

Experimental Studies on the Tolerance of *Anodonta woodiana* against Temperature, Phenol and Lead

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Anodonta woodiana ,
37-38 , LC₅₀ 1200 ppm,
LC₅₀=220 ppm .

This study was carried out to determine the lethal water temperature and lethal concentrations of phenol and lead on *Anodonta woodiana* collected from Bam islet in Han river, Seoul, Korea.

Lethal temperature(LT_{85.0}) on *A. woodiana* was 37-38 , and lethal concentrations(LC₅₀) of phenol and lead nitrate were 1200 ppm and 220 ppm, respectively

Key words : *Anodonta woodiana*, tolerance, phenol, lead

가 ,
-2 100
가 (Brock, 1985).
(life time)
(Langford, 1990).
4가
(Fry, 1967; Langford, 1990), 1)
(lethal effect;
, 2) (controlling effect;
, 3)
(directive effect;
) 4) (indirect effect;
, 1.
(*Anodonta woodinana*)
95 9 , 12 96 5

2.

1)

20-40 5 48 5
 10 10
 10 / 10 20
 1

fine forcep

(lethal temperature) Langford(1990)
 48 50%
 , $LT_{48.50}$

2)

10 / 10
 20 ppm, 200
 ppm, 1000 ppm, 2000 ppm, 3000 ppm
 (lead nitrate) 20 ppm, 200 ppm, 400
 ppm
 48
 (LC_{50})
 3

III.

1.

1 38
 (1 / 1) 가
 41 (Fig. 1). 2
 31 가 32
 50%가 37 . 3
 37 90% 가
 41 . 2

2

95 12

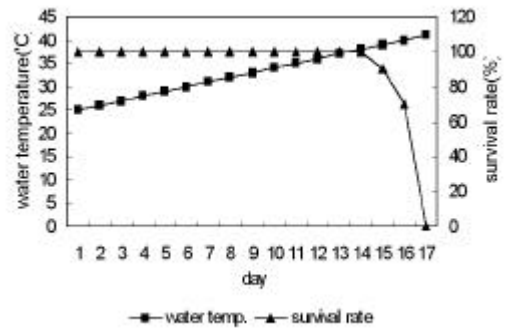


Fig. 1. Lethal effect of continuous increase of water temperature on *Anodonta woodiana*.

20-40 5 48
 30
 90%가
 $LT_{48.50} = 37.8$ (Fig. 2).
 40

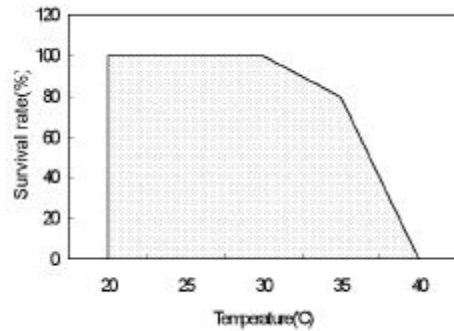


Fig. 2. Survival rate of *Anodonta woodiana* exposed in various water temperature.

2.

200 ppm
 48 76.67%
 , 2 100%
 (Table 1). 1000 ppm 50%
 2000 ppm 20%
 3000 ppm
 $LC_{50} = 1200$ ppm

Table 1. Survival rate of *Anodonta woodiana* exposed to various concentrations of phenol for 48 hours

Concentration of phenol	Survival rate (%) at trial			
	1	2	3	mean ± S.D.
0 ppm	100	100	100	100 ± 0
200 ppm	70	100	60	76.7 ± 28.8
1000 ppm	50	60	40	50 ± 10.0
2000 ppm	20	30	10	20 ± 10.0
3000 ppm	0	0	0	0

3.

100%
60%가
LC₅₀=220 ppm
20 ppm
200 ppm
, 400 ppm
(Table 2).

Table 2. Survival rate of *Anodonta woodiana* exposed to various concentrations of lead for 48 hours

Concentration of lead	Survival rate (%) at trial			
	1	2	3	mean ± S.D.
0 ppm	100	100	100	100 ± 0
200 ppm	100	100	100	100 ± 28.8
1000 ppm	50	60	70	60 ± 10.0
2000 ppm	0	0	0	0
3000 ppm	0	0	0	0

IV.

1-2 m

(natural water) 45-50 가
(Coleoptera)
(Chironomidae)
(Brock, 1975). 35
36-37
(Langford, 1990). 1995

1996

26.1 (, 1996),

30 100%
35 90%

Mytilus californianus

37

(Fox and Corcoran, 1957),

Anodonta anatina

(reproductive period)

(Negus, 1966; Walters, 1977).

acuta)

(*Physa*

Physa virgata

1 3

2

39.5

(McMahon, 1975).

가 (Langford, 1990).

가

LC₅₀=1200 ppm,

LC₅₀=220 ppm

가

V.

1995- 1996

VI.

. 1996.

- . 428 pp.
- Brock, T. D. 1975. Predicting the ecological consequences of thermal pollution from observations on geothermal habitats. In; IAEA (ed.): Environmental effects of the cooling system at nuclear power stations, International Atomic Energy Agency, Vienna. pp. 599-621.
- Brock, T. D. 1985. Life at high temperature. *Science*, 230(4722): 132-138.
- Fox, J. L. and E. F. Corcoran. 1957. Thermal and osmotic counter measures against some typical marine fouling organisms. *Corrosion.*, 14: 31-32.
- Fry, F. E. J. 1967. Responses of vertebrate poikilotherms to temperature. In; Rose, A.H. (ed.): Thermo- biology. Academic Press, London, New York. pp. 375-420.
- Langford, T. E. L. 1990. Ecological effects of thermal discharges. Elsevier Applied Science, London & New York. 468 pp.
- Massengill, R. R. 1976. Benthic fauna. 1965-1967 versus 1968-1972. In; Merriman, D. and L.H. Thorpe (eds.): The Connecticut river ecological study, The impact of nuclear power plant. Am. Fish. Soc. Monograph, No. 1. 252 p.
- McMahon, R. F. 1975. Effects of artificially elevated water temperatures on the growth, reproduction and life-cycle of a natural population of *Physa virgata*, Gould. *Ecology*, 56: 1167-1175.
- Negus, C. L. 1966. A quantitative study of growth and production of unionid mussels of the River Thames at Reading. *J. Animal. Ecol.*, 35: 513-532.
- Walters, J. 1977. An ecological study of *Hydrobia ulvae*, (Pennant), in the Medway estuary, including the possible effects of power station warm water effluent. Ph.D. Thesis, Department of Biological Sciences, City of London Polytechnic, London.