

EVALUATION OF INFANT'S MILK POWDER FOR AFLATOXIN IN KALIUBIA GOVERNORATE

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Abstract

This study was carried out on 30 random samples of infant's milk powder collected from different pharmacies in Kaliubia Governorate. The collected samples were analyzed and screened for detection of aflatoxin B₁, B₂, M₁ and M₂. The obtained data revealed that the incidences of B₁, B₂, M₁ and M₂ were 0.8, 0.6, 1.5 and 0 ppb, respectively. The public health importance of aflatoxin and the control measures to safeguard the infant's milk powder from exposure to aflatoxins were discussed.

INTRODUCTION

Molds are widely distributed as environmental contaminants of air, water, dust, thus, most foods are susceptible to fungal invasion and aflatoxin B₁ and B₂ existence during some stages of production, processing, transport and storage. Cooking and preparation of food containing aflatoxins will not destroy it, as it is heat stable especially, in moistened milk powder (Vanwalbeek *et al.*, 1986). Also, one of the major routes through which humans are exposed to aflatoxin is through metabolism, and transmission of aflatoxin M₁ and M₂ secreted in milk of cows ingesting feed contaminated with aflatoxin B₁ and B₂ (Kisza and Domagala, 1994).

This study was undertaken to throw light on the occurrence of aflatoxin in infant's milk powder by using Thin Layer Chromatography (TLC) which is still very commonly method used for mycotoxin analysis (Chu, 1991).

MATERIALS AND METHODS

1) Collection of samples

Thirty random samples of infant's milk powder were collected from different pharmacies in Kalubia Governorate.

2) Extraction and analysis of infant's milk powder samples

Samples were screened for aflatoxin B₁, B₂, M₁ and M₂ by Thin Layer Chromatography (TLC) according to the method recommended by Stubbelfield (1979).

3) Statistical analysis

The obtained findings were statistically analyzed according to Berly and Lingren (1990).

RESULTS AND DISCUSSION

Table 1. Incidence and quantitative estimation of aflatoxin B₁, B₂, M₁ and M₂ in the examined infant's milk powder sample.

Number of examined samples	Positive samples		Aflatoxin (ppb)			
	No.	%	B ₁	B ₂	M ₁	M ₂
30	3	10	0.8	0.6	1.5	0

Table 2. Permissible limits of aflatoxin (sum of B₁, B₂, M₁, G₁ and G₂) in infant's milk powder in some countries.

Country	Permissible limits(ng /kg)
Argentina	100
Italy	50
Netherlands	50
Austria	10
Brazil	10
Switzerland	10
Germany	10

(Galvano *et al.*, 1996)

DISCUSSION

The obtained results in Table 1 revealed that 10 % of examined infant's milk samples contained aflatoxin B₁, B₂, M₁ and M₂ at concentrations of 0.8, 0.6, 1.5 and 0 ppb, respectively. Nearly, similar findings were reported by Fukal and Brezina (1991) and Nagah and Zaky (1995) who found AFB₁ and AFM₁ at level of 0.9 – 1.7 ppb in infant's milk powder, while, it was relatively low in comparison with previous study by Kiermeier (1976) and Prado *et al.* (1994) who detected level of 2 – 7 ppb aflatoxin M in milk powder. Kawamura *et al.* (1994) did not find aflatoxin in dried or milk powder examined in Italy and Newzealand, but, Bennett *et al.* (1980) found that in milk – based infant formula inoculated with *Aspergillus parasiticus* and incubated at 30 °C for 24h, aflatoxin B₁ and B₂ were produced at level of 273 ng /ml. The results of this study reflected a low incidence and concentrations in comparison with the permissible limits of some countries (Table 2). From view of public health, aflatoxin M could be estimated at level of 5 – 954 ng /ml blood taken from patient of liver cirrhosis as aflatoxin could inhibit the synthesis of messenger RNA in the hepatocytes. Also, aflatoxins were detected in 81% of examined brain specimens of children who died, as aflatoxin could withstand gastric acidity and could pass the placental barriers to fetus (Baker, 1990 and Oyelami *et al.*, 1995). The legal limits of infant formula are highly variable, depending on the degree of development and economic involvement of the countries where it ranged between 100 ng /kg in Argentina and 10 ng /kg in Austria, Brazil, and Germany (Galvano *et al.* (1996).

Thus, even the low regulatory limits set in different countries could not prevent chronic effect of aflatoxin especially the carcinogenic effect, due to continued exposure to sub acute level of aflatoxin.

So, efforts should be made in attempting to provide further and extensive scientific information on human health hazard related to low level long – term aflatoxin exposure and to standardize the already existing regulatory limits for aflatoxins.

Finally, the real hazards of aflatoxin may be due to the cumulative effect of repeated exposure to very small or even undetectable doses of aflatoxin for comparatively long period. So, educational programs and informations have to be directed especially to infant's milk powder manufactureres to learn them how to keep this milk product in a hygienic manner to avoid aflatoxin existence in their product of infant's milk powder (Hendericke, 1991).

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تقييم ألبان الأطفال المجففة للأفلاتوكسين بمحافظة القليوبية

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أجريت هذه الدراسة لتسهم في تقييم إمكانية تعرض جموع الأطفال للإصابة بالسموم الفطرية (الأفلاتوكسين) بطريقة غير مباشرة عن طريق استهلاكهم للألبان المجففة. لذا تم جمع ثلاثين عينة عشوائية من ألبان الأطفال المجففة من الصيدليات المختلفة بمحافظة القليوبية وفحصها لاستبيان مدى تواجد الأفلاتوكسين بها، و أظهرت النتائج تلوث ألبان الأطفال بالأفلاتوكسين B_2 جزء في البليون على التوالي وقد تم مناقشة الأهمية 0.8, 0.6, 1.5, 0.0, بمعدل M_1 , B_1 الصحية لتلوث تلك الألبان بالأفلاتوكسين والإجراءات الواجب اتباعها استرشادا بالتقارير الدولية بشأن المستوى المسموح به في ألبان الأطفال بالدول المختلفة.