



UNIVERSITI PUTRA MALAYSIA

***EFFECTS OF ANTIFUNGAL TREATMENT ON THE EMBRYONIC
DEVELOPMENT, HATCHING, AND LARVAL SURVIVAL OF *Clarias
gariiepinus* (Burchell, 1822)***

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**This project report is submitted in partial fulfillment of the requirements for
the degree of Bachelor of Agriculture (Aquaculture)**

DEPARTMENT OF AQUACULTURE

FACULTY OF AGRICULTURE

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ABSTRAK

Satu kajian mengkaji kesan agen antikulat yang berlainan terhadap perkembangan embrio, penetasan dan kemandirian ikan keli Afrika, *Clarias gariepinus* yang dijalankan bermula April sehingga Ogos, 2013. Telur dan sperma *C. gariepinus* telah dihasilkan melalui teknik pembiakan aruhan dengan menggunakan hormon ovaprim. Telur disenyawakan melalui kaedah persenyawaan kering. Telur yang baru disenyawakan dirawat selama 24 jam dengan dos rawatan yang berlainan seperti formalin, ekstrak chamomile dan methilin biru pada suhu pengeraman $27\pm 1^{\circ}\text{C}$. Perkembangan embrio telah dipantau setiap satu jam dalam selama 24 jam. Rawatan dengan formalin pada 15, 30 dan 45 ppm menunjukkan penetasan yang paling tinggi ($p < 0.05$), masing-masing pada 59, 57, dan 58% berbanding dengan rawatan yang lain. Walaubagaimanapun, rawatan ini memberikan bilangan larva cacat yang paling tinggi ($p < 0.05$). Sebaliknya, rawatan dengan chamomile menghasilkan bilangan larva cacat yang paling rendah ($p < 0.05$). Kajian ini menunjukkan bahawa formalin adalah rawatan anti-kulat paling berkesan terbukti dengan penghasilan peratus penetasan yang paling tinggi. Walaubagaimanapun, pertimbangan terhadap isu keselamatan dan persekitaran perlu juga diberi perhatian. Pilihan kedua terbaik adalah dengan menggunakan ekstrak chamomile sebagai rawatan anti-kulat untuk telur *C. gariepinus*. Pertumbuhan kulat pada telur dapat dikesan seawal 15 jam selepas persenyawaan. Pada keseluruhannya, rawatan antikulat didapati tidak mempengaruhi perkembangan embrio *C. gariepinus*.

ABSTRACT

A study on the effect of different antifungal agents on the embryonic development, hatching and survival of African catfish, *Clarias gariepinus* was carried out from April to August 2013. Eggs and sperms of *C. gariepinus* was produced through induced breeding technique using ovaprim hormone. Eggs were fertilized using dry method. Newly fertilized eggs were treated for 24 hours with different dosages of formalin, chamomile extract and methylene blue at incubation temperature of $27\pm 1^{\circ}\text{C}$. Embryonic development was monitored at hourly intervals for 24 hours. Formalin treatment at 15, 30 and 45 ppm showed the highest percentage of hatching ($p < 0.05$), of 59, 57, and 58% respectively as compared to other treatments. However, this treatment produced the highest numbers of deformed larvae ($p < 0.05$). In contrast, treatment using chamomile produced the lowest numbers of deformed larvae ($p < 0.05$). This study showed that formalin is the most effective anti-fungal treatment, evident with the highest percentage of hatching. However consideration on safety and environmental issues need to be given attention. Second best alternative is using chamomile extract as antifungal for the eggs of *C. gariepinus*. Fungal growth was observed as early as 15 hours after fertilization. Overall, all the anti-fungal treatments used in this study do not affect the development *C. gariepinus* embryos.

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LIST OF SYMBOLS AND ABBREVIATIONS

°C degree celsius

% percent

g gram

mg milligram

L liter

mg/L milligram per liter

ppm parts per million

DO dissolved oxygen

S.D standard deviation

DAH days after hatching

CHAPTER 1

INTRODUCTION

Clarias gariepinus (Burchell, 1822) is known as African catfish or locally called Keli. According to Richter *et al.* (1995), there are 5 identified species that are of economic importance, they are *C. lazera*, *C. mossambicus*, *C. gariepinus*, *C. anguillaris*, *C. senegalensis*. There was once a confusion on the identification of these 5 species but with much research scientist are able to identify these species using their morphological differences. To date there are more than 100 species of the genus *Clarias* have been described in Africa (De Graaf and Janssen, 1996).

According to Osman *et al.* (2008), the African catfish *C. gariepinus* inhabits tropical swamps, lakes and rivers. They also noted that the economic importance of *C. gariepinus* are increasing considerably and *C. gariepinus* are even introduced to Europe, Asia, and Latin America for farming purposes.

The Department of Fisheries Malaysia (DoF) (2010) has recorded a total production of 63,206.24 metric tonnes of *C. gariepinus* in the year 2010 with an estimated whole sale value of RM194,479,510. The total retail value of *C. gariepinus* reaches an estimate of RM315,622,850. The total production of *C. gariepinus* is 27.6% of the total freshwater aquaculture production in Malaysia. This is almost one third of the aquaculture production industry.

With this in mind, sustainable breeding of *C. gariepinus* should be established to ensure that this industry can continue to grow and generate revenue for the country. Although *C. gariepinus* spawns naturally in flood plains but the collection from the wild is unreliable and limited to the raining season only thus induce breeding have been practised in many hatcheries (Rasowo *et al.*, 2007). According to Akpoilih and Adebayo (2010), aquatic fungi are ubiquitous or in other words, present or found anywhere in natural water supplies of fish hatcheries often can causing serious disease problems that can incur a high economic lost. Fish eggs that are unfertilized are highly susceptible to fungal infection particularly from the family of Saprolegniaceae during the incubation period and it can mycelia that spreads to healthy eggs. The spreading of the mycelia can cause mortality in fish eggs (Rasowo *et al.*, 2007). Therefore the objectives of this study were to:

1. Observe the effects of different antifungal treatments on the embryonic development of *C. gariepinus*
2. Determine the effects of different antifungal treatment on the hatching of *C. gariepinus* eggs
3. Observe the effects of different antifungal treatments on larval development and survival of *C. gariepinus* during the critical period.

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