

APPLICATION OF GUAVA LEAF EXTRACT IN FRESH PORK SAUSAGE

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I. OBJECTIVES

The objective of the current study was to determine the antioxidant efficacy of guava leaf (GL) extract in comparison with butylated hydroxytoluene (BHT) in fresh pork sausage during refrigerated storage

II. MATERIALS AND METHODS

GL were cut, extracted in 48% ethanol, and concentrated under vacuum to a solution with an IC₅₀ inhibitory concentration value of 0.04 mg. Treatments included a negative control (no antioxidant [CON]), 200 ppm BHT, and GL extract at 3,000 ppm (GL3000), 4,000 ppm (GL4000), 5,000 ppm (GL5000), and 6,000 ppm (GL6000) on a fat content basis. Pork lean and fat trimmings were ground a 6-mm plate at a 4:6 ratio. Ground meat was mixed with seasonings (wheat flour, sodium chloride, sucrose, black pepper powder, monosodium glutamate, and antioxidants), hand-mixed for 5 min, stuffed into collagen casing to produce 35-g sausage links, and placed in a polyamide bags (maximum moisture and oxygen transmission rates of 180 g/m²/d and 15 cm³/cm²/d/bar, respectively) at 4°C for 0, 1, 4, 7, 10, and 14 d in the dark. The study was conducted as a randomized complete block design with 3 replications. On each storage day, 3 sausage links per replication were randomly sampled for acidic value (AV), peroxide value (PV), conjugated dienes (CD), thiobarbituric acid reactive substances (TBARS), and total antioxidant capacity (TAC). A generalized linear mixed model was used to analyze the variances with treatment, time, and treatment × time being fixed effects and replication being a random effect, using the GLIMMIX procedure of SAS version 9.4 (SAS Institute Inc., Cary, NC). Actual probability was reported with the determination of statistical significance.

III. RESULTS

There was a two-way treatment × time interaction for TAC and oxidation products ($P \leq 0.017$). On day 0, GL5000 and GL6000 had 117 and 131 μmol trolox/g, greater than that in CON sausage (101 μmol /g; $P \leq 0.014$). However, only GL6000 had more TAC than BHT (113 μmol /g; $P = 0.011$). On day 7 and 10, all treatments had similar TAC ($P \geq 0.231$) and more than the CON ($P < 0.001$). CON had at least 0.10 mmol/kg (25%) more CD than all other treatments on day 4 ($P \leq 0.013$). On day 7, both BHT and GL6000 had similar CD (0.42 and 0.45 mmol/kg; $P = 0.567$), 0.1 mmol/kg less than CON, GL3000, GL4000, and GL5000 ($P \leq 0.030$). On day 1, the PV of GL4000, GL5000, and GL6000 was similar to that of BHT (3.4 to 4.7 mEq/kg; $P \geq 0.068$) but was less than that of CON and GL3000 (8.4 and 8.6 mEq/kg, respectively; $P \leq 0.001$). On day 4, 7, and 10, CON had 1.68 to 10.0 mEq/kg more PV than all other treatments ($P \leq 0.001$). On day 1, CON sausage had similar AV to other treatments (0.71 to 1.55 g KOH/kg; $P \geq 0.057$), with the exception of GL6000 (0.52

g/kg; $P=0.020$). On day 4 and 7, CON had 1.33 to 2.05 g/kg greater AV than GL4000, GL5000, GL6000, and BHT ($P\leq 0.004$). On day 10 and 14, CON had 2.66 to 4.42 g/kg greater AV than all other treatments ($P\leq 0.001$). BHT had similar AV to that of GL treatments ($P\geq 0.057$) from day 1 to 14. From day 1 to 14, CON had greater TBARS value than other treatments ($P\leq 0.001$). BHT, GL5000, and GL6000 were similar ($P\geq 0.147$) and more effective at controlling TBARS than GL3000 and GL4000 ($P\leq 0.001$) from day 1 to 14.

IV. CONCLUSION

GL extract was as effective at slowing the process of lipid oxidation in fresh pork sausage as 200 ppm BHT. Therefore, GL extract has potential as a natural antioxidant in clean-label meat products pending further sensory testing.

Keywords: clean label, guava leaf, lipid oxidation, natural antioxidant, pork sausage