Antioxidant Effectiveness of Natural Rosemary Extract in Pork Sausage

A.S. Leaflet R1852

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Summary and Implications

A natural rosemary extract, FORTIUM™ R20, provides a significant means of protecting color and freshness for pork sausage products. The rosemary extract, used at 2500 ppm, was as effective as commercial antioxidants (BHA/BHT) in fresh pork sausage and was superior to the commercial antioxidants in frozen pork sausage.

Introduction

Many processed meat products are very susceptible to spoilage from oxidative rancidity and require antioxidants for flavor stability. Pork sausage in fresh or frozen form is one of the most susceptible products and commercial antioxidants are commonly used to protect flavor. However, the commercial antioxidants normally used (BHA and BHT) are synthetic compounds, and some health concerns have been raised concerning their use. A natural antioxidant such as rosemary extract could provide an alternative that would be attractive to both meat processors and consumers.

Materials and Methods

Pork sausage was manufactured in the Iowa State University Meat Laboratory with commercial BHA/BHT antioxidants and with rosemary extract (FORTIUM™ R20) produced by Kemin Americas, Inc. Rosemary extract was used at concentrations ranging from 200 ppm to 3000 ppm. The pork sausage was produced as fresh-refrigerated, fresh-frozen and cooked-frozen products.

Rancidity, measured as TBA values, color and sensory panel evaluations were conducted during refrigerated or frozen storage of the pork sausage products.

Results and Discussion

Table 1 shows the results for rancidity measurements of fresh-frozen pork sausage during 112 days of frozen storage. The 2500 ppm of rosemary provided improved stability over BHA/BHT from 28 days onward. The 1500 ppm of rosemary accomplished a similar effect at 42 days of storage and longer. Table 2 shows results of fresh refrigerated pork sausage for rancidity changes during storage. In this case, the rosemary extract provided a level of rancidity control that was comparable to the commercial BHA/BHT antioxidants. Similar results were observed for cooked, frozen pork sausage.

Thus, the rosemary extract (FORTIUM™ R20) provides effective antioxidant protection that is as effective as commercial BHA/BHT antioxidants in fresh-refrigerated and cooked-frozen pork sausage. The rosemary extract was more effective than BHA/BHT in fresh/frozen pork sausage. Consequently, the natural rosemary extract (FORTIUM™ R20) provides an effective alternative to synthetic antioxidants for extending the shelf life of pork sausage products.

Table 1. TBA values (mg/kg) during frozen storage of raw pork sausage with different additives

Treatment	Day								
	1	14	28	42	57	70	84	98	112
Control	0.78^{c}	0.92^{b}	1.41^{c}	2.51^{b}	2.78^{c}	2.54^{c}	2.89^{b}	2.38^{b}	2.90^{c}
BHA/BHT	0.57^{b}	0.78^{ab}	1.12^{bc}	1.99^{b}	1.74^{b}	1.98^{bc}	2.29^{b}	2.65^{b}	1.99^{b}
Rosemary extract R1500	0.48^{ab}	0.54^{ab}	0.85^{ab}	0.75^{a}	0.94^{a}	0.97^{a}	1.04^{a}	1.07^{a}	1.10^{a}
Rosemary extract R2500	0.38^{a}	0.48^{a}	0.59^{a}	0.70^{a}	0.67^{a}	0.91^{a}	0.96^{a}	1.11^{a}	1.30^{a}
SEM	0.04	0.10	0.14	0.26	0.10	0.25	0.20	0.16	0.17

^{a,b,c} means within a column with different superscripts are significantly different ($P < 0.05$).

Table 2. TBARS values during storage of pork sausage in simulated retail display (refrigerated) as affected by different antioxidants.

Treatment	Days of Storage					
	1	4	7	9	11	14
Control	0.33	0.51	0.65	0.87	1.66[b]	3.63[c]
BHA/BHT	0.24	0.35	0.44	0.48	0.67[a]	1.19[a]
Rosemary extract R500	0.30	0.40	0.69	0.74	1.70[b]	2.93[abc]
Rosemary extract R1000	0.27	0.41	0.59	0.90	1.24[ab]	1.98[abc]
Rosemary extract R1500	0.24	0.36	0.54	0.58	1.35[ab]	2.79[abc]
Rosemary extract R2000	0.22	0.37	0.52	0.75	1.31[ab]	2.21[abc]
Rosemary extract R2500	0.25	0.36	0.45	0.57	0.90[a]	1.71[ab]
Rosemary extract R3000	0.22	0.33	0.48	0.62	0.99[ab]	1.23[a]
SEM	0.08	0.08	0.12	0.14	0.22	0.54

[a,b,c] means within a column with different superscripts are significantly different ($P < 0.05$)

Acknowledgements

Support for this project from the Iowa State University Center for Advanced Technology Development (CATD) and Kemin Americas, Inc., Des Moines, Iowa is gratefully acknowledged.