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Mycology Quality of Crayfish

[1]Owhoudue, E. Roland and [2]Efejene, O. Unity

[1,2]Biology / Microbiology Unit, Department of Science Laboratory Technology, Delta State Polytechnic, Otefe-Oghara, Nigeria

ABSTRACT

The quality of crayfish meat deteriorates due to the release of proteolytic enzymes from the intestines. The aim of the research is to isolate and identify microbes (fungi) occurring in crayfish. The crayfish (Procambarus clarkii) used was purchased from the market and weighed (1 g) using scales and paper. Six (6) fungal species were isolated from the sample; Aspergillus niger, icrosporium spp, Aspergillus fumigatus, Fusarium spp, Aspergillus flavous and yeast. Presence of crayfish pathogens; It is caused by environmental factors, hygiene, equipment and personnel-related activities in the area. The following is recommended: Crayfish must always be clean, hygienic and handled to prevent contamination. Crayfish must be presented in a hygienic manner.

Keywords: Cray fish, dilution, colour, isolation, Egypt

INTRODUCTION

Procambarus clarkii is considered the most important of the 400 known species in the world and is well established in all countries except Antarctica and Australia because it is highly productive and tolerant of poor water quality (Alderman, 2006). In recent years, aquaculture and primary industries have grown rapidly worldwide, reaching 39.4 million tonnes in 1998 (Bailey, 2004). However, crayfish stocks in Egypt are promising, but the average annual consumption is estimated at only 4.6 tonnes (Amborski, et al; 2005). The quality of crayfish meat deteriorates due to the release of proteolytic enzymes from the intestines. In general, the transportation of live specimens to the country of origin is prohibited (Brock and Lightner, 2000). Crayfish were first found in Egypt in the early 1980s. Burns (2000) found viable populations in the aquatic environment of Giza, Cairo, and some delta governorates. Chinain and Vey (2007) reported 620 species, including at least 440 Cambaridae, a family of red swamp beetles. The most common fish is P. clarkii, which was introduced to the Nile waters in Egypt; this species is a polytropic crustacean that may be an effective species in the management of freshwater ecosystems (El-Gamal et al., 2006). The season of crayfish activity began in late March, when temperatures rose to (22 °C) and water in various channels and holes was high (after winter closure). Therefore, the growth rate of fish in Egypt is higher than in the United States, probably due to the lower temperature in the United States (El-Gamal et al., 2006). In Egypt, as in other countries, the red fish P. clarkii has become a truly new food source, a cheap and popular source of seafood in some local fish markets, replacing the expensive from the sea. (El-Gamal et al., 2006).

Since there is currently no established method for processing crayfish, the specific conditions are very different. If enzymes in the hepatopancreas are not produced during respiration, the presence of this tissue in crayfish meat packaging can cause mold formation (Evans et al., 2002; Fisher, 2008). They also reported that the hepatopancreas of crayfish is a rich source of proteolytic enzymes. In addition, the presence of health-promoting bacteria in food waste; however, no studies on bacterial contamination in commercially processed crayfish have been reported in the literature (Foster and Slater, 2005). The consequences of post-harvest food mishandling remain a significant food safety issue for ready-to-eat foods such as crayfish, which can become contaminated through undercooking or oral contamination in the absence of adequate sanitation. Infectious diseases are a global health problem that causes morbidity and mortality. When it comes to packaging dried fish offered for sale by vendors and traders in the local market, it is usually hand large fish trucks. Poor hygiene among food handlers is one of the most common factors contributing to food borne illness; Poor hand hygiene is also a "significant factor". Bacterial and fungal contamination after eating can cause serious health problems; Therefore, proper handling, storage, processing, packaging and transportation of fava beans is necessary to ensure their safety. The aim of this research is to isolate and identify microbes (fungi) found in crayfish; and improving understanding of fungal abundance and distribution to provide a better basis for implementing and supporting management strategies to increase and sustain invasive plant species.

METHODOLOGY

Sample Collection and Preparation

The Cray fish (*Procambarus clarkii)* used was purchased from the market and showing signs of infection such as brownish-red melanisation on abdomen and sluggish movement. The crayfish sample was weighed (1g) using the weighing balance and foil paper. Three (3) different test tube rack containing four test tubes was arranged. Then 9ml of distilled water was measured into each of the test tube. The weighed 1g of crayfish sample was put into three

of the test tubes in the test tube rack. Then, the test tube was covered with foil paper and allowed to dissolves for about an hour. After an hour, the crayfish solution was gotten.

Preparation of Potato Dextrose Agar (PDA)

This medium was prepared according to the manufacturer's instructions too. Thirty nine grammes (39g) of the dehydrated base powder was dissolved in 600ml of distilled water and mixed vigorously. The mixture was heated to melt the agar and then diluted to 1 litre and its pH checked to conform to standard (5.6 + 0.2). A portion of the medium was transformed in 15ml portion to McCartney bottles for slants. The entire medium was sterilized in an autoclave at 121ºC and 15Psi for minutes. After, the slant bottles were allowed to cool and gel on racks in slanted positions while the rest was aseptically poured into sterile Petri dishes to form agar gel used for propagation of fungi.

Sterilization of Equipment and Work Bench

Glass wares (bottles and test tubes) were washed with detergent and allowed to dry and then autoclaved at 121^0c for 15minutes to achieve sterilization. The work bench was disinfected using 70% alcohol.

Serial Dilution

10ml of sterile distilled water was pipette into each test tube (5 test tubes). 1 ml of crayfish sample was added to the first tube and stirred. 1ml was drawn out from the first test tube to the second test tube and gradually to the fifth test tube. 1ml from the fifth test tube was discarded and this was done to the entire crayfish sample.

Identification of Organism

The prepared potato dextrose agar was poured into six petri-dishes and allowed to solidify. The petri dishes were then labeled as follows, $A10^{-3}$, $A10^{-5}$, $B10^{-3}$, and $B10^{-5}$. Then syringe was used to collect 0.5ml from test tube $A10^{-3}$ and placed it in petri dish $A10^{-3}$, collected 0.5ml from sample $A10^{-5}$. This process was repeated for each of the test tubes. As the 0.5ml of the diluted sample was put into the petri dish, the sterile bend glass was used to spread the diluted sample all over the solidified agar on the petri dish. At the end of this procedure, the petri dishes were inoculated.

RESULTS

The table below show the results obtained from the experimentation conducted on the isolation and characterization of fungi in crayfish.

Table 1: Cultural Characteristic of Fungal Isolates

Cultural Characteristics	$A10^{-3}$	$A10^{-5}$	$B10^{-3}$	$B10^{-5}$
Cell type	Filamentous	Filamentous	mucor	Filamentous
Texture	velvety	velvety	Cottony	velvety
Surface colour on PDA	White/brown	White	Green/white	Red yellow/white
Reverse colour	Yellowish	Yellowish	Creamy	Creamy
Gram reaction	Candida (Gram +ve)	Candida (Gram +ve)	Candida (Gram +ve)	Candida (Gram +ve)
Fungi identified	*Aspergillus niger*	*Aspergillus niger*	*Aspergillus fumigatus*	*Fusarium spp*

DISCUSSION

From table 4.1, the total number of three (3) six fungal species were isolated from the samples; *Aspergillus niger, Aspergillus fumigatus* and *Fusarium spp.* The presence of food borne pathogens in a crayfish is a function of the environment, sanitary conditions, and practices associated with equipment and personnel in the processing environment (Alderman, 2006). The handling of crayfish products during processing involves a risk of contamination by pathogenic fungi.

This investigation detected *Aspergillus* as the most commonly encountered species in the crayfish. This is consistent with the observations made by earlier researchers including Amborski et al., (2005), El-Gamal et al., (2006) and Evans et al., (2002). These researchers concluded that the genus *Aspergillus* is most commonly isolated genera in aquatic systems. This is concurrent with our result. *Aspergillus spp* produces toxic organic compounds in seafood

which cause allergies, asthma and various other infections (Foster, and Slater, 2005). However, the presence of these microbes in the crayfish provokes thoughtful concern since it is one of the major sources of protein and vitamins.

It is known that members of the dominant genus, *Aspergillus* have been implicated in the production of strongly potent and toxic hepatocarcinogenic compounds generally known as afflatoxins (Getchell, 2009). Specifically, *Aspergillus niger* is associated with common allergy and may trigger opportunistic infections in hospital immunized patients (Gydemo, 2002). Again in a related research, Hall, and Unestam, (2000) named *Aspergillus* as one of the most commonly isolated genera in crayfish having the highest contribution to microbial contamination in the aquatic system. *Aspergillus niger* has again been noted as the causative agent of Aspergillosis in which the fungus infects the lungs and spreads to other organs, producing abscesses and necrotic lesions (Huner, 2004; Johnson, 2003). The contamination of the sample may be due to improper handling and exposure to the environment.

CONCLUSION AND RECOMMENDATION

From the result obtained from this study, contamination of crayfish may be due to improper handling, how they are been prepared and the environment they are been sold and improper storage. It is hereby recommended that: Crayfish should be properly and effectively preserved and handled to avoid been contaminated; Crayfish should be displayed in hygienic manner; Crayfish should be properly cooked before consumption; Consumers should be enlightened about sanitary measures.

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