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INCIDENCE OF AEROBIC SPORE FORMERS IN MILK

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Among the samples of milk collected from different sources namely, organised farms dairy plants, street vendors and village milk, higher incidence among aerobic spore formers was encountered in samples of milk collected from street vendors followed by village milk, dairy plants and organised farms. Among the aerobic spore forming bacteria, the incidence of *B. subtilis* was maximum (15.54%) followed by *B. megatherium* (17.57%) and *B. cereus* (15.54). The incidence of the aerobic spore formers was found to be in equal proportion in the milk samples collected from the four sources

Aerobic spore formers constitute major flora in market milk supplies in India. (Ethiraj 1976 and Chopra *et al*, 1980). The importance of these micro-organisms have been keenly felt as they affect keeping quality of milk, cause ropiness or slimminess in raw pasteurised milk [Cox 1975], produces heat stable enterotexin causing food borne illness (Kristenesen, 1981, Johnson *et al* 1982 and also mastitis Agarwal and Srinivasan 1981). Hence, the incidence of these microorganisms in milk was investigated.

MATERIALS AND METHODS

Forty milk samples from the following sources viz, organised farms, dairy plants street vendors and village milk were collected following aseptic precautions. Estimation of viable count of organisms was done as described in Indian standard-1479-1977. The isolation and identification of pure cultures of aerobic spore formers was done by the method described by Buchannan and Gibbons (1974).

RESULTS AND DISCUSSION

Table I shows the total count, aerobic spore formers count and the per centage of aerobic spore formers in milk collected from the four sources The total bacterial count was found to be more in milk samples collected from street venders (6.6×10^6 CFU/ml) followed by milk samples from village, dairy plants and organised farms. The aerobic spore formers count was found to be maximum in samples of milk collected from street vendors (1.15 to 10^1 C_F^U /ml). The same trend of results were obtained in the incidence of spore formers in milk collected from street vendors, village, in the dairy plants and organised farms. The corresponding per centage of incidence in the samples of milk from various sources were 0.1744, 0.0265; 0.0211 and 0.0125 respectively. Thus it is seen that the milk samples collected from the street vendors showed higher total count as well as spore formers count compared to those samples collected from village, organised farms and dairy plants.

It is interesting to note that the samples from villages showed lower incidence of spore formers than samples from street vendors which indicates the increasing awareness of

Tabte 1 : Total count, aerobic spore count and per centage of aerobic spore formers in milk collected from different sources.

Sl. No.	Sources	Total count Cfu/fml	Aerobic spore count cfu/ml	Percentage o aerobic spore
1.	Organised Earms	2.8×10^6	3.5×10^3	0 0125
2.	Dairy Plant	3.6×10^6	7.6×10^3	0.0211
3.	Street vendors	6.6×10^8	1.15×10^4	0.1744
4.	Villages	4.2×20^6	1.1×10^3	0.0265

able 2 : Distribution of aerobic spore forming bacteria in milk samples.

Sl. No.	Species	Number of isolates	Percentage of species
1.	*B. Substilis*	49	33.11
2.	*B. cereus*	23	15.54
3.	*B. megatherium*	26	17.57
4.	*B coaqulens*	19	12.84
5.	*B. ilcheniformis*	10	6.76
6.	*B. sphaericus*	9	6.08
7.	*B. pumilis*	8	5.40
8.	*B. firmus*	2	1.35
9.	Unidentified	2	1.35
	Total :	148	100.00

clean milk production in villages among the producers. The samples from the street vendors were found to contain high incidence of spore formers which was expacted, since the vendor carries milk in open containers exposed to atmosphere giving scope for entry of aerobic spore formers into milk. The total number of aerobic spore formers incidence in milk from various sources are similar to the work carried out by Verma *et al.*, (1950) who also came across an aerobic spore count in village produced milk showing a range of 2000 5000/ml while Janina (1966) encountered 80-200 aerobic spore formers in raw milk. Milk samples collected from commercial dairy were found to contain aerobic spore formers at 1000-3000 per ml. Ranganathan *et al;* (1974) and Ethiraj (1976) found aerobic spore formers in milk to the extent of60-36000 per ml. In this study it was found that the milk samples from aerobic spore formers was observed to be many times more than other recorded references. The reason may be street vendors milk is invariability adulterated with water and frequently got contaminated from the bad habits of vendors.

A total number of 148 types of aerobic spore formers were isolated and their distribution is shown in Table 2. Among the aerobic spore forming bacteria the incidence of *B. subtilis* was the maximum (33.11%) followed by *B. megatherium* (17.57%) and *B. cereus* (15.54%). Shroff and Butt (1955) came across the incidence of *B. cereus* in aerobic spore formers to an extent of 29.79%, while Muddappa (1973) accounted 25% of the incidence of *B. cereus* in milk collected from cattle yard and 20% in milk collected from market. Similar trends of results were reported by Srinivasan *et al*, (1973). Ethiraj (1976) however examined the pooled samples of milk and reported the incidence of *B cereus* as 8.73% of the samples. The detection of *B cereus* which constituted about 15.53% has to be viewed seriously as *B. cereus* causes food poisoning as many incidences have been recorded (Jonston *et al*. 1982). Hence care has to be taken while milk production.

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