قسم : المراقبة الصحية على الأغذية.
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تأثير سوربات البوتاسيوم على نمو باسيلس سيريس في اللبن والآيس كريم

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تم اضافة سوربات البوتاسيوم بثلاث تركيزات مختلفة (٠ر٢، ٠ر٢٥، ٠ر٣٪) الى عينات من اللبن والآيس كريم معدية بميكروب باسيلس سيريس لمعرفة تأثيرها على نمو الميكروب المذكور عند درجات حرارة مختلفة ، وكذلك تركت عينات خالية من سوربات البوتاسيوم للمقارنة.

وقد أثبتت النتائج أن اضافة سوربات البوتاسيوم الى عينات اللبن أدت فى زيادة مدة صلاحيته ، وبالنسبة لعينات الآيس كريم أدت الى تقليل عدد الميكروب .

وهذه النتائج أوضحت أن اضافة سوربات البوتاسيوم على الأغذية لها تأثير مثبط على ميكروب باسيلس سيريس .

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EFFECT OF POTASSIUM SORBATE ON THE GROWTH OF BACILLUS CEREUS IN MILK AND ICE-CREAM

(With One Table & Two Figs.)

By
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SUMMARY

Sterile milk and ice-cream containing different concentrations of Potassium Sorbate (0.20, 0.25, 0.30%) were prepared and infected with Bacillus cereus. The infected samples including thier controls were kept at room and refrigerator temp. (30°C & 8±2°C) for milk, and freezing and deep freezing temp. for ice-cream. Addition of Potassium Sorbate to sterile milk increased its keeping quality up to 72 h. and 5 d. at room and refrigerator temp. respectively inspite of their contamination with Bacillus cereus. Furthermore, Potassium Sorbate has an effect on the survival of Bacillus cereus in ice-cream, in which the count decreased from 10^6 to 19×10^3, 6×10^3 and 4×10^3 at freezing temp. and from 10^6 to 17×10^3, 6×10^3 and 3×10^3 at deep freezing temp. for each concentration of Potassium Sorbate.

INTRODUCTION

Salts of sorbic acid are well established as additives for preserving foods and beverages against microbial deterioration. During the last 30 years sorbate has been tested and used widely throughout the world due to its inhibitory effect against many microorganisms (SOFOS and BUSTA, 1981). As with other food preservatives, it has advantages as well as limitations, but generally it is very useful when used with proper planing and correct conditions. It has been found that sorbate at least three times more effective and less toxic than benzoat (SMITH and ROLLIN, 1954 and GOODING, et al. 1955). Also, sorbate can be metabolized by the organisms in a way similar to naturally occuring fatty acids (DEUEL, et al. 1954). RAEVUORI (1976) stated that 0.2% sorbic acid and 0.4% pot. sorbate have an inhibitory effect on B. cereus growth. While WYATT and GUY (1981) reported that 0.25% of pot. sorbate and refrigerator temp. inhibited the growth of B. cereus.

Sorbate level of 0.15 and 0.2% in milk effectively prolonged quality and reduced the rate of psychrotrophic bacterial growth, and demonstrated a shelf life of 19 to 20 d. at 7°C (MISTRY and KOSIKOWSKI, 1982). In 1982 Amendments to Japanese regulations on food additives, allowing use of pot. sorbate and sorbic acid in cheese manufacture (IWIDA and TONOGAT, 1982).

The aim of this work was to determine the effect of pot. sorbate on the growth of B. cereus in milk and ice-cream.

MATERIAL and METHODS

1- Milk

4 samples of sterile milk infected with 10^5 B. cereus/ml. were used. The first 3 samples were treated with 0.2, 0.25 and 0.30% of pot. sorbate respectively, while the fourth one remained untreated (control). Each sample (the treated and the control) was divided into 2 subsamples, one of which was stored at room temp. (30°C) and the other was kept in refrigerator (8±2°C). The keeping quality of treated samples is determined daily and compared with sorbate free sample (control).

2- Ice-cream

4 samples of ice-cream were prepared in the laboratory from ice-cream mix (as recomended by the manufacturer), and contaminated with B. cereus. Potassium sorbate was introduced to the first 3 samples at levels of 0.20, 0.25 and 0.30%, while the other one was left as a control. Each sample was divided into two portions, one of which was held at freezing temp., while the other was stored at deep freezing temp. (- 18±2°C). Samples were examined at zero time, then weekly up to 6 weeks for B. cereus growth.

RESULTS

All results obtained from this work are recorded in Table 1 and Figures 1&2.

DISCUSSION

It is evident from table 1 that control milk samples were kept in good quality at room and refrigerator temp. (30 & 8±2°C) for 24 h. and 40 d. respectively. The addition of 0.20, 0.25 and 0.30% of pot. sorbate to sterile milk previously infected with B. cereus, increased the keeping quality at room temp. from 42 h. to 48, 72 and 72 h., respectively. While at refrigerator (8±2°C) the keeping quality increased from 40 d. to 44, 49 and 50 d., respectively. These results suggest the effectiveness of pot. sorbate and refrigerated storage as ihibitory agents against B. cereus. Similar finding were reported by WYATT and GUY (1981), while MISTRY and KOSIKOWSKI (1982) noted that pot. sorbate prolonged the keeping quality of milk.

Figures 1 & 2 show that B. cereus decreased from 10^6 to $3x10^4$ and $2x10^3$ at freezing and deep freezing temp. by the end of the 6th week. Addition of 0.2, 0.25 and 0.30% pot. sorbate to ice-cream previously infected with B. cereus. which decreased from 10^6 to $19x10^3$, $6x10^3$ and $4x10^3$ during freezing. while at deep freezing temp. the count decreased from 10^6 to $17x10^3$, $6x10^3$ and $3x10^3$/ml. These findings reveal the effectiveness of pot. sorbate with freezing or deep freezing temp. as ihibitory agents against B. cereus.

In conclusion, pot. sorbate as a food preservative is valuable as an inhibitory agent against B. cereus.

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Table (1)

Effect of Pot. sorbate on keeping quality of sterile milk previously infected with 10^5 B. cereus/ml and kept at room temp. (30°C) and refrigeration temp. (8-2°C)

Keeping quality period in hours or days	without pot. sorbate (control)	with pot. sorbate		
		0.2	0.25	0.3%
At room tmep. (30°C)	24	48	72	72
In refrigerator	40	44	49	50

* Keeping quality at room temp. in hours.

* Keeping quality at refrigerator temp. in days.

Fig (1) : Effect of potassium sorbate on the growth of B. cereus in ice-cream stored at freezing temperature (Zero C°).

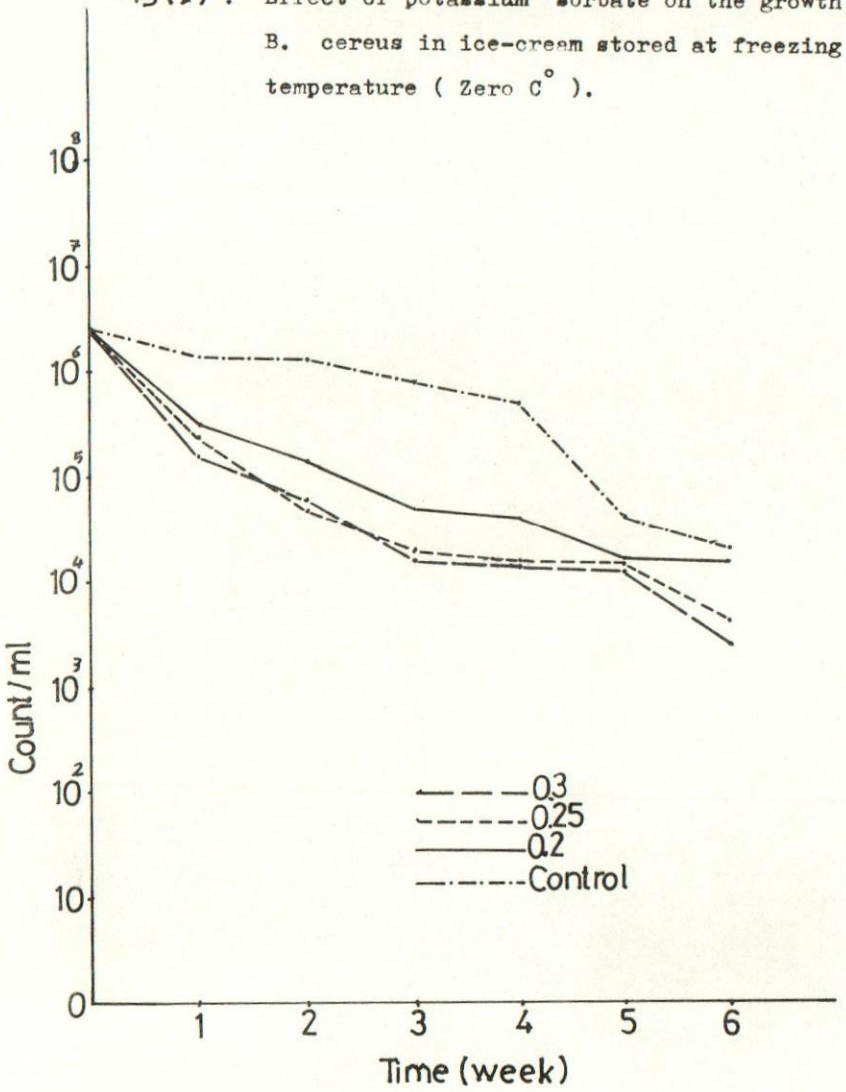

Fig (2) : Effect of potassium sorbate on the growth of B. cereus in ice-cream samples stored at deep freezing temperature (-18 ± 2 C°) .