

Use of High Hydrostatic Pressure as an Alternative Preservation Method in Camels Milk

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Abstract : The effects of different high hydrostatic pressure treatments on the shelf life of camel's milk were studied. Treatments at 300 to 350 MPa for 5 minutes at 40°C reduced microbial contamination to levels that prolonged the shelf life of refrigerated (3° C) milk up to 28 days. The treatment resulted in a decrease in the proteolytic activity of the milk. The content of proteolytic enzymes in the untreated milk sample was 4.23 µM/ml. This content decreased significantly to 3.61 µM/ml when the sample was treated at 250 MPa. Treatment at 300 MPa decreased the content to 3.90 which was not significantly different from the content of the untreated sample. The content of the sample treated at 350 MPa dropped to 2.98 µM/ml which was significantly lower than the contents of all other treated and untreated samples. High pressure treatment caused a slight but statistically significant increase in the pH of camel's milk. The pH of the untreated sample was 6.63, which increased significantly to 6.70, in the samples treated at 250 and 350 MPa, but insignificantly in the sample treated at 300 MPa. High pressure treatment resulted in some degree of milk fat oxidation. The thiobarbituric acid (TBA) value of the untreated sample was 0.86 mg malonaldehyde/kg milk. This value remained unchanged in the sample treated at 250 MPa, but then it increased significantly to 1.25 and 1.33 mg/kg in the samples treated at 300 and 350 MPa, respectively. High pressure treatment caused a small increase in the greenness (a* value) of camel's milk. The value of a* was reduced from -1.17 for the untreated sample to -1.26, -1.21 and -1.30 for the samples treated at 250, 300 and 350 MPa, respectively. Δa^* at the 250 MPa treatment was -0.09, which then decreased to -0.04 at the 300 MPa treatment to increase again to -0.13 at the 350 MPa treatment. The yellowness (b* value) of camel's milk increased significantly as a result of high pressure treatment. The b* value of the untreated sample was 1.40, this value increased to 2.73, 2.31 and 2.18 after treatments at 250, 300 and 350 MPa, respectively. The Δb^* value was +1.33 at the treatment 250 MPa, decreased to +0.91 at 300 MPa and further to +0.78 at 350 MPa. The pressure treatment caused slight effect on color, slight decrease in protease activity and a slight increase in the oxidation products of lipids.

Keywords : high hydrostatic pressure, camel's milk, mesophilic aerobic bacteria, clotting, protease

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