

IMPACT OF ADDING OATS ON THE CHEMICAL, RHEOLOGICAL, MICROBIOLOGICAL AND SENSORY ASSESSMENT OF YOGURT

Omar Awaied Ahmed^{1*}, Khazaa Shaban Abdullah¹

¹Food Science Department, College of Agriculture, University of Mosul,
University street 94GW+J9, 41002 Mosul, Iraq

*e-mail: omarali622@gmail.com

Abstract

Yogurt is considered as one of the most widespread dairy products in the world, and is of great importance. That's why many studies are dedicated to production of yoghurt acceptable to the consumer. This study aimed at the use of oats in the yogurt industry and extent to which it affects its properties.

Yogurt was produced in the dairy plant of the Department of Food Sciences/College of Agriculture/University of Mosul, where it was divided into 4 variations, represented by the control sample (T) and (T1, T2 and T3) in which the oat powder was added in the rates of 0.5, 1 and 2% respectively. The milk was heated to 85 °C at 15 min., then cooled to 42 °C, vaccinated by 3% of the cultures (*Streptococcus thermophilus*, *Lactobacillus bulgaricus*) was incubated at 42 °C until clotting. Chemical composition of yogurt was determined by following methods: total solids - 1 g from the sample was dried at 105 °C; ash - 2 g of the sample was burned in the muffle furnace at 550 °C; protein - was determined by Kjeldahl method; fat - by Kerber method; acidity - by the titration; and fibre by treating the sample with H₂SO₄, and then with NaOH. The rheological qualities were measured too: the viscosity was estimated using a RVDVE, and syneresis by the discharge test. In addition, the content of the bacteria (total bacteria count, coliform bacteria, yeasts, and molds) was determined by classical methods. Also, experienced panelists performed sensory evaluation: 60% flavor, 30% texture, and 10% overall appearance. All measurements were performed at 1 and 14 days of storage.

The results of the chemical analysis showed an increase in the proportion of total solids for oat-added yogurt samples (T1, T2, and T3) with 14.77%, 15.25% and 16.17%, respectively, while the comparison sample (T) was 14.34% at 1 day of storage, while after increasing the storage period to 14 days, the highest oat-added yogurt sample (T3) reached 18.02%. Ash ratio increased by increasing the percentage of oatmeal addition and increased storage time, reaching 0.54, 0.57, 0.60, and 0.65 each (T, T1, T2, and T3) respectively at the 1 day of storage, while the ratio increased after 14 days of storage to reach its highest value (0.85) for the T2 sample. The protein ratio of the control sample (T) (4.35) was at one day of storage while this percentage increased to (4.57) for (T3), while storage for 14 days has increased the protein content of all treatments. The percentage of fat increased by increasing the rate of addition and storage duration; the control sample (T) 3.64% from one day of storage increased to 3.85 at 14 days of storage, while the fat ratio of the sample yogurt of added oats (2%) (T3) (3.7, 3.88) at 1, 14 days of storage, respectively. The acidity of the control sample (T) at one day of storage was 0.89, while the addition of oatmeal and storage time increased acidity until it reached 1.22 for the yogurt sample with added oats by 2% (T3) after 14 days of storage. Also, adding oatmeal to yogurt led to fibre appearance in transactions (T1, T2, T3), where the highest ash ratio for T3 was 0.32%.

While the rheological properties of yogurt indicated an increase in viscosity to the samples of yogurt added to oatmeal, this viscosity increased by increasing the rate of oatmeal addition to: 3,415, 3,796, 4,180 and 4,532 cP, each for (T, T1, T2, and T3) respectively, were at 1 day of storage. Also, the viscosity increased at 14 days of storage, reaching (3768, 4017, 4398, 4703 cP) each for (T, T1, T2, T3) respectively, as for the syneresis of whey for yogurt samples, the addition of oats reduced the amount of syneresis whey, where it was for the control sample (T) (17.81 mL/100 mL) and it went down to (16.12, 14.92, 13.65 mL/100 mL) for treatments (T1, T2, T3) respectively, the 14-day storage also reduced the amount syneresis of whey. The results of the microbiological analysis showed that

the addition of oats to yogurt led to an increase in the total bacteria count, where the number reached: 38, 41.5, 43, and 46.5 x 10⁶ cfu/mL for treatments: T, T1, T2, T3 respectively, while no growth of yeast, molds, and coliform bacteria was detected. Finally, the results of the sensory assessment of yogurt showed that the addition of oats improved the sensory properties of yogurt, where the overall evaluation where the total value (Flavour, Body and Texture and Appearance), (86.16, 89.66, 90.66 and 92.83) for treatments (T, T1, T2, T3) respectively, for one day of storage.

We conclude from the findings that adding oats to yogurt has improved the resulting yogurt's chemical, rheological and sensory properties.

Key words: *Yogurt, Oat, Viscosity, Sensory evaluation.*