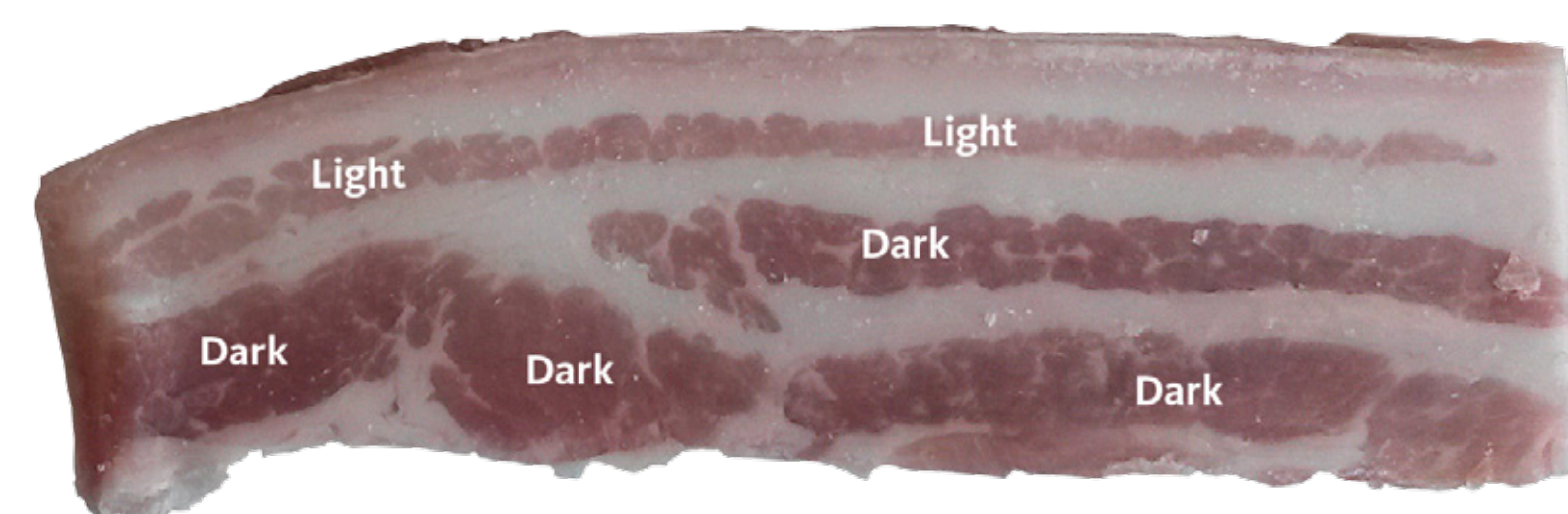


# Enhancing Crispiness of Pork Belly by Tri-gas MAP

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## AIM

To determine the influence of MAP and muscle fibre composition on eating quality and oxidative stability of retail-packed pork belly during refrigerated storage.



## CONCLUSION

Lipid and protein oxidation markers were affected by storage time and gas mixture in both light and dark muscle fractions of pork belly. To obtain enhanced crispiness of pork belly, the meat industry should retail-pack in a tri-gas MAP with a gas mixture of 50% O<sub>2</sub> + 40% CO<sub>2</sub> + 10% N<sub>2</sub>.

## MATERIALS & METHODS

12 female pigs (79-83 kg)  
Pork belly, crust frozen and sliced (9 mm)  
Retail-packed in 2-gas and 3-gas MAP  
Stored at 5°C, 1200 lux for 6-7 days

### MAP 0/20

20% CO<sub>2</sub> + 80% N<sub>2</sub>

### MAP 40/20

40% O<sub>2</sub> + 20% CO<sub>2</sub> + 40% N<sub>2</sub>

### MAP 50/20

50% O<sub>2</sub> + 20% CO<sub>2</sub> + 30% N<sub>2</sub>

### MAP 50/40

50% O<sub>2</sub> + 40% CO<sub>2</sub> + 10% N<sub>2</sub>

### MAP 80/20

80% O<sub>2</sub> + 20% CO<sub>2</sub>

## ANALYSIS



— Dark muscle fraction  
— Light muscle fraction

### Oxidation

Lipids by TBARS  
Proteins by carbonyls

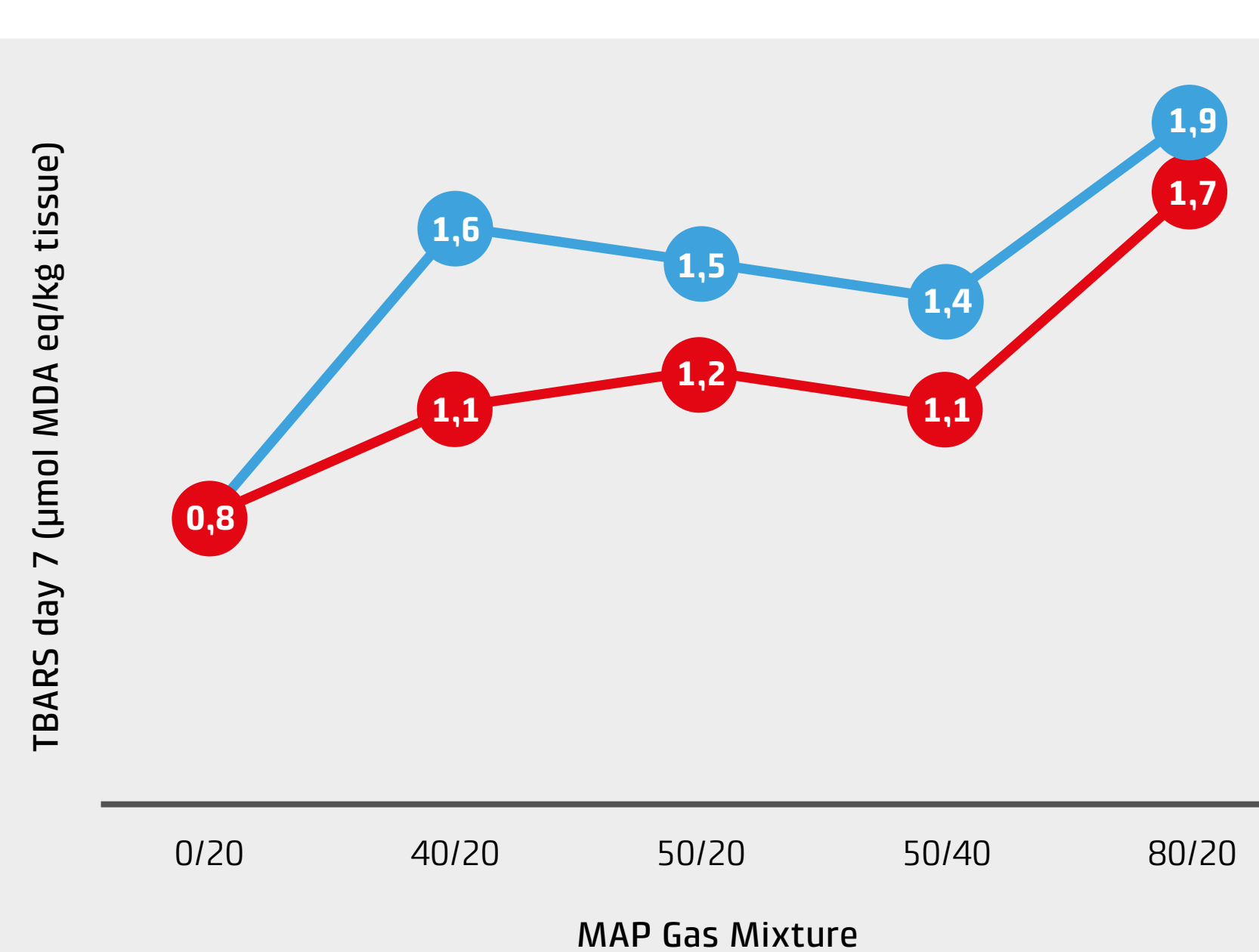
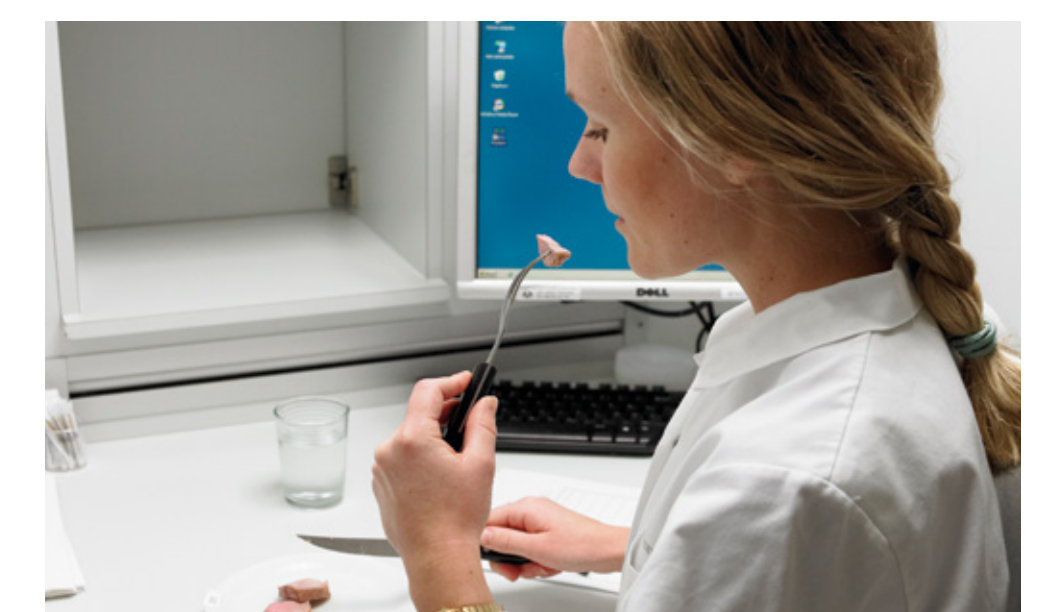


Figure 1. TBARS (µmol MDA eq/kg tissue) in dark and light muscle fractions of sliced pork belly, retail-packed in MAP (O<sub>2</sub>/CO<sub>2</sub>) and stored for 7 days at 5°C (n=3).

### Eating quality

Sensory profile  
Cooking loss



— Crispiness of meat  
— Crispiness of rind

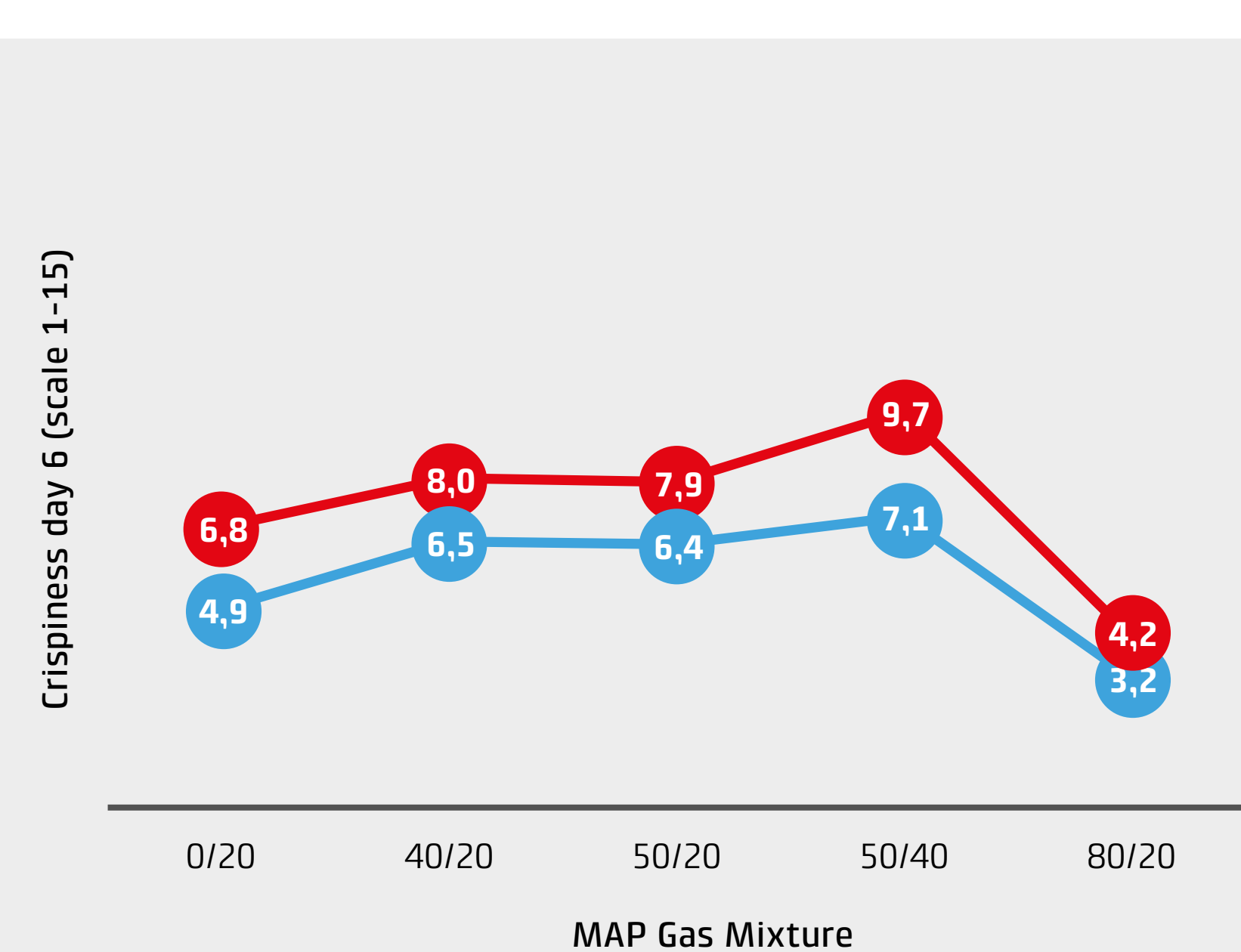


Figure 2. Crispiness of meat and rind of sliced pork belly, retail-packed in MAP (O<sub>2</sub>/CO<sub>2</sub>) and stored for 6 days at 5°C (n=6).

TBARS were affected by oxygen level in MAP. As shown in Figure 1, TBARS were, for both muscle fractions, lowest for non-oxygen MAP, and increased with O<sub>2</sub> levels: MAP 0/20 < MAP 40/20, MAP 50/20, MAP 50/40 < MAP 80/20.

When stored in an O<sub>2</sub> containing gas mixture, the dark muscle fraction were more sensitive to lipid oxidation than the light muscle fraction.

In relation to protein oxidation, packaging in high-CO<sub>2</sub> (MAP 50/40) for 7 days, increased carbonyl formation in the light muscle fraction compared with intermediate CO<sub>2</sub> (MAP 50/20). In general, increased O<sub>2</sub> levels appeared to gradual increase carbonyl formation during storage.

Eating quality was affected by the combination of O<sub>2</sub> and CO<sub>2</sub>. As shown in Figure 2, high CO<sub>2</sub> levels in combination with intermediate O<sub>2</sub> levels (MAP 50/40) increased the crispiness of pork belly meat and rind compared to traditional high O<sub>2</sub> MAP.

Using a MAP 50/40 cooking loss increased significantly, suggesting that the water-holding capacity of pork belly is affected by the level of CO<sub>2</sub>.



## CONTACT

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