentration of 5mg/l, 12mg/l and 15mg/l. pH value was observed as 6.85, 6.10 and 5.93 respectively. DO also decreased with the increase in concentration of extract. In control DO was recorded as 6.15mg/l and in medium supplemented with extract the value of DO was recorded as 5.94mg/l, 5.53mg/l and 4.74mg/l in 5mg/l, 10mg/l and 15mg/l concentration respectively.

Temperature remains constant in all concentration. Temperature was recorded as 27^0C in control and in all concentration of extract.

Electrical conductivity increased with the increase in concentration of extract. Details of physico chemical parameters are presented in Fig. 01.

The median lethal concentration (LC_{50}) value at 96H was recorded as 12mg/l. Percentage mortality response varied from 0 to 100% in concentration of extract ranging from 10mg/l to 15mg/l during 96H.

Fafioyeoo reported LC_{50} of *Zanthoxylum rhetsa* in *Heteropneustes fossilis* as 70.1mg/l for 96H. Edafe *et al.,* (2016) reported LC_{50} value of Lufta cylindrical fruit extract on African cat fish as 14mg/l.

Cagauan *et al.,* (2004) investigated Piscicidal effect of some plants against Niletilapia. He reported LC_{50} value of *Azadirachta indica, Tinospora crispa, Citrus microcarpa, Vitex negundo, Blumea balsamifera* and *Agave americana* as 2.5ml/l, 0.44ml/l, 3.12ml/l, 2.93ml/l, 5.11ml/l and 30ml/l respectively.

For finding LC_{50} value and percent mortality response, 10 fishes were added in medium containing 10mg/l, 10.5mg/l, 11mg/l, 11.5mg/l, 12mg/l, 12.5mg/l, 13mg/l, 13.5mg/l, 14mg/l, 14.5mg/l and 15mg/l extract of *Polygonum hydropiper*.

Result of LC_{50} value and percent mortality during 96H is mentioned in Table 01. Mortality response

was observed in different concentrations and different time periods. In a concentration of 15mg/l fish mortality was observed 30% in time duration of 24H, 40% in 48H, 60% in 72H and 100% in 96H. Mortality was not observed in concentration on 10mg/l and 10.5mg/l. In a concentration of 11mg/l, mortality was observed at 96H duration. At a concentration of 12.5mg/l to 14mg/l mortality was observed during 72Hr and onward.

Behavioral change in test fish was observed in LC_{50} dose during 1-12H, 13-24H, 25-36H, 37-48H, 49-72H and 73-96H. The details are mentioned in Table 2.

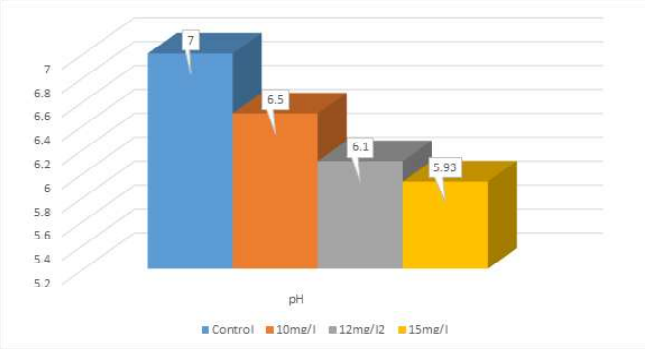

Fig. 1: pH value of control and test extract

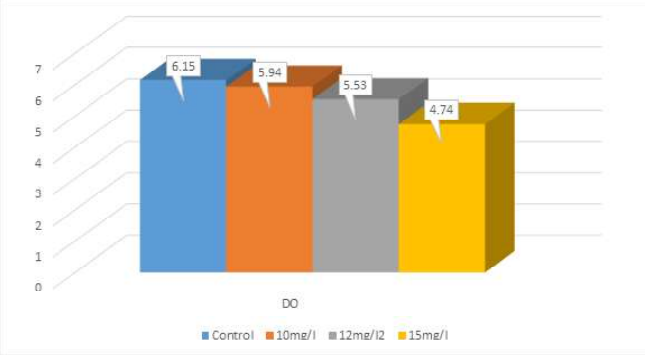

Fig. 2: DO (mg/l) value of control and test extract

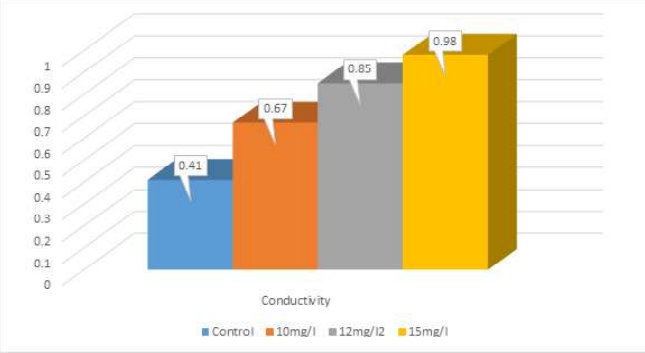

Fig. 3: Conductivity value (ms/cm) of control and test extract

Table 1- Percentage mortality response and LC_{50} value

Conc. of extract	No. of fishes	Count of dead fishes				% mortality response	LC_{50}
		24H	48H	72H	96H		
Control	10	0	0	0	0	0	12.5mg/l
10mg/l	10	0	0	0	0	0	
10.5mg/l	10	0	0	0	0	0	
11mg/l	10	0	0	0	0	0	
11.5mg/l	10	0	0	0	2	20	
12mg/l	10	0	0	0	4	40	
12.5mg/l	10	0	0	2	4	40	
13mg/l	10	0	0	2	5	50	
13.5mg/l	10	0	0	3	6	60	
14mg/l	10	0	2	3	7	70	
14.5mg/l	10	1	2	5	8	80	
15mg/l	10	3	4	7	10	100	

Table 2: Behavior change of test fish in LC_{50} concentration

Exposure period	Behavior change
1-12Hr	Vertical movement
13-24Hr	Change in skin color, mucus secretion
25-36Hr	Lips and eye swollen, increased air gulping
37-48Hr	Fish become sluggish, excessive mucus secretion
49-72Hr	Operculum beats decreased, reduced caudal fin beat frequency
73-96Hr	Mucus secretion in gills disrupted with red patches, motionless with taking vertical position and died

CONCLUSION

Piscicidal effect of *Polygonum hydropiper* was tested on *Catla catla* fish obtained from local fisherman. Extract of *Polygonum* leaves was prepared and diluted up to 5mg/l, 10mg/l and 15mg/l. Fresh water was considered as control. In each concentration, 10 fishes were placed and fish behavior as well as mortality was tested for 24H, 48H, 72H and 96H. Physicochemical analysis of each concentration and control was examined for pH, DO, temperature and electrical conductivity.

It was observed that temperature was constant in control and all concentration (27°C) but pH and DO gradually decrease with the increase in concentration. Electrical conductivity increased with the increase in concentration. LC_{50} dose was calculated by keeping 10 fishes in various concentration of leaf extract. LC_{50} value was recorded as 12mg/l. Fish behavior was observed at every 12 hours in LC_{50} dose. Mucus secretion was observed during 13-14 hours. At an exposure period of 73-96H, mucus secretion in gills disrupted

with red patches, fish became motionless with taking vertical position and finally died.

Mortality response was observed in different concentrations and different time periods. In a concentration of 15mg/l fish mortality was observed 30% in time duration of 24H, 40% in 48H, 60% in 72H and 100% in 96H. Mortality was not observed in concentration on 10mg/l and 10.5mg/l. In a concentration of 11mg/l, mortality was observed at 96H duration. At a concentration of 12.5mg/l to 14mg/l mortality was observed during 72Hr and onward.

REFERENCES

Basumatary N. & Khangembam B.K. 2023. Ethnobotanical uses of Piscicidal plants for fishing by the Bodo tribes of Kokrajhar, Assam. *Indian Journal of Applied and Pure Biology*. 38(01): 438-448.

Bokolial D. & Nath R. 2014. Piscicidal Plants of North East India: An overview. *Environment & Ecology*. 32(4B): 1636-1641.

Cagauan A.G., Galaites M.C. & Fajardo L.J. 2004. Evaluation of botanical piscicides on Nile Tilapia (*Oreochromis niloticus* L.) and mosquito fish (*Gambusia affinis* Baird and Girard). Proceedings of 6th International Symposium on Tilapia in Aquaculture; Manila, Philippines. 179-87.

Cheon I., Song M.J., Kim H., Lee K.H. & Yoo Y.J. 2015. Traditional knowledge of plants used for river fishing in local communities of North Jeolla Province, Korea. *The Korean Journal of Community Living Science*. 26(4): 675-681.

Dutta M.P., Singh M.K. & Borah D. 2019. Piscicidal plants of Northeast India and its future prospect in aquaculture-A comprehensive review. *Indian Journal of Natural Products and Resources*. 10(3): 165-174.

Edafe O., Sikoki D.S.F., Vincent-Akpu I.J. & Ita U.D. 2016. Acute Toxicity of Sponge Plant (*Luffa Cylindrica*) Fruit Extract on African Catfish (*Clarias gariepinus,* Buchell 1822) Juveniles. *International Journal of Life Sciences Research*. 4(1): 148-159.

Joshi A.R. & Joshi K. 2006. Piscicidal Plants of Nepal: checklist, ethnobotanical uses and indigenous practices. *Ethnobotanical Leaflets*. 10: 342-349.

Prasad K.S. & Raveendran K. 2011. Plants used as fish poison in Kasaragod district, Kerala. *Journal of Ecobiology*. 28(2): 101-105.

Raha S. & Mallick H. 2016. Piscicidal and fish stupefying plants used by tribal people living around Panchakot hills, Purulia, West Bengal, India. *International Journal of Life Sciences*. 5(1): 27-30.

Singh A., Singh S.K., Yadav R.P., Srivastava V.K., Singh D. &, Tiwari S. 2006. Eco-friendly molluscicides, piscicides and insecticides from common plants. In Livingston, JV (Ed). Trends in Agriculture and Soil Pollution Research, Nova Science Publishers, Inc. India.

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