

MYCOLOGICAL STATUS OF SOME DAIRY PRODUCTS SERVING IN ASSIUT UNIVERSITY HOSPITALS

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ABSTRACT

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A total of 60 random samples of yoghurt and feta cheese (30 of each) were collected from Food Department in Assiut University hospitals from July, to October, 2013 for estimation the counts and identification of total yeasts and moulds in yoghurt and feta cheese. In yoghurt only 14 samples (46.67%) contaminated with yeasts and moulds and their counts / gram are ranged from 2.1×10^1 to 1.1×10^3 with an average count of 4.76×10^2 /gram. The highest frequency distribution was 6(42.86%) lied within the range of $>10^2$. The isolates belong to genera *Aspergillus* 3 (12.00%), *Penicillium* 1 (4.00%), *Geotrichum* 12 (48.00%) and *Moniliella* 9 (36.00%). In feta cheese only 8 (26.67%) from 30 samples contaminated with yeasts and moulds and counts / gram are ranged from 2.4×10^1 to 1.5×10^3 with an average count of 2.79×10^2 /gram. The highest frequency distribution was 4(50%) lied within the range of $>10^2$. The isolates belong to genera *Aspergillus* 2 (13.33%), *Penicillium* 1 (6.67%), *Geotrichum* 7 (46.67%) and *Moniliella* 5(33.33%). The healthy importance of yeasts and moulds and methods of control are discussed.

Key words: Yoghut, feta cheese, yeast, mould.

INTRODUCTION

Yoghurt and cheese are very important foods for any person at all stages of life specially patients. So, a great deal of efforts have been made to produce and keep dairy products of good keeping quality.

Yeasts and moulds not survive pasteurization, so its presence in dairy products come mainly from re-infection of pasteurized milk during manufacture (Jordral *et al.*, 1993) which come from the environment of factories, air, equipment, water, milk, etc.. (Jay, 1992).

The storage of any milk products in a fluctuated temperature gives a good chance for yeast and mould growth and mycotoxins production which have been associated with several cases of human poisoning of mycotoxicosis (Neal *et al.*, 1998).

At least 200 different types of mould and yeast when growing in certain food, under suitable condition, form a substance that are toxic when eaten (Ibrahim, 2000) they are responsible for many serious diseases of liver, kidney, blood circulation system and blood forming organs (Cole and Cox, 1981), Certain species of yeast constitutes a public health hazard in the form of gastrointestinal disturbance, endocarditis and

pulmonary infection (Wilson and Plunkett, 1965).

On the other hand, yoghurt and cheese are undesirable even when contain a few fungal numbers of yeasts and moulds as they rapidly grow in it at a wide range of temperature, pH and humidity resulting in objectionable changes that render the product unmarketable (Mossel, 1982).

Likewise, yeasts and moulds in milk and dairy products might act as allergen and an irritant to human health (Karthikeyan and Dhanalaksnmi, 2010) and may be the reason for the recent gastrointestinal disease reported in individuals (Irshad *et al.*, 2014).

In hospitals, food serving system quality control is a major management function. As the contamination of yoghurt and cheese with a wide range of yeasts and moulds constitute a great problem for food consumer, therefore this work is planned to secure the prevalence of yeasts and moulds in yoghurt and cheese serving in Assiut University hospitals.

MATERIALS and METHODS

Collection and Preparation of samples

A total of 60 random samples of yoghurt and feta cheese (30 of each) were collected in clean, dry and

sterile containers from Food Department in Assiut University hospitals from July to October, 2013.

Each sample was put in an ice tank with thermometer to maintain temp. at 4°C. The samples were dispatched to the laboratory with a minimum of delay where they were examined.

Yoghurt:

11 g of the well mixed *yoghurt* samples were transferred into sterile flask containing 99 ml of sterile 0.1 % peptone water to obtain 1 / 10 dilution (A.P.H.A., 1985).

Cheese (Feta cheese):

11 gram of the well mixed cheese samples were transferred into sterile mortar and thoroughly mashed. 99 ml of sterile 2% sodium citrate solution were added to obtain 1/10 dilution. Ten fold serial dilution up to 10⁻⁸ from each sample of yoghurt and cheese were prepared.

Estimation of total yeasts and moulds counts (Harrigan and McCance, 1976):

From the already prepared serial dilutions, duplicate marked plates were inoculated with one ml from each dilution and carefully mixed with 10-15 ml of malt extract agar (containing 500 mg each of chlorotetracycline Hcl and chloramphenicol) tempered at 45 ±1°C. After solidification inoculated plates were incubated at 25 °C for 5 days of incubation to determine the degree of growth and then repeated on the fifth day. All yeasts and moulds colonies calculated and recorded.

Identification of yeast and mould genera and species (Moubasher, 1993):

Macroscopical examination: That is carried out by naked eye or by using magnifying hand lens.

Microscopical examination:

By using the wet mount technique a triangular piece of mould colony (4-6 days).

RESULTES

Table 1: Statistical analytical results of yeasts and moulds counts / g of the examined yoghurt and feta cheese samples:

Type of samples	N.of exam. samples	N. of +ve samples	% of +ve samples	Counts / g		
				Min.	Max.	Average
<i>Yoghurt</i>	30	14	46.67	2.1 x 10 ¹	1.1 x 10 ³	4.76 x 10 ²
<i>Feta cheese</i>	30	8	26.67	2.4 x 10 ¹	1.5 x 10 ³	2.79 x 10 ²

Table 2: Frequency distribution of the examined serving yoghurt and feta cheese samples based on their yeasts and moulds counts / g:

Interwals	Yoghurt		Feta cheese	
	No.of +ve samples /30	% of +ve samples	No.of +ve samples /30	% of +ve samples
>10 ¹	4	28.57	3	37.5
>10 ²	6	42.86	4	50
>10 ³	4	28.57	1	12.5

Table 3: Fungal genera and their % of the examined serving yoghurt and feta cheese samples:

Fungal genera	% in Yoghurt	% in Feta cheese
<i>Aspergillus</i>	3 (12.00%)	2 (13.33 %)
<i>Penicillium</i>	1 (4.00%)	1(6.67%)
<i>Geotrichum</i>	12 (48.00%)	7 (46.67 %)
<i>Monilielle</i>	9 (36.00%)	5 (33.33%)
Total	25 (100.00)	15 (100.00)

DISCUSSION

The summarized results in Tables 1, 2&3 showed that only 14 (46.67 %) samples contaminated with yeasts and moulds and their counts / g in yoghurt samples ranged from 2.1×10^1 to 1.1×10^3 with an average count of 4.76×10^2 cfu / g. The highest frequency distribution was 6 (42.86%) lied within the range of $>10^2$ cfu /g. According to Egyptian Standards (1990), yoghurt must be free from yeasts and moulds, that due to its media which is a good environment for growth, multiplication and mycotoxins production.

The isolates belong to genera *Aspergillus* 3 (12.00%), *Penicillium* 1 (4.00%), *Geotrichum* 12 (48.00%) and *Monilielle* 9 (36.00%). Nearly similar results were obtained by Abuzied and Hammad (2002) and Bahout and Moustafa (2002).

The stipulated results in Tables 1,2&3 indicated that only 8 (26.67%) from 30 feta cheese samples contaminated with yeasts and moulds and their counts / gram in feta cheese samples ranged from 2.4×10^1 to 1.5×10^3 with an average count of 2.79×10^2 cfu / g. According to Egyptian standards (2000), cheese must be not contain more than 10 cfu / g yeasts and moulds. The highest frequency distribution was 4(50%) lied within the range of $>10^2$ cfu /g.

The isolates belong to genera *Aspergillus* 2 (13.33%), *Penicillium* 1 (6.67%), *Geotrichum* 7 (46.67%) and *Monilielle* 5(33.33%). Nearly similar results were obtained by EL-shaheer (2013) and Hegazy and Mahgoub (2013). Higher results were obtained by Salih *et al.* (2012).

The ability of the mould and yeast species to grow at low temperatures and their proteolytic and lipolytic activities (Besancon *et al.*, 1992 and Jakobsen and Narvhus, 1996) may cause spoilage of food by break down their components and liberation of different acids and gases with subsequent change of their odour and flavor and become undesirable and often result in down grading of the product which lead to economic losses (Bouton and Grappin 1995; Beuvier *et al.*, 1997 and EL-Kewaiey *et al.*, 2014).

Likewise, yeast and mold indicator testing is extremely important for determining product freshness and quality, but the current testing process is so long that it can hold up a product's release for several days.

In general, presence of yeasts and moulds in yoghurt and feta cheese indicate their manufacturing under unsanitary condition and recontamination of pasteurized milk used in manufacturing by workers hand, equipment, utensils and containers or from dust, air and water. Fluctuated temperature given a good chance for growth and multiplication of fungi

and secretes toxins which cause the harmful effect to the consumers.

CONCLUSION

In hospitals, milk and dairy products specially yoghurt and cheese are considered the main foods for patients, so that dairy products must be safe, healthy and free from any contamination, specially yeasts and moulds.

So, the following points must be taken in consideration:

Dairy products must be come from dairy processing plant which apply HACCP system in processing, packing, storage and distribution of such products.

Cooling equipment should be fitted with thermograph and cooling monitored by experience personnel.

Avoid presence of dairy products in room temperatures for long time, specially in summer.

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الحالة الفطرية لبعض منتجات الالبان المستخدمة في مستشفيات جامعة اسيوط

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تم جمع عدد 60 عينة عشوائية من الزبادى والجبن الفيتا بواقع 30 عينة لكل منهما من قسم الأغذية بمستشفيات جامعة اسيوط فى الفترة من يوليو حتى اكتوبر 2013 وتم فحصهما لتقدير العدد الكلى للفطريات والخمائر ومعدل تواجدهما بالإضافة الى تصنيف الانواع المختلفة لهم. ففي الزبادي كانت 14 عينة فقط بنسبة 46,67% تحتوى على الفطريات والخمائر بعدد يتراوح من 10¹ × 10¹ - 10¹ × 10¹ ومتوسط 4,76 × 10¹ / جرام. وكان اعلى معدل انتشار بعدد 6 عينات بنسبة 42,86% يتراوح بين أكثر من 10² /جم. والعزلات كانت لجنس *Aspergillus* بعدد 3 عينات بنسبة 12,00% ، *Penicillium* بعدد 1 عينة بنسبة 4,00% ، *Geotrichum* بعدد 12 عينات بنسبة 48,00% و *Monilielle* بعدد 9 عينات بنسبة 36,00%. أما في الجبن الفيتا كان 8 عينات فقط بنسبة 26,67% من 30 عينة تحتوى على الفطريات والخمائر بعدد يتراوح من 10¹ × 10¹ - 10¹ × 10² ومتوسط 2,79 × 10² / جرام. وكان اعلى معدل انتشار بعدد 4 عينات بنسبة 50% يتراوح بين أكثر من 10¹ / جرام. والعزلات كانت لجنس *Aspergillus* بعدد 2 عينة بنسبة 13,33% ، *Penicillium* بعدد 1 عينة بنسبة 6,67% ، *Geotrichum* بعدد 7 عينة بنسبة 46,67% و *Monilielle* بعدد 5 عينات بنسبة 33,33%. وقد تم مناقشة الأهمية الصحية لكلا منهما والطرق المختلفة للحفاظ على تلك الأغذية من التلوث بمثل هذه الفطريات والخمائر.