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Effect of Some Physicochemical Parameters on Hatching Ability in Cyst of *Artemia urmiana*

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Abstract: Artemia is one of the most important live foods for aquatic animals and is essential for larva stage of many species of fishes. One of the usual application ways of Artemia is hatching of cyst and if this hatching occurred with high percentage, production of Artemia and then Aquatic creature will be increase and eventually human protein requirement will be provided. In this investigation , we study the effect of three level of temperature (25,30,35 °C) and three level of salinity (25,30,35 ppt) with together in three time (24, 26,28 h) after hydration on percentage of cyst hatching of *Artemia urmiana* for determining optimum of salinity and temperature on ability of hatching cyst of *Artemia urmiana* . Totality we had 9 factors with 27 repetition (3 repetition for every factors). Results indicated that the effect of salinity in this experiment has no any significant variance in all of the factors ($p > 0.05$) But temperature is more effective on hatching and had significant variance in factors . ($p<0.05$).The high percentage of hatching observed in temperature of 30 °C and salinity of 35 ppt, but in statistical result, temperature of 30°C in all salinity has high percentage of hatching. The low percentage of hatching observed in temperature of 25°C and salinity of 25ppt but in statistics result temperature of 25°C in all salinity has low percentage of hatching. So, temperature appeared to be more effective for hatching than salinity and percentage of hatching has shown to be increased by time and high percentage of hatching appeared 28 hours after hydration in 30 C and 35 ppt.

Key word: Artemia · Hatch · Cyst

INTRODUCTION

For the first time, *Artemia urmiana was identified* by Gunther (1899), then Clark and Brown (1987) named that. *Artemia urmiana* exist on the Uremia lake in Iran (a lake with salinity rang 140-210 ppt). In this time cyst of *Artemia urmiana* have not a good quality [1] which with examination of some factor of decreasing of quality and determination of the best optimum of hatching we can have a high potential use from this enormous sources.

Exploitation of cyst of *Artemia urmiana* started in last decade. The most researcher that study on cyst of Artemia , had best rang of temperature between 25-30°C [1-3]. Others stated a rang of 15-30 C for hatching cyst of *Artemia urmiana* they stated a rang of 37 ppt for salinity and 28°C for temperature [4] 33ppt for salinity and 26°C for temperature [2] For salinity they state 29ppt [3] .

Hatching of cyst depended to many factor like genetic and geographic dispute, condition life of adult , method of harvest and post harvest, but the important factor is the effect of salinity and temperature [5]. In this study we just examined the effect of salinity and temperature on ability of hatching cyst of *Artemia urmiana*.

MATERIAL AND METHODS

This investigation examined the effect of various levels of temperature (25,30,35°C) and salinity (25,30,35 ppt) on ability of hatching cyst of *Artemia urmiana* on three time after hydration (24,26,28 h) with method of 3×3 factorial with casual base on three repetition So we had 27 repetition and need to 27 treatment .

This examination was carried out in the fishery lab of IUT in Iran. We collected cyst from surface of Uremia

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Lake with 120 M plankton net. Then we process that with diphase flotation method and dehydration [6]. We make salinity with NACL in lab and regulate with REFLECTOMETER. We make temperature with Aquarium heater .intensity of light was 2000 luxe and air condition was 10 lit/min. in every treatment incubator we had 1 gr/lit cyst.

Method of sampling and counting was according to international standard of Artemia [4], of course sampling was casual and we sampling with MICROSAMPLER and counting with LOOP .for calculate of hatching percentage we use from this formula : %H = N / N+U+E that N= naupli stage , U = umbrella stage ; E = embryo un hatched.

For having of effect of temperature on difference salinity, we make all of treatment in favor temperature (for example 30°C) and different salinity (25, 30, 35 ppt). In others day make this for remainder temperature (25, 35°C). For having effect of salinity do like above method. So we have 9 invoice (25C and 25ppt), (30C and 25 ppt), (35C and 25 ppt) with 27 repetition.

For analyze of data we use from fisher test (F-TEST) and SAS program, for compare of average of invoices use from DUNCAN test with level of %0.05 and %0.02 we use from MSTAT program and for draw table related to output of SAS program we use from Microsoft word and excel program [1].

RESULTS

Statistical analysis result for the effect of different levels of temperature and salinity on hatching cyst of *Artemia urmiana* during different time after hydration are shown in Table 1.

Effect of Temperature on Hatching Percentage: The result showed that maximum percentage of hatching in different time after hydration was related to 30°C and minimum was at 25°C and different between 25, 35°C was not signification but with 30°C was signification that means by diminish and raise of temperature from 30°C , hatching percentage will be decrease .

Effect of Salinity on Hatching Percentage: The result showed that maximum percentage of hatching at 24 h after hydration was related to 35 ppt and at 26 and 28 h was in 30ppt. that in 24 h was not signification different but at 26 and28 h there was signification difference, so the maximum percentage of hatching was on 30ppt and minimum was on 25 ppt.

Table 1: Statical analyses of hatching rate

		P -value		
Source of changes	Freedom degree	28	26	24
Invoice	8	<0.001*	<0.001*	0.047*
Salinity	2	<0.001*	0.07 n.s	0.51 n.s
Temperature	2	0.001*	0.001*	0.01*
Salinity ×temperature	4	0.0003*	0.002*	0.17 *
Mistake of experiment	18			
Total	26			

* : signification difference on level of %5

n.s : don't signification different

Effect of Different Level of Temperature and Salinity on Hatching Percentage: The result showed that at 24 and26 h after hydration, maximum percentage of hatching was at 30°C and 35 ppt and minimum was at 25°C and 35 ppt, but there was not signification difference between different level of salinity. at 28 h after hydration ,maximum percentage of hatching was at 30°C and 35 ppt and minimum was at 25°C and25 ppt and there was not signification difference between different level of salinity

RESULT OF ALL PARAMETERS

Salinity doesn't establish difference signification, but temperature does that and temperature have more effect on hatching. with progress of time, percentage of hatching was increased. Maximum percentage of hatching was at 28 h and 30°C and 35 ppt.

DISCUSSION

The past study emphasized on introduction of *Artemia urmiana* [7] and anatomy of that species and research about cyst was few [7,8] . But in the present research we study condition of cyst and in often past research they studied just one parameter [2] but we study two parameter alone and together and their reciprocal effect.

The present study was the same with other stated in Introduction section and a little difference of result is 3probably for effect of lab environment, genetic and geographic dispute [2, 5,7], condition life of adult [3], food and density [6] and method of harvest and post harvest. In the present study we use from optimum of other parameter, like pH [8] and density [8] and disregarded from testing that.

So with this study we show that with implement of optimum condition and control of environment, we can have maximum of hatching cyst of *Artemia urmiana* and have best use from this natural sources.

Because this study was in lab, suggest that other study be in natural environment, may be it have better result. And with increasing of invoice and repetition will have a complement series .and suggest in future study, with increase limits of salinity and temperature, maybe in highest or lowest range of salinity and temperature we have more exact optimum for hatching cyst of *Artemia urmiana.*

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REFERENCES

1. Tavassoli, M., 2000. Determination of the optimum enviromental conditions(PH,Water temp and stochingdensity) for hatching of the brine shrimp (Artemia) for lake Urmieh (*Artemia urmiana*), M.Sc thesis of marin biology , tarbiat modarres university (Iran). pp: 88.
2. Agh, N., 1997. Effect of physicochemical factors on hatching cyst of Artemia Urmiana, first Iranian conference of Zool.,
3. Fengqi, L., X. Jionhai and L. Anxi, 2001. Studies on the optimum hatching temperature of artemia cyst from a salt lake in Tibet. International workshop on Artemia. Aquatic Animal Research Center,Urmia Univ. Iran.
4. Dana, G.L., C.J. Foley. G.L. Starrett. W.M. Peny and J.M. Melack, 1998. In situ hatching of Artemia monica cysts in hypersaline Mono lake, California Hydrobiologia, 158: 183-190.
5. Dana, G.L. and P.H. Lenz, 1985. Effects of increasing Salinity an Artemia population fromMono lake, California. Oecologia, 68: 428-436.
6. Babu, M., M.P. Marian and M.R. Kitto, 2001. A cradle aeration system for hatching Artemia. Aquaculture Engineering..24: 85-8
7. Drihkwater, L.E. and J.H. Crowe, 1991. Hydration state, metabolism and Hatching of Mono lake Artemia cysts. Biological Bulletin. 180: 432-4.
8. Thun, M.A. and G.L. Starrett, 1987. The effect of cold hydrate dormancy and salinity on the hatching of Artemia cyst from Mono Lake,California.