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PEANUT BUTTER–A SERIOUS HEALTH HAZARD IN SUDAN

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ABSTRACT

Further contamination can occur by the fungus during the unhyiegenic preparation and marketing of the butter, which explains the literature reports of higher Samples of roasted and unroasted peanuts, used for the preparation of peanut butter, were collected from the local markets in Omdurman Khartoum and Khartoum North to test for fungal contamination and aflatoxin formation.

_Culturing peanuts on Potato Dextrose Agar (PDA), revealed *Aspergillus flavus* growth.

_A representative sample (C) of unroasted peanuts was prepared and examined for aflatoxins using the flourometer (viacom series 4) method, which revealed 13.5 µg/Kg aflatoxin.

_Roasted samples (A) revealed less aflatoxin1.5 µg/Kg, while in sample (B) no aflatoxin was detected.

_The findings indicate serious health risks of consuming contaminated peanut butter, since it is widely reported that aflatoxins cause liver cancer.

_concentrations of aflatoxin in butter which explains the literature reports of higher concentrations of aflatoxin in butter.

INTRODUCTION

Peanut butter is becoming a main food ingredient for the preparation of salads as a nutritive alternative meal for large sections of the Sudanese.

Aflatoxin, is widely reported as a main cause of the increasing liver cancer in underdeveloped countries, including Sudan. Research in Sudan and abroad implicates peanut butter as a major source of aflatoxin contamination and hence liver cancer (ICRISAT, 2000).

Bakhiet and Musa (2011) carried out a survey, collecting 60 samples of peanuts form main growing areas, rain-fed and irrigated, of different varieties, and tested them for *Aspergillus flavus* contamination and aflatoxin formation. All samples were found to be contaminated with the fungus, and aflatoxin was found in all samples in varying levels ranging from 404 µg/kg to 17.5 µg/kg. The lowest level reported is by far higher than 2.5 µg/kg the level allowed by the Health Authorities in Sudan.

Hag Elamin et al.(1988) showed the high aflatoxin contamination levels of pre-and post-harvested peanuts.For this reason the European Market banned the importation of peanuts and their animals feed cakes (Ombaz), because of the light levels of aflatoxin.

In addition to the already contaminated raw peanuts, the non-hygienic conditions of preparing peanut butter as a small household production in dirty dusty surroundings using primitive utensils and handling methods, aggravate fungal contamination (Bakhiet, 2012) and raise levels of aflatoxin in the butter, making it a real health hazard.Poor handling and marketing in dusty

local markets, and in dusty street corners expose the butter for further contamination.

Peanut butter producers usually roast the raw peanuts obtained from dirty local markets before crushing them to prepare the butter in order to have a better taste. Butter producers believe that roasting, at high temperature treatment will reduce aflatoxin contamination – "no toxin after heating" a popular saying!

Peanut butter production has always been a small scale hut production of small quantities for the market, and hence the health risks are confined to a lesser degree of distribution. Unfortunately a recent report in the daily news paper "Khartoum" (2014) revealed that peanut butter, the "Dakwa" is going to be produced on a massive industrial scale, using tons of peanuts daily to prepare the butter for wider markets distribution in Sudan. As mentioned above no production area, no peanut varieties are immune from insect infestations and *A.flavus* and aflatoxin contamination. This mass production represents a grave catastrophic health hazard, distributing aflatoxins in a wider scale to wider sections of the population. Such an industry fails to abide by the first rules and the strict guidelines of FAO, HACCP for food production by using an already highly contamination raw material. This explains the high levels of aflatoxin reported for peanut butter collected from local markets.

MATERIALS AND METHODS

Microbiological Analysis

1) Three lobs of peanut representative samples A, B and C were collected from three different locations in Sudan-from Omdurman, Khartoum and Khartoum North, sample (C) was not roasted while samples A and B were roasted. Kernels from each sample were tested for fungal growth by inoculating on Potato Dextrose Agar (PDA) plates and after incubation for 5 days at 28°C, the plates were examined for *Aspergillus flavus* growth, using microscopic examination on Cotton Blue in Lactophenol Slides, which showed the fungus growth recording to culture characteristics.
2) Suspensions, of sample peanut kernels were prepared; using dilution method by taking 0.5 ml from each dilution; and placed; into Petri dishes, and incubated at 28°C for 3-5 days (Bakhiet, 2012). After the incubation period, the growing fungal cultures were examined microscopically using Lactophenol Cotton Blue (LPCB) stain and classified according to the culture characteristics at the face and reverse side of the inoculated Petri dishes (Cheesbrough, 1984).
3) The samples were prepared for examination of aflatoxin concentrations using Flourometer (Vicam Series 4). The readings were recorded.

RESULTS AND DISCUSSION

1) All samples (AB and C). Showed the growth of *Aspersgillus flavus* on PDA plates.

2)Flour meter readings showed aflatoxin concentrative of 13.5 µm for samples (C), and 1.5 µm/Kg for sample (A) and no aflatoxin was detected in sample (B).
3)The peanut butter is becoming an important food ingredient in Sudan as a cheap nutritive alternative as a component of tomato salad for the breakfast of large sections of the Sudanese population.
4)Unfortunately the peanut butter in many underdeveloped countries, including Sudan is implicated in the rising cases of liver cancer (ICRISAT, 2000).
5)In the Sudan, all 60 samples collected from rain-fed and irrigated production areas, representing various peanut varieties revealed very high levels of aflatoxin contamination ranging from 404 µg/kg to 17.5 µg/kg. The lower level is still much higher than the minimum allowed, 2.5 µg/kg, for human consumption (Bakhiet and Musa, 2011). Hag Elamin, in Sudan (1988), pointed to the high contamination levels of stored peanuts by *Aspergillus flavus*and Aflatoxin formation.
6)Despite all warnings about the health hazards, specially liver cancer, peanut butter is still prepared from already contaminated peanuts under very poor non-hygienic conditions and dirty utensils by poor families in dirty hut conditions, to be marketed in dusty local markets and streets corners to non-suspecting buyers in order to earn some cash for poor family needs. All conditions, of raw peanuts, prepared butter, and marketing do not observe any Health Authorities regulations(HAR).

Peanut butter is usually prepared using roasted peanuts or unroasted. Roasting gives the butter a better taste, but the vendors of raw un-roasted peanut at the local market and those who prepare the butter believe that roasting inhabits toxin formation.

Some butter producers do not roast peanuts when preparing the butter.The results of the present study revealed high levels of aflatoxin in unroasted peanuts with concentrations of 13.5 µg/kg, while roasted peanuts showed lower concentrations SSMO Sudanese Standard and Metrology Organization (2014) less than the accepted higher limit of 10 µg/kg. by

Butter contamination can occur during preparation and marketing under poor hygienic conditions. Further work is needed to test aflatoxin production of market peanut butter sample

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زبدة الفول السودانى- مصدر خطر جدى للصحة فى السودان

احلام سر الختم
مركز البحوث والاستشارات الصناعية- السودان

تم جمع عينات من الفول السوداني المحمص وغير المحمص والذي يستعمل لتحضير زبدة الفول من الأسواق المحلية الشعبية بأمدرمان والخرطوم والخرطوم بحري لفحصها لمعرفة التلوث الفطري، وتحديد تركيزات سموم الافلاتوكسين.وقد اوضحت النتائج مايلى:

- زراعة بعض حبوب الفول المحمص وغير المحمص على الوسط الغذائي Potato Dextrose Agar (PDA) ، أوضحت نمو الفطر *Aspergillusflavus*.
- تم تحضير عينات من الفول لتحديد تركيزات سموم الافلاتوكسين باستعمال طريقة الفلورميتر – (فيكان ٤) وأظهرت النتائج وجود الافلاتوكسين في العينة غير المحمصة (c) بتركيز ١٣.٥ مليجرام/الكيلوجرام.
- في العينات المحمصة (A و B) أوضحت العينة (A) وجود الافلاتوكسين بتركيز ١.٥ مليجرام/الكيلوجرام. بينما لم يظهر وجود الافلاتوكسين في العينة (B).
- العينات المحمصة (A) و (B) لا تحتوي على تركيزات أعلى من ١٠ مليجرام/الكيلوجرام.
- تحميص الفول السوداني يقلل من تركيزات الافلاتوكسين.
- قد يحدث تلوث بالفطر لاحقاً لكل العينات عند تحضير الزبدة وتسويقها لعدم الالتزام بالإجراءات الصحية السليمة، مما يرفع من تركيزات الافلاتوكسين في زبدة الفول في الأسواق الشعبية.