

Effect of storage time, packaging material and MAP composition on spray-dried kefir and its reconstitution properties

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Objective:

A study on the effect of packaging material and MAP composition on the shelf-life, quality and functional properties of spray-dried kefir and its reconstitution properties.

Methods:

Kefir samples were prepared from pasteurized, homogenized, heat-treated (95°C for 5 min) bovine semi-skimmed milk, inoculated with a lactic acid starter culture and yeast (XPL-30, LAF-4, CHR-HANSEN, Denmark respectively) and incubated at 30°C until pH 4.4. A probiotic culture (BB-12, CHR-HANSEN, Denmark) was mixed in the product and four different sample treatments were followed before low temperature spray drying. Apart from the control, the effect of trehalose, at a concentration of 1%w/v, and two different low temperature storage treatments (storage at -12°C for 24 h followed by 24 h at 4°C and storage at 4°C for 72 h) was evaluated.

A selection of flexible packaging materials was studied for their effect on storage with regards to products properties. Five commercially available packaging samples with varying barrier properties, on water and oxygen permeation rates, including multilayered structures and/or metalized polymeric films with the addition of oxygen or water absorbers were studied.

Different MAP compositions were used and the samples were stored at high temperature- high humidity accelerated storage conditions in thermostatic chambers.

Kefir powder and reconstituted samples were periodically characterized based on their physicochemical, structural and microbiological properties. Physicochemical analysis involved pH, moisture content, color, particle size, particle porous structure, as well as bulk density, tapped density, flowability, cohesiveness, and insoluble matter content. Viability of lactic acid bacteria, yeasts and probiotics was also evaluated.

Results:

Based on the results, the use of different packaging materials and MAP environments affected the physicochemical characteristics of the spray dried kefir powder and its reconstitution properties during storage. The most effective materials and MAP conditions were chosen for product self-life assesment.

Conclusions:

The use of proper packaging material and MAP may exhibit a protective effect on kefir microflora and the reconstituted product properties during storage and expand its shelf-life.

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