

Analysis of Antimicrobial Effect of Cinnamon and Nutmeg Oil Extractions on Preserving Tomato Sauce

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Cinnamon and nutmeg essential oils are considered to have high antimicrobial potential that will be beneficial as natural food preservatives. Sodium benzoate is a common preservative used but reveals to have many negative health effects. Hence this research attempts to evaluate the potential of preserving tomato sauce based on the antimicrobial effect of cinnamon and nutmeg essential oil extractions. Freshly prepared tomato sauce samples were separately treated with 0.05, 0.1, 1.0 and 2.0 % concentrations of cinnamon bark oils (70 % cinnamaldehyde and 40 % cinnamaldehyde containing samples), cinnamon leaf oil and nutmeg seed oil. 0.05 % concentration of cinnamon bark oils, cinnamon leaf oil and nutmeg seed oil showed best sensory properties in the tomato sauce. Cinnamon leaf oil treated sample was rejected from the sensory analysis and most preferred sample was nutmeg seed oil treated sample and there were significant difference in taste and aroma compared to other samples. pH, brix and total titratable acidity analysis and microbial analysis were carried out for 0.05 % spice oil treated tomato sauce samples at initial stage and after 6 weeks storage at room temperature and refrigerated temperature. According to the results pH, brix and total titratable acidity values were 3.63 ± 0.02 - 3.85 ± 0.01 , 41.7 ± 0.1 - 43.7 ± 0.12 , 1.74 ± 0.06 - 1.88 ± 0.04 (as acetic acid, percent by mass) respectively. Total plate counts (SLS 516-1-Sec, 1:2013) were $< 1.4 \times 10^2$ cfu/g at initial stage, $< 1.364 \times 10^3$ cfu/g after 6 weeks stored at room temperature and $< 6.82 \times 10^2$ cfu/g after 6 weeks stored at refrigerated temperature (4°C - 8 °C) for all samples and yeast and mold count (SLS 516-2-Sec, 1: 2013) were not detected in all samples. According to the results, there is a possibility in using cinnamon bark oil and nutmeg seed oil in preserving tomato sauce based on pH, brix, total titratable acidity and total plate count according to SLS 260:1989 standard.

Keywords: Antimicrobial effect, Cinnamon oil, Natural preservative, Nutmeg oil, Tomato sauce