

ANTIBIOTICS RESIDUES IN MILK OF
BAGHDAD AREA

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SUMMARY

Hazardous residues in milk are reviewed with a special emphasis upon antibiotic residues in cow's milk. In this study a survey involving 1700 milk samples from three collection centers (Al-Fadhilia, Abu Ghraib and Al-Taji Center) and the farm of the College of Agriculture, was carried out. Milk samples were collected within three months and tested for antibiotic residues using a microbiological assay by using *Bacillus subtilis* modified method of cylinder plate method.

The percentage of positive samples out of 1700 milk samples collected from the three centers ranged from 8.6% to 9.4%.

INTRODUCTION

Dairy farmers and veterinarians routinely use antibiotics in the form of udder infusions to treat mastitis. Mol (1975) estimated that intramammary treatment of mastitis accounted for 72% of antibiotic residues in milk, while systemic administration accounted for a further 8%. Malton (1968) reported a significant

health hazard from consumption of milk contaminated with antibiotic residues. Marth and Ellikson (1959) and Egan and O'conner (1980) reported that the presence of antibiotics in milk even in minute quantities has created problems in the dairy industry including: (a) inadequate curdling of milk and improper ripening of cheeses during their manufacture; (b) decreased acid and flavor production during the manufacture of buttermilk and similar products which may result in inferior products that must be discarded, causing costly equipment clean up, and subsequent disruption of schedules (Anon, 1982). The work reported here was done to determine the incidence of antibiotics in the fluid raw milk in areas arround Baghdad, like Al-Fhadhilia, Abu Ghraib and Al-Ta,ji villages.

MATERIALS AND METHODS

Milk samples were collected and examined at weekly intervals over a three months period (May, June and July). Two hundred samples from one of three milk collection centers in Abu-Ghraib, Al-Fadhilia and Al-Ta,ji villages were taken weekly. A total of 1700 different samples were investigated. All samples were assayed for the detection of residual antibiotics after heat treatment at 83 °C for 3 minutes in order to inactivate non specific inhibitors (Duthie *et al.*, 1976). The procedures recommended by the standard Methods for the Examination of Dairy Products (Marth, 1978) were followed in handling of spore suspensions seeding of plates and analytical work.

Milk samples and standard antibiotics (Penicillin G) were assayed microbiologically by using *Bacillus subtilis* modified method of cylinder plate method (Grove and Randall 1955). Ten milliliters of seeded antibiotic

medium No. 1 were poured at 55 °C in a petridish (100 x 15 mm.). Plates and standard solution of antibiotic were made fresh for each assay. Standard curve was made from a stock solutions of penicillin G in distilled water and were further diluted with milk. Known drug standard or milk samples (20 μ l) were placed in six wells (8 mm. diameter) and 40 mm. apart. All positive samples were assayed twice and compared to the diameters of standard reference point. Diameter of growth inhibition zones were measured with zone meter of Fisher Sci. Co. after 18 hrs. of incubation at 37°C.

A linear relationship between logarithmic drug concentrations and zone diameters was established between concentration of 0.25 to 4 I.U. of sod. penicillin G/ml of milk (Table 1). The concentration of the reference point was one I.U./ml. All standard concentrations were diluted in milk. Samples were considered positive when showed 9 mm. zone of inhibition or above (Grove & Randall 1955).

RESULTS AND DISCUSSION

The number of samples and the positive ones which are taken from the three centers in Baghdad are shown in tables 2 and 3. Out of 500 samples taken from each collection center in Baghdad, Al-Fadhilia center showed 43 positive samples (8.61%), while Abu-Ghraib center showed 45 positive samples (9%), and Al-Taji center showed 47 positive samples (9.4%). A hundred samples were collected from the farm of the Agriculture College in different occasions showed 15 positive samples (15%).

A total of 75 samples taken from the balance tank of the three centers only 12 samples (16%) were positive. Out of 40 samples taken from the storage tank of the

Table (1): Zone of inhibition from selected concentrations of Penicillin obtained to produce a standard curve for quantitation of Penicillin in milk.

Penicillin Conc. I.U./ml.	Zones of inhibition -mm-
4	22.4
2	20.2
1	17.0
0.5	14.0
0.25	11.0
Control	8.0*

*: Diameter of the wall

Intercept = -1.64
Slope = 0.0997
Correlation = 0.98

Table (2): Incidence of antibiotic residues in raw milk of individual producers (cans of 50 Kg.) as detected by *Bacillus subtilus* microbiological assay method.

Milk reception center	No. of examined samples	No. of positive samples	% of positive samples
Fadhilia village	500	43	8.6%
Abu Ghraib village	500	45	9.0%
Taji village	500	47	9.4%
Agricultural College Farm	100	15	15.0%

Table (3): Incidence of antibiotic residues in raw milk of bulk tanks as detected by *Bacillus subtilus* microbiological assay method.

Samples Collection	No. of examined samples	No. of positive samples	% of positive samples
Storage tank (6 tons)	40	4	10 %
Balance tank (1 ton)	75	12	16 %

three milk collection centers, only four samples (10%) were positive.

These results indicate a substantial public health hazard since antibiotic residues in milk may cause several harmful effects (Katz, 1982). The consumption of minute quantities of antibacterial such as chloramphenicol and tetracycline results in uprise of resistant bacteria. This will lead to the failure of the routinely used antibacterial to treat bacterial infection. Moreover, some antibacterials cause severe toxicities (Powers *et al.*, 1985). Chloramphenicol causes a very fatal aplastic anemia and bone marrow depression. Penicillin causes anaphylactic shock in sensitive individuals which may lead to death. Tetracyclin causes permanent discoloration of infant teeth (Pratt and Fekety, 1986).

On the light of this study it seems very important to draw the attention of the Veterinary community in Iraq for the rational and proper use of antibacterial drugs for treatment of bacterial diseases in food animals and milk producing animals especially mastitis. Standard withdrawal times should be established for antibacterial drugs which are convenient for Iraq conditions and for the time being the allowable withdrawal time which are mentioned in the literature should be used.

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مستقيبات المضادات الحياتية في الحليب

لمنطقة بغداد

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الخلاصة

استعرض البحث عن وجود المستقيبات الخطرة في الحليب المنتج من
الابقار وبصورة خاصة تلك التي تعود الى المضادات الحياتية. شملت
هذه الدراسة مسح ١٧٠٠ نموذج من الحليب من مراكز جمع الحليب
المتابعة للشركة العامة لمنتجات الالبان في ثلاث قرى:
ابو غريب والتاجي والفضيلية وكذلك الحقل الحيواني التابع الى
كلية الزراعة. اخذت نماذج الحليب خلال فترة ثلاثة اشهر وفحصت عن
وجود مستقيبات المضادات الحياتية فيها بواسطة استخدام الطرق
المايكروبيولوجية وقد استخدمت (Bacillus subtilis) كـبكتريا
الفحص. كانت نسبة السمادح التي احتوت على مضادات حياتية من
مجموع ١٧٠٠ نموذج تراوحت من ١٦% الى ٩٤%.