

## **Edible kefiran films with probiotics - structure, physical properties and probiotic viability during storage as affected by cryo-treatment, kefiran concentration and milk protein addition**

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### **Objective:**

The present work evaluated the effect of cryo-treatment, kefiran concentration and milk proteins, sodium caseinates and whey protein concentrates, on the structure, physical properties and probiotic viability during storage of kefiran films.

### **Methods:**

Kefiran was isolated from kefir grains and films, with or without cryo-treatment, were produced either with no other additives, at kefiran concentrations ranging from 1 to 3% (w/w), or with the concomitant addition of sodium caseinates and whey protein concentrates at 2%(w/w) concentration. For film preparation, the polysaccharide was dissolved in hot water, at 80oC, followed by the addition of milk proteins, when required, and heat treatment at 80oC for 30min. The probiotic culture (BB-12) was subsequently added at 30°C, and the film-forming solutions were subsequently transferred to petri dishes and subjected to cryo-treatment by slow freezing at -18°C for 24h, followed by defrosting at 4°C for 24h. Post cryo-treatment, the films were dried to constant weight in a lamina air flow oven at 40°C and stored at 25°C before further analysis. Films without cryo-treatment were also prepared. The physical properties of the films, thickness and moisture content, the probiotic culture viability and the film structure were monitored.

### **Results:**

Cryo-treatment increased film thickness, but did not affect moisture content. Protein addition did not affect the films' physical properties but improved probiotics viability during storage of films subjected to cryo-treatment. Increasing kefiran concentration resulted in increasing probiotics viability as did cryo treatment. Kefiran films without cryo-treatment appear too rough when compared to films with cryo-treatment. The presence of probiotics made the structure of cryo-treated films appear smoother.

### **Conclusions:**

Cryo-treatment and kefiran concentration affects films structure and improve probiotics viability. Milk proteins improve probiotic viability during storage.

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