PE4.68 Effect of Adding Rhus verniciflua Stokes Extract and O2 Concentration on the Quality of Ground Pork Packaged in Modified Atmosphere 246.00

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***Abstract*—The objective of this research was to investigate the effect of adding *Rhus verniciflua* Stokes (RVS) extract and O_2 concentration (0%, 40%, and 60%) on the quality of ground pork packaged in modified atmosphere containing 30% CO_2. The pH and VBN were not affected by the addition of RVS extract and O_2 concentration. The TBARS content was inhibited by the addition of RVS extract but promoted by 60% O_2-MAP. The color was resulted in a darker by the addition of RVS extract but in a redder by higher O_2-MAP.**

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***Index Terms*—RVS extract, MAP, pork.**

I. Introduction

NATURAL antioxidants improve the human health and food safety [13, 16]. In Korea, *Rhus verniciflua* Stokes (RVS) (a member of Anacardiacea family) has been used traditionally as natural medicines for treating gastritis, stomach cancer, and arteriosclerosis [3, 4]. The antioxidant potential of RVS extract has been verified in liposome and meat homogenate model systems [8] and emulsion-type sausage [7].

Modified atmosphere packaging (MAP) is an effective technique to minimize the deterioration of meat products [9, 17]. Especially, high O_2 MAP (70-80% O_2 and 30-20% CO_2) is the most common method for fresh meat and results in the fascinating bright-red color [15] and further long shelf-life than air packaging [1]. But it promotes the lipid oxidation and myoglobin denaturation [2].

Therefore, the objective of this research was to investigate the effect of adding RVS extract and O_2 concentration on the quality of ground pork packaged in modified atmosphere.

II. Materials and Methods

A. RVS extract preparation

RVS extract was made from 100 g of naturally dried-RVS meal and 2,000 mL of deionized water using a red ginseng master (HS-777, Hansscience, Korea).

B. Sample preparation

Frozen pork was ground through 6 mm and 4 mm plates using a meat chopper and divided into two groups. RVS extract was added to one group at 2% (w/w) based on total weight of meat and the other (control) was non-added meat. About 300 g of sample was placed on a barrier foam tray (Maximum O_2 transmission rate=0.1 cc/m^2 at 23℃, 0% RH; Maximum moisture vapor transmission rate=2.0 g/24 hr·254 cm^2 at 28℃, 100% RH, Cryovac Sealed Air Corp., USA), filled with either 0% O_2/30% CO_2/70% N_2, 40% O_2/30% CO_2/30% N_2, or 60% O_2/30% CO_2/10% N_2 and sealed with O_2 barrier film (Maximum O_2 transmission rate=20 cc/24 hr·254 m^2 at 4.4℃, 100% RH; Maximum moisture vapor transmission rate=0.10 g/24 hr ·254 cm^2 at 4.4℃, 100% RH; Lid 1050, Cryovac Sealed Air Corp., USA) using a MAP machine (HyperVac, Korea) equipped with a gas mixer (MAP Mix 9001 ME, PBI Dansensor, Denmark).

Gas composition in each tray was measured using a handheld gas analyzer (CheckPoint O_2/CO_2, PBI Dansensor, Denmark) and N_2 concentration (%) was calculated as 100-[O_2 (%)+CO_2 (%)].

All packaged meat was stored at 4℃ for 12 days.

C. Experimental methods

The pH was measured by a pH meter (SevenEasy pH, Mettler-Toledo GmbH, Switzerland). Oxidation-reduction potential (ORP) was determined as described by Nam and Ahn [11] and expressed as mV. Total reducing ability (TRA) was determined as described by Lee et al. [6] and expressed as absorbance of 1 mM potassium ferricyanide minus absorbance of sample. Lipid oxidation was performed by the TBARS (2-thiobarbituric acid reactive substances) method of Sinnhuber and Yu [14] and expressed as mg malonaldehyde (MA) per kg meat. Volatile basic nitrogen (VBN) was measured by the conway dish method of Kohsaka [5] and expressed as mg%. CIE L^* and a^* values were measured by a chroma meter (CR-400, Konica Minolta Sensing, Inc., Japan). Data was analyzed by the General Linear Model procedure of SAS program [12].

III. RESULTS AND DISCUSSION

The effect of adding RVS extract and O_2 concentration on the pH of ground pork packaged in modified atmosphere is presented in Fig. 1. The pH was not significantly (P>0.05) different with the addition of RVS extract and O_2 concentration.

The ORP (Fig. 1) was significantly (P<0.05) decreased by the addition of RVS extract during storage. In the RVS extract -added, O_2 concentration did not affect ORP during storage. But in the non-added, 60% O_2-MAP retained the highest ORP until 12 days of storage.

The VBN (Fig. 2) was not significantly (P>0.05) different with the addition of RVS extract and O_2 concentration.

The TBARS content (Fig. 2) was significantly (P<0.05) decreased by the addition of RVS extract after 4 days of storage. Regardless of the addition of RVS extract, 60% O_2-MAP showed the highest (P<0.05) TBARS content after 8 days of storage.

The L^* value (Fig. 3) was significantly (P<0.05) decreased by the addition of RVS extract after 4 days of storage. But in the RVS extract-added and the non-added, O_2 concentration did not affect L^* value during storage.

The a^* value (Fig. 3) was not significantly (P<0.05) different with the addition of RVS extract during storage. Regardless of the addition of RVS extract, the higher O_2-MAP showed the higher a^* value during storage.

IV. CONCLUSION

The effect of adding RVS extract and O_2 concentration on the quality of ground pork packaged in modified atmosphere was investigated in this research. The addition of RVS extract improved the lipid oxidation stability. Moreover, the high O_2 -MAP decreased the lipid oxidation stability but improved the color quality.

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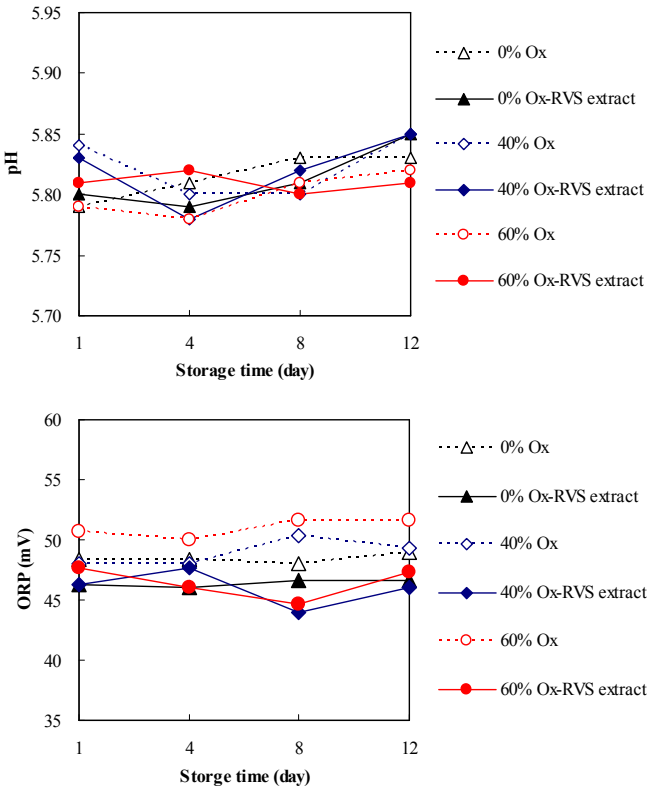

Fig. 1. The effect of adding RVS extract and O_2 concentration on the pH and ORP of ground pork packaged in modified atmosphere during storage at 4℃.

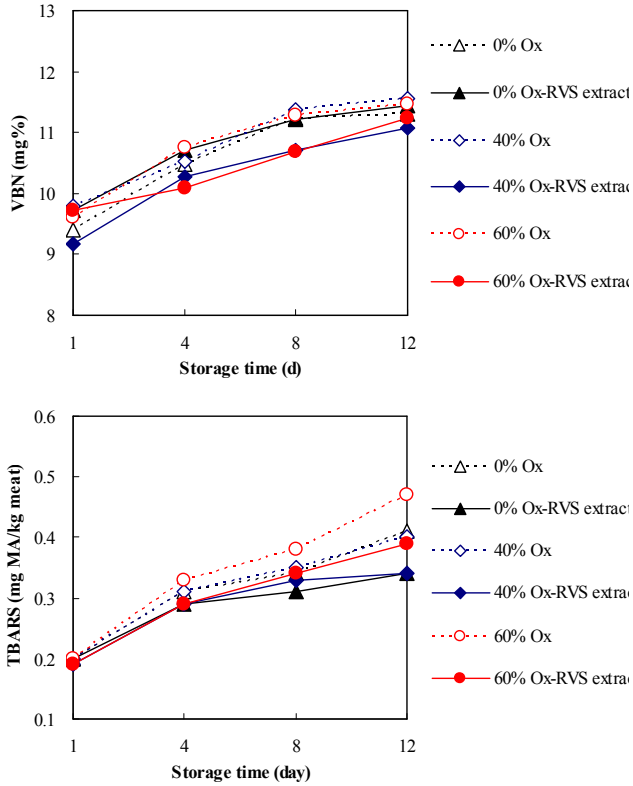

Fig. 2. The effect of adding RVS extract and O_2 concentration on the VBN and TBARS content of ground pork packaged in modified atmosphere during storage at 4℃.

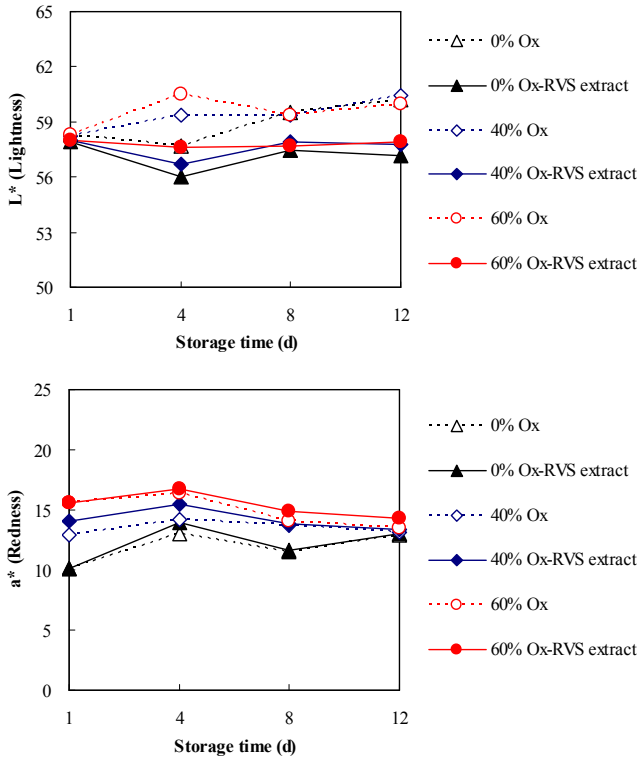

Fig. 3. The effect of adding RVS extract and O_2 concentration on the color of ground pork packaged in modified atmosphere during storage at 4℃.