Dept. of Brucellosis
Animal Health Reaserch Institute, Dokki, Egypt.
Head of Dept. Samira El-Gibaly.

VIABILITY OF BRUCELLA MELITENSIS IN ARTIFICALLY INFECTED CREAM

(With One Table)

By

M.E. HAMDY and E.H. ABDEL-HAKIEM*

(Received at 6/2/1994)

مدى قدرة ميكروب البروسيلة مليتسيس على المعيشه فى القشده

محمود حمدى ، امام عبد الحكيم

تزايدت فى الاونه الاخيره زيادة معدلات الاصابه بمرض الحمى المتموجه (البروسيللوسيس) بين الاداميين ، ونظراً لان اللبن الخام ومنتجاته يمثل دوراً رئيسياً فى نقل العدوى ، لذا تم دراسة مدى قدرة عترتين من ميكروب البروسيلا مليتنسيس على المعيشه فى ثلاثة أنواع من القشده والتى تم حفظها عند درجة حرارة الثلاجه (٤م).

وقد أظهرت النتائج ان العتره الحقليه الثالثه استمرت حيه لمدة ٢٨ ر ٧ ر ٣ يوم فى القشده المحلاه والقشده بعد تسويتها طبيعياً وكذلك القشده بعد تسويتها صناعياً ، على التوالى . كما أظهرت النتائج ان العتره القياسيه (١٦م) دامت حيه لمدة ٢٦ ر ٤ ر ٣ يوم فى أنواع القشده المذكوره على التوالى .

وقد نوقشت خطورة الميكروب على الصحه العامه وكذلك الاشتراطات الصحيه الواجب توافرها فى انتاج الالبان الخام وتصنيعها .

---

*: Dept. of Food Hygiene and Control Fac. of Vet. Med. Suez Canal Univ.

suspension of the tested organisms-as the other two portions-then artificially soured using 3% of freshly prepared *Strept.cremoris* and *Strept.diacetilactis* cultures in equal proportions (1:1). After that the two portions were stored in a refrigerator at (4°C) as *artificially soured cream.*

Cream samples were taken just after inoculation to determine the initial viable organisms. Then the viability of brucella organisms were tested daily using culture on brucella agar media containing different concentrations of antibiotics and dyes to inhibit microorganisms other than brucella. The amounts of crystal violet and antibiotics were added according to *ALTON* et al, *(1975).* The pH of the cream was measured using Jenway pH meter.

RESULTS

The results obtained are recorded in Table 1.

DISCUSSION

Several factors may be responsible for the disintegration of *Br.melitensis* in different materials. Initial pH, an increase in acidity or alkalinity, presence of other microorganisms, temperature of storage and the presence of deleterious substances are among these factors.

The results represented in Table (1) illustrate the different periods of survivabilities of the two tested strains of *Br.melitensis* (local field biovar 3, and 16M) in sweet and soured cream either naturally or artificially ripened, as well as the pH of the cream. The results indicate that in sweet cream, the local field biovar 3 strain was detected for up to 28 days, while 16M strain was found to be viable for 26 days. In naturally soured cream, the local field and 16M strain survived for 7 and 4 days, respectively, while in artificially soured cream, both *Br. melitensis* strains remained viable 8 or 3 days only.

In the available literature, little could be obtained regarding the viability of *Brucella* organisms in dairy products. The results of longivity of *Br.melitensis* in sweet cream run parallel to that reported by *GUERRA (1957) and BARTON (1989),* who found that the organisms survived for 4 weeks in cream at 4°C. However, *AWAD* et al. *(1975) studied the viability of Br.melitensis* biovar 3 isolated from goat, showed that the survival period was 5-9 days in raw milk. Shorter survival periods of *Br.melitensis* biovar 3 have been observed by *HAMDY*

(1992), as he mentioned that the organism survived for only 1 day in raw milk kept at room temperature and 5 days in refrigerator. In the present study the survival rate of *Br.melitensis in cream exceeds those in milk this may be due to the protective effect of the high fat content of cream (CHAMPNEYZ, 1953).* It is evident from the obtained results that there were shorter survival periods of *Br. melitensis* either in naturally or artificially soured cream than those in sweet cream. This may be in fact due to the development of lactic acid, or other acids, or may be due to metabolites produced by the starter bacteria during fermentation. Also, the culture bacteria may have an antagonistic action on *Br.melitensis* as their action was proved on other pathogenic microorganisms such as *Sal.typhimurium, Staph.aureus,* and *E.coli.*

Moreover, the starter bacteria produce antibiotic like substances which may affect the growth of *Br.melitensis (COLLINS, 1961 and IANDOLO* et al., *1965).* It is obvious from the obtained results that the local field strain survives longer than the 16M strain, this findings may be due to that the local field strain is accommodated to the environmental conditions, due to its several passages in animal and man, as it is the prevalent strain among animals and humans in Egypt, where it is isolated by higher incidence *(AWAD* et al., *1975 and HAMDY, 1992).* The results of the pH represented in the same Table show that the termination of *Br.melitensis* will occur at the pH ranging from 4.45-4.65, a finding which is in harmony with that recorded by *HAMDY* (1992).

Our results concluded that the survival periods of *Br.melitensis* in cream has a public health significant especially when the cream was manufactured from raw milk without any prior heat treatment. The danger of brucella contaminated cream does not only arise from its consumption, but also from using it in manufacturing of several food stuffs. As cream, especially which prepared from unheat treated milk is considered as a potential source of infection to consumers. The addition of cream to different kinds of food stuffs is a popular habit this constitutes a great deal of jeopardy regarding the transmission of the disease to human beings.
Therefore, it is wise to conclude that the cream must be manufactured from heat treated milk, as the pasteurization process kills *Brucella organisms (CARPENTER and HUBBERT, 1963; RAMMELL, 1967; and RAY, 1979).* An alternate conclusion is to restrict the consumption of cream to soured cream after elapsing at least one week from its manufacture.

REFERENCES

Alton, G.G.; Jones, L.M. and Pietz, D.E. (1975): Laboratory techniques in *brucellosis* 2nd Ed. FAO Geneva.

Awad, F.I.; Hafez, M.A.; Salem, A.A. and Shawkat, M.E. (1975): Studies on brucellosis in sheep and goats in Egypt. J. Vet. Sci. 12(2): PP 95-105.

Barton, C. E. (1989): Human brucellosis. Brucellosis seminar Cairo, Egypt. Feb. 1989.

Carpenter, C.M. and Hubbert, W.T. (1963): Diseases transmitted from animals and man Hull, T.G. and Charles, C.T. Spring field Publ. USA. chap. (3), p 126.

Champneyz, W.D. (1953): Brucella infection in man and animals in Great Britain. Epidemiology and the future Vet. Rec. 65(7). PP(99-104).

Collins, E.B. (1961): Domination among strains of lactic *Streptococci* with attention to antibiotic production. Appl. Microbiol. 9: PP 200-205.

El-Gibaly, S.; Goda, M.; Nada, FF.M. and Sayour, E.M. (1981): Duphavac N. A. 45/20. A diagnostic reagent in brucella infection. Vet Med. J. 28: PP 371-380.

Guerra, M. (1957): Boll/Soc. Ital. Biol. 33: 52-57. (Cited after Hamdy, 1992).

Hamdy, M.E.R. (1989): Epidemiological studies on brucellosis in dairy animals to assess the probable sources of infection to man. M.V.Sc. Thesis Faculty of Vet. Med. Cairo University.

Hamdy, M.E.R. (1992): Epidemiological studies on *Brucella melitensis* in dairy animals and man. Ph. D. Thesis, Fac.Vet.Med. Cairo University.

Iandolo, J.J; Clark, C.W.; Bluhm, L. and Ordal, Z.J. (1965): Repression of *Staph aureus* in associative culture. Appl. Microbiol. 13: PP 646-649.

Ismail, E.H. (1971): Prevalence of brucellosis in Barki sheep. Ph. D. Thesis. Fac. Vet. Med. Cairo University.

Rammell, G.G. (1967): Brucella in dairy products: A review Aust. J. Dairy Tech., 22 PP 40-43.

Ray, W.C. (1979): Brucellosis. Cited in CRC handbook, series in zoonoses by Steele, J.H. CRC press, INC Bocaraton Florida.

Robertson, L. (1961): Brucella organisms in milk. Roy. Soc. Hlth. J. 81: 6-15

Sdiwerifeger, E.O. (1963): Quantitative recovery of *Bruella abortus* from the milk of infected cows. Ludwng, Maximilian Univ. Munchen. Diss. Germany.

Table (1) Viability of the local field ***Br. melitensis*** biovar 3 , and 16 M strains in sweet and soured cream stored at refrigerator temperature .

Storage Period (day)	Sweet cream				Soured cream							
					Natural				Artificial			
	Local		16 M		Local		16 M		Local		16 M	
	S	PH	S	PH	S	PH	S	PH	S	PH	S	PH
O	+	7.0	+	7.0	+	7.0	+	7.0	+	7.0	+	7.0
1	+	6.79	+	6.8o	+	4.87	+	4.81	+	4.79	+	4.79
2	+	6.7	+	6.73	+	4.73	+	4.70	+	4.47	+	4.47
3	+	6.69	+	6.7	+	4.61	+	4.59	+	4.45	+	4.45
4	+	6.69	+	6.69	+	4.60	+	4.58	-	4.45	-	4.45
5	+	6.62	+	6.63	+	4.58	-	4.5	-	4.43	-	4.43
6	+	6.5	+	6.5	+	4.56	-	4.42	-	4.42	-	4.42
7	+	6.42	+	6.43	+	4.51	-		-		-	
8	+	6.27	+	6.3	-	4.5	-		-		-	
9	+	6.2	+	6.19	-	4.48	-		-		-	
12	+	6.11	+	6.10	-	4.48	-		-		-	
15	+	5.9	+	5.97	-		-		-		-	
20	+	5.4	+	5.45	-		-		-		-	
23	+	5.1	+	5.13	-		-		-		-	
26	+	4.98	+	4.98	-		-		-		-	
28	+	4.65	-	4.67	-		-		-		-	
30	-	4.61	-	4.61	-		-		-		-	
32	-	4.58	-	4.59	-		-					
33	-	4.56	-	4.56	-		-					

S : Survival