



Research Article

Mycological Quality of Palm Oil at Retail Sales in Awka Metropolis, Anambra State, Nigeria

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Article History: Received: September 23, 2015 Revised: November 25, 2015 Accepted: December 12, 2015

ABSTRACT

This study was carried out to assess the mycological quality of palm oil sold in Eke Awka market. A total of 40 samples (one from each seller) were collected in sterile bijou bottles. The samples were processed using standard techniques. The fungal contaminants isolated were identified based on their gross macroscopic and microscopic characteristics. The isolates included; *Aspergillus niger* 30(43.5%), *Penicillium* species 15(21.7%), *Phialophora verrucosa* 9(13.0%), *Alternaria alternata* 5(7.2%), *Microsporium gallinae* 5(7.2%) and *Fonsecaea pedrosoi* 5 (7.2%). *Aspergillus niger* had the highest frequency of occurrence followed by *Penicillium* species. The presence of these organisms in the palm oil samples showed that they are contaminated with fungal isolates which may cause health problems on individuals who consume or apply it topically without heat processing.

Key words: Palm oil, Fungal isolates, Public health, Awka

INTRODUCTION

Palm oil is an edible vegetable oil derived from the mesocarp (reddish pulp) of the fruit of oil palm, mainly the African oil palm, *Elaeis guineensis* (Reevis and Weihrauch, 1979; Obahiagbon, 2012).

Palm oil is a common cooking ingredient in the tropical Africa and South East Asia. Along with coconut oil, palm oil is one of the highly saturated vegetable fats. It is semi-solid at room temperature and contains several unsaturated fats in the form of glyceryl laurate (0.1% saturated), myristate (1% saturated), palmitate (44%, saturated), stearate (5% saturated), oleate (39% monosaturated), linoleate (10% polysaturated) and alpha-linolenated (0.3% polyunsaturated) (Cottrel, 1991). Like all vegetable oils, palm oil does not contain cholesterol (US Federal Food, Drug and Cosmetic Act, 1991), although saturated fat intake increases a person's low density lipid LDL and HDL cholesterol (Mensink and Katan, 1992; Sundram, 2003).

Palm oil apart from being a common cooking ingredient in Nigeria, some people consume it raw; some apply it to skin boils to aid in its rupturing. Therefore, this research was carried out with the aim of determining the presence of fungi contaminants in the palm oil sold in

Eke Awka market which may be of public health significance.

MATERIALS AND METHODS

Sampling area: Forty samples of palm oil were collected from different sellers in Eke Awka market

Collection of samples: the samples were collected aseptically in sterile bijou bottles. The samples were then transported to the laboratory for mycological analysis.

Isolation and identification fungal isolates: An aliquot of each of the palm oil sample was inoculated in Sabouraud's Dextrose agar (Diffco) using spread plate method. The plates were incubated in inverted position at room temperature for 5 to 7 days. Each resultant colony was carefully examined. The rate of growth, consistency, color and texture of surface growth, nature of reverse side and other peculiar features of the colony were noted and were guide to final identification. The final identification of isolates was based on standard criteria for fungal identifications (Frey *et al.*, 1979; Rippon, 1988; St-Germain and Summerbell, 1996).

Cite This Article as: Umedum CU and C Ezeugbo, 2015. Mycological quality of palm oil at retail sales in Awka Metropolis, Anambra State, Nigeria. Inter J Agri Biosci, 4(6): 215-217. www.ijabio.com (©2015 IJAB. All rights reserved)



Fig. 1: Sampling site in Eke Awka Market

Table 1: Frequency of occurrence of isolates

Isolates	No. Isolated	Frequency of occurrence (%)
<i>Aspergillus niger</i>	30	43.5
<i>Penicillium</i> species	15	21.7
<i>Phialophora verrucosa</i>	09	13.0
<i>Alternaria alternata</i>	05	7.2
<i>Microsporium gallinae</i>	05	7.2
<i>Fonsecaea pedrosoi</i>	05	7.2
Total	69	99.94

RESULTS

A total of 40 samples of palm oil were screened for the presence of fungi. All the forty samples processed were contaminated with fungi. Four species of fungi were isolated and identified as; *Aspergillus niger*, *Penicillium* species, *Phialophora verrucosa* and *Alternaria alternata*. the most predominant isolate was *Aspergillus niger* 30(43.5%) followed by *Penicillium* species 15(21.7%) and the least isolates were *Alternaria alternata*; *Microsporium gallinae* and *Fonsecaea pedrosoi* 5 (7.2%). The frequency of occurrence of fungi isolates is shown in Table 1.

DISCUSSION

All the 40 samples processed yielded heavy growth of fungi isolates. This finding is not surprising because of poor hygienic handling and marketing of the product in the market. The ability of these fungi to produce spores helped them to survive the anaerobic nature of the oil.

Aspergillus niger was the most predominant isolate. This organism has been noted for its ability to survive in oil by producing the enzyme lipase (Onilude *et al.*, 2005). *Aspergillus niger* is of public health significant because it can cause aspergilloma, it can also cause cutaneous, pulmonary and disseminated infection in immuno-compromised patients. (St Germain and Summerbell, 1996; Cheesebrough, 2003). A similar observation was made by Okechalu *et al.*, (2011) in Jos.

The second predominant isolate was *Penicillium* species. *Penicillium* species are naturally non-pathogenic

with exceptions of *Penicillium marneffe* that causes infections of lymphatic system, lungs, liver, skin, spleen and bones. Some are frequently implicated in deterioration of food products, where they may elaborate mycotoxins. (Ellis, 2015).

Phialophora verrucosa and *Fonsecaea pedrosoi* also isolated from this study are agents of chromoblastomycosis. Chromoblastomycosis is a chronic warty mycosis of skin and subcutaneous tissues, transmitted by traumatic implantation of the organism. (Haishan, 1994; Deb *et al.*, 2013). If uncooked palm oil contaminated with these organisms is applied to a boil, it can lead to secondary infection by these organisms.

Alternaria alternata is a cosmopolitan saprophytic organism. The spores are airborne and found in the soil and water. It is also of public health significance because it can cause upper respiratory infections in AIDS patients, asthma in people with sensitivity and has been implicated in chronic rhinosinusitis (Lawrence *et al.*, 2013).

Microsporium gallinae is a zoophilic dermatophyte and a common cause of dermal infection in fowl, especially chicken and turkey (Fonseca and Mendoza, 1984; St Germain and Summerbell, 1996).

Its presence in the palm oil may probable be an airborne contamination with poultry feathers because very close to palm oil stand is where they keep and sale fowl.

Conclusion

The palm oil samples sold in Eke Awka market are highly contaminated with fungal organisms. Some of the organisms isolated can cause health problems in individuals who consume or apply topically without heat processing. Some of the fungi are food spoilage organisms and may accelerate the deterioration of palm oil.

Recommendations

Health education of palm oil sellers on common hygiene habits to prevent contamination is very important. Further research probable on total microbial count of palm oil on retail sales in our markets is recommended.

Vegetable oil companies should undertake the hygienic packaging of palm oil to reduce contamination by microorganisms.

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