# Physicochemical, structural, microbiological and reconstitution properties of spray-dried kefir during storage

**GROZTIDOU O. (1), KARIPOGLOU D. (1), EXARHOPOULOS S. (1), GOULAS A. (1), GEORGIOU D. (1), DIMITRELI G. (1)**
1 International Hellenic University Department of Food Science and Technology, Thessaloniki, Greece

Objective:
The aim of the present work was to evaluate the effect of storage time on the physicochemical, structural, microbiological and reconstitution properties of spray-dried kefir.

Method:
Kefir samples were prepared using homogenized and pasteurized semi-skimmed milk and commercial starter cultures (XPL-30, LAF-4, CHR HANSEN, Denmark). Following fermentation (30C until pH 4.4), a probiotic culture (BB-12, CHR HANSEN) was added to kefir and ten different sample formulations were prepared, one control without carrier addition, 3 samples with trehalose (1, 2, 4%w/w), 3 with fructooligosaccharides-FOS (2, 3, 6%w/w) and 3 with whey proteins (2, 5, 10%w/w). The samples were subsequently spray-dried at reduced process temperatures (inlet 140C, outlet 80C). The powdered kefir samples were stored at ambient temperature for 6 months during which period their properties were monitored.
Moisture content, color parameters, particle size distribution via laser diffraction, particle porous structure by confocal laser microscopy, as well as bulk density, tapped density, flowability, cohesiveness, water solubility index and insoluble matter content of powder samples were determined. Color parameters, pH, particle size distribution, morphology and microbiological viability of lactococci, lactobacilli, yeasts and probiotics were also evaluated at the reconstituted samples.

Results:
Carrier addition affected the reconstitution properties of the samples during storage when compared to control. Moisture content and structure of the samples was not altered during storage. The pH values of reconstituted samples were increased, compared to unprocessed samples for all treatments, but they did not exhibit further changes during storage. The color parameters of the powder samples during storage, was affected by the addition of carriers. Carriers also improved kefir microflora survival as it concerns lactococci and lactobacilli. Trehalose affected microflora survival the most. Yeasts did not survived after drying, nor did probiotics that exhibited very low viability.

Conclusion:
Carriers' addition affected kefir powders properties during storage. Survival of lactococci and lactobacilli during storage improved the most in the presence of trehalose.

The research project was supported by the Hellenic Foundation for Research and Innovation (H.F.R.I.) under the "2nd Call for H.F.R.I. Research Projects to support Post-Doctoral Researchers" (Project Number: 0075).