

Examination of the effect of relative humidity on different properties of pork loin during curing and ageing

Anna VISY*, Gábor JÓNÁS, Zsuzsanna HORVÁTH-MEZŐFI, Karina Ilona HIDAS, Annamária BARKÓ, Koppány László MAJZINGER, László FRIEDRICH

Institute of Food Science and Technology, Hungarian University of Agriculture and Life Sciences, H-1118 Budapest, Hungary
Email : visy.anna@uni-mate.hu

INTRODUCTION

Meat curing is the process by which food products are preserved and flavored, typically through the addition of salts, nitrates, nitrites or sugars. Despite meat curing being used for hundreds of years to produce stable longlife products, there are few modern techniques available to monitor the curing and ageing process. Temperature is a well known hurdle for microbial stability and affects proteolysis and some sensorial properties. However, the effect of relative humidity (RH) has only been partially studied in dry-cured ham.

In this study, the effects of relative humidity during meat curing and ageing of pork loin (*Longissimus dorsi*) on the quality characteristics, salt and mass transport processes, protein denaturation and structural changes were investigated.

MATERIALS AND METHODS

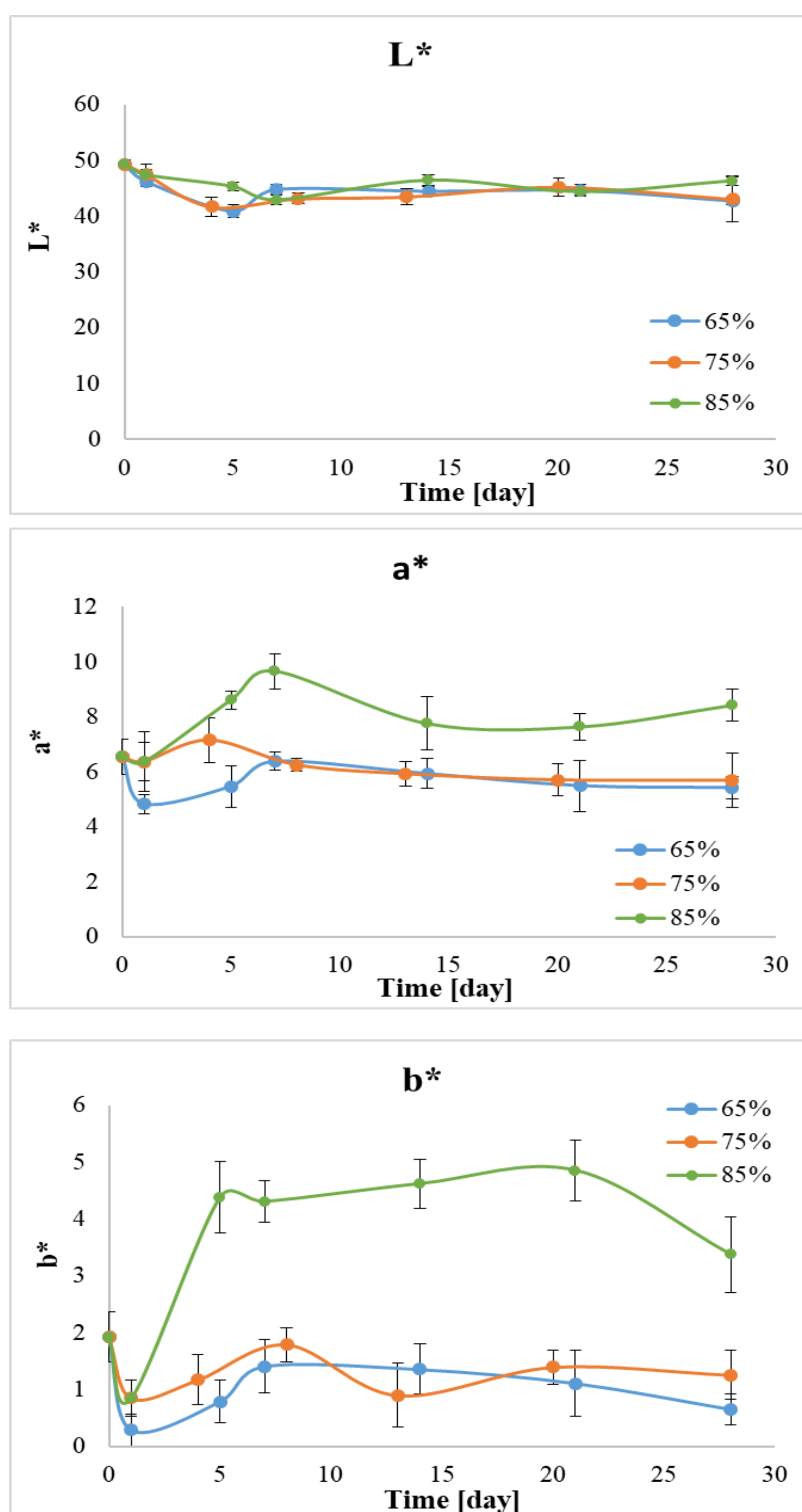
Pork loin (*Longissimus dorsi*) ~ 1 kg



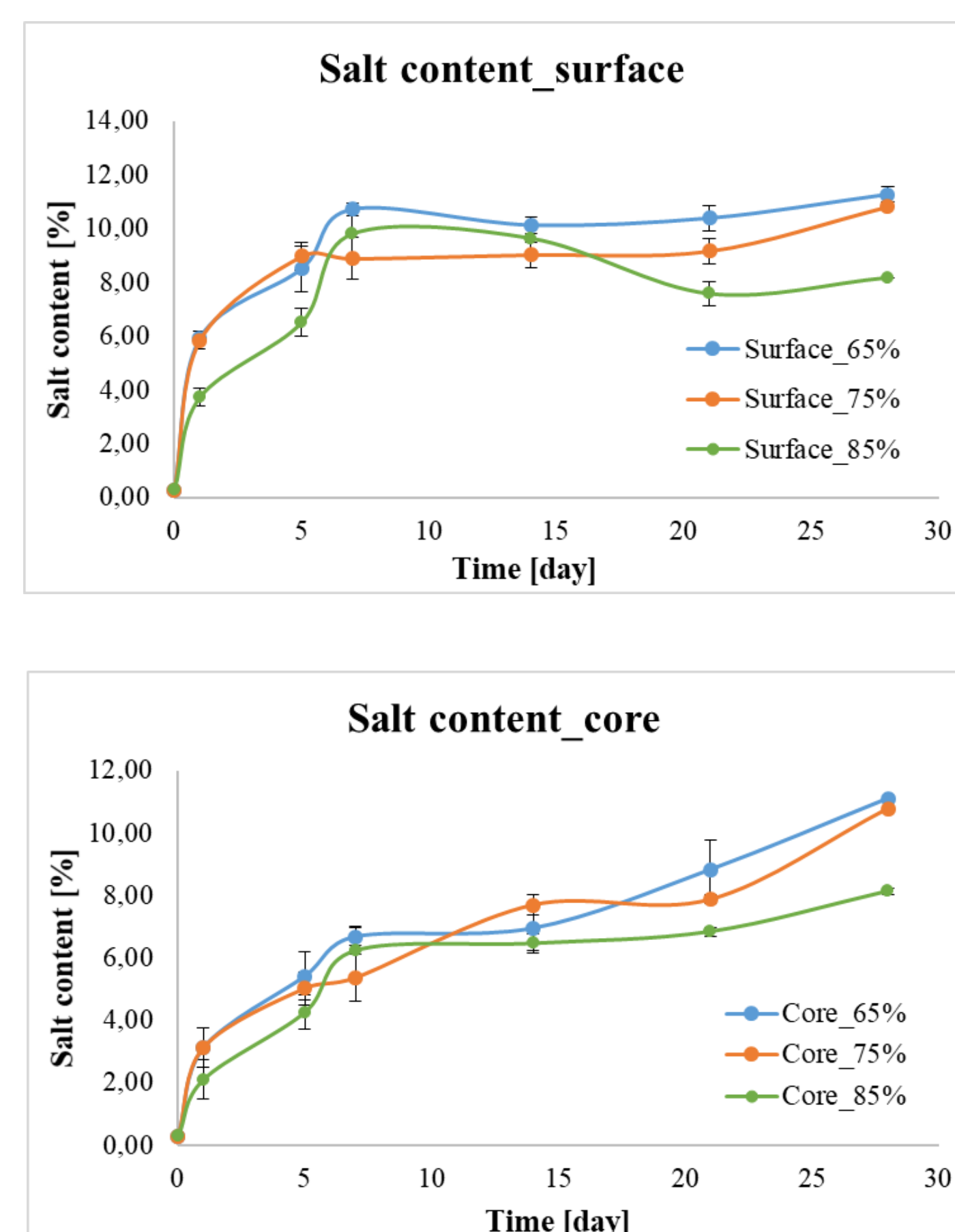
- samples were salted with 10% nitrite salt by weight of meat
- the experiment was carried out in ageing chambers at 65%, 75% and 85% relative humidity and controlled temperature (curing: 3°C, 7 days; ageing: 12°C, 21 days)
- the measurements were carried out on the following days: 0, 1, 5, 7, 14, 21, 28
 - colour measurement (Konica Minolta CR-400)
 - NaCl content (Mohr method)
 - water activity (LabMaster-aw neo)
 - protein denaturation (Setaram MicroDSC III)
 - meat tissue microstructure (Thermo Scientific™ Prisma™ E SEM)



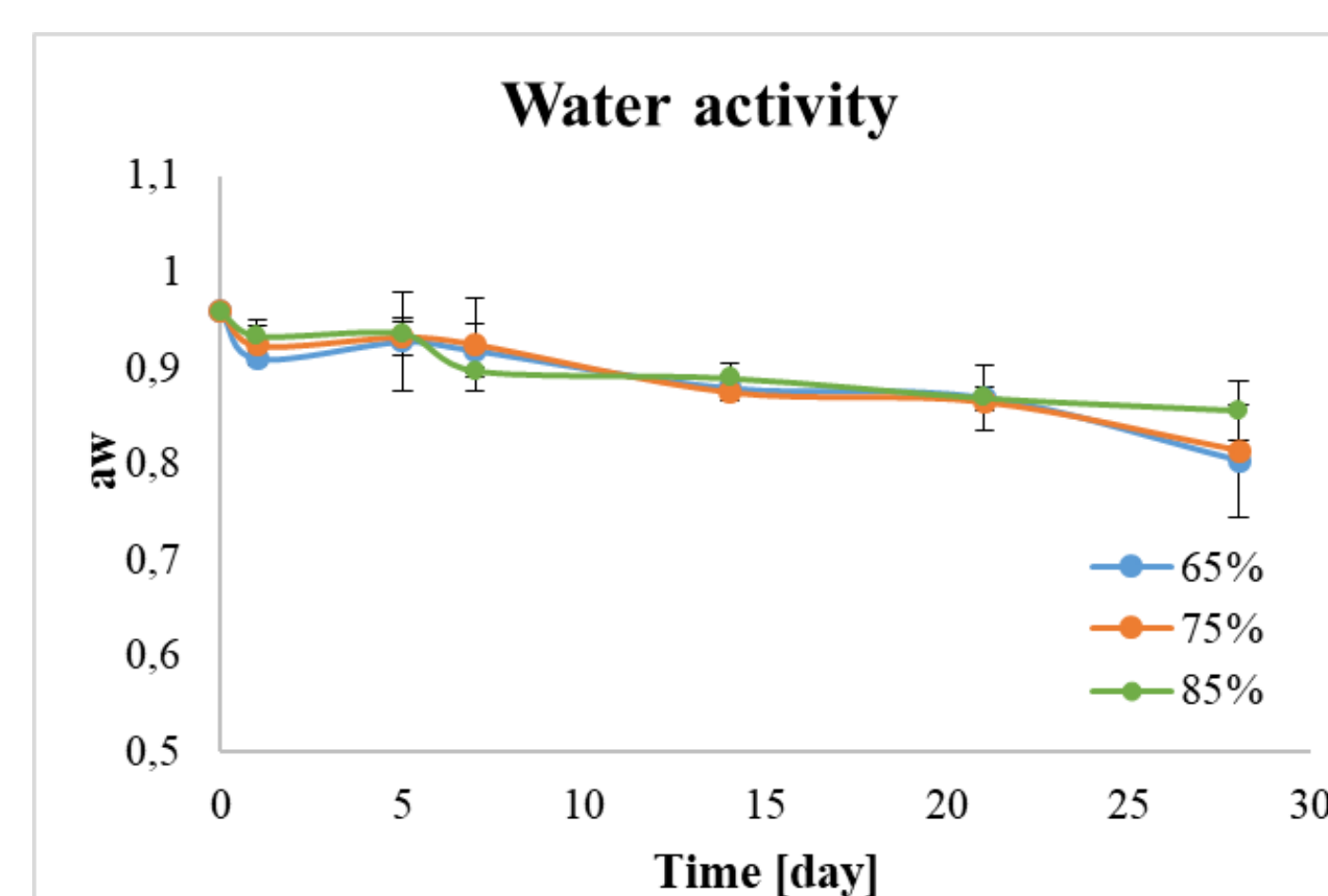
RESULTS - Colour



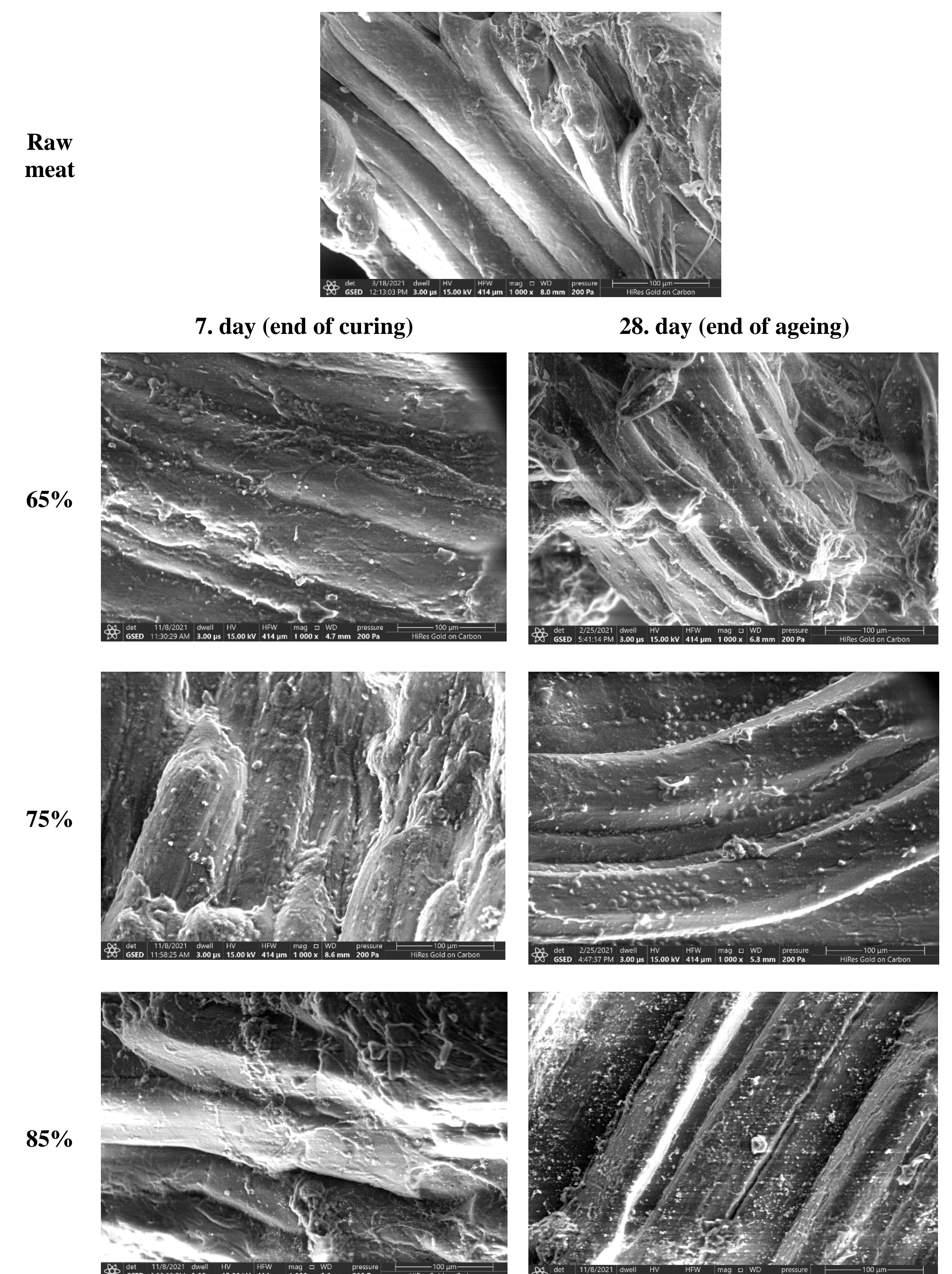
RESULTS – Salt content



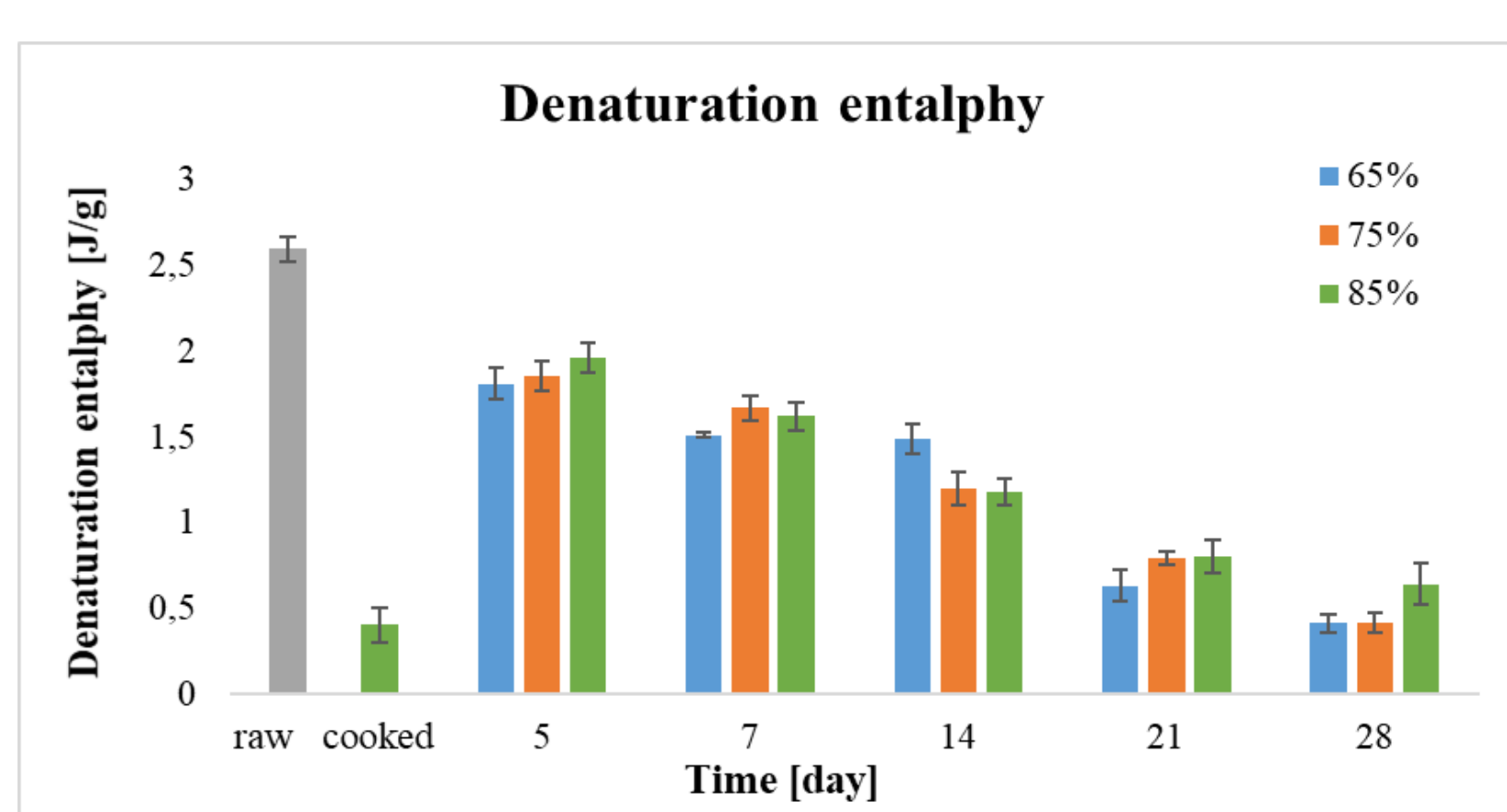
RESULTS – Water activity



RESULTS – Electron microscopy



RESULTS – DSC



CONCLUSION

At the end of the experiment, the NaCl contents of the samples treated at three different relative humidity levels were 8-9 g/100 g, but there were no significant differences between the samples. For meat samples cured and aged at lower relative humidity, salt and water diffusion was found to be faster. There were no significant differences in water activity values between samples with 65%, 75% and 85% relative humidity. At the end of the ageing period, colour differences between the 65%, 75% and 85% samples appeared, which were already statistically significant, mainly in the red (a*) colour. The measurements of protein denaturation show that relative humidity has no significant effect on the changes in the state of meat proteins. This change is due to the effect of curing, which denatures the proteins. The SEM images show the swelling of muscle fibres due to the curing in addition to the forming of salt crystals. During the ageing process, the muscle bundles dehydrate, making it difficult to see the sharp boundaries between the fibres.

In conclusion, 75% relative humidity is the ideal treatment for the curing and ageing of pork loin.

Acknowledgements: This work was supported by the Thematic Excellence Program TKP2020-NKA-16 of the Hungarian University of Agriculture and Life Science, awarded by the Ministry for Innovation and Technology. The authors acknowledge the Hungarian University of Agriculture and Life Sciences's Doctoral School of Food Science for the support in this study.