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The effect of wrapping veal carcasses in viscose foil on some carcass and meat quality traits

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ABSTRACT

Fifty veal calves were used to study the effect of wrapping carcasses in viscose foil on carcass and meat quality traits. Half of them were wrapped in viscose foil before they were exposed to chilling, and half of them served as a control. Veal calves were around 4 months old at slaughter and reached on average 84 kg warm carcass weight. After 24 hours of conventional chilling wrapped veal calves had for 0.45 kg or 0.5% lower (P<001) chilling loos and 0.1 lower (P<0.001) pH value in longissimus dorsi muscle. Wrapping had no significant (P>0.05) effect on meat colour of flenk muscle.
(Keywords: calves, chilling, meat quality)

INTRODUCTION

Veal meat production is an important part of cattle production in Slovenia. In 2009 from 36,943 t of total beef and veal meat harvested in abattoirs, 5.9% represented veal meat (*SURS,* 2010). Slaughtered calves represented 19.4% of total number of slaughtered cattle. Veal meat production in Slovenia is characterised by slaughtering of very young calves. The average carcass weight of slaughtered calves in Slovenia in 2009 was only 89 kg. The main reason for slaughtering so young and light calves is that consumers favour light coloured pink meat.

Valin (1991) stated that veal colour was always considered as a quality characteristic. Moreover, tenderness was the most important veal quality characteristic at the consumer level. Also *Glitsch* (2000) found out in the consumer survey, carried out in six European countries, that meat colour is one of the most important intrinsic quality indicators of meat. Meat colour is defined by many factors like animal genetics, ante- and post-mortem conditions, fundamental muscle chemistry, and many factors related to meat processing, packaging, distribution, storage, display, and final preparation for consumption (*Mancini and Hunt,* 2005).

There are numerous publications concerning veal feeding and well being due to the fact that in the past a number of changes in veal meat production system occurred (*Ngapo and Gariepy,* 2006). The most important change was the introduction and acceptance of grain-fed, heavier calves and a move from individual pens to group housing owing to well being of animals and public perception of such production systems. Proper consumer education towards the purchase of welfare friendly beef and veal meat as stated by *Cozzi et al*. (2009) appears to be one of the most important tools for further development of animal friendly production systems. Consumers give increasing importance to the extrinsic quality attributes of meat in response to increasing concerns on safety, health, ethical factors, etc. (*Bernues et al.,* 2003), which seems promising.

On the other hand less attention has been devoted to post-slaughter management of veal calves carcasses. Chilling rate affects carcass weight losses as well as meat quality traits together with the rate and extent of pH-fall (*Honikel,* 2004a, *Savell et al.,* 2005). Adjusted pH-fall and temperature-fall are extremely important to prevent cold shortening (*Honikel,* 2004b). This is of special importance in calves because they chill very rapidly due to their low carcass weight and absence of significant subcutaneous fat.

In our paper we study the effect of wrapping veal carcasses in viscose folia to prevent rapid chilling on carcass chilling losses and meat colour.

MATERIALS AND METHODS

Fifty veal male Holstein calves were slaughtered in commercial slaughterhouse in a common procedure. Thirty minutes after slaughter warm carcass weight was recorded and veal calves were randomly arranged into two groups. Half of the veal calves were wrapped in viscose foil. Wrapping was started at hind shank and continued around the carcass and downwards to the neck to completely cover the carcass and to make some kind of carcass isolation. The other half of the veal calves served as a control. Conformation and fatness were estimated according to EUROP system. Carcasses of the veal calves were subsequently moved into chilling room. They were conventionally chilled for the next 24 hours (temperature 0 °C, wind speed 0.5 m/s). After 24 hours, carcasses were weighted again and chilling losses were calculated. pH_{24} (Metler, Toledo) was measured in *longissimus dorsi* muscle between last thoracic and first lumbar vertebra. Meat colour was measured on flenk muscle with Minolta CR300 colorimeter and expressed as CIE Lab values. Statistical analysis was performed by SAS statistical package (*SAS,* 2001) with TTEST procedure.

RESULTS AND DISCUSSION

In *Table 1* carcass traits of veal calves are presented. Veal calves were about 4 months old at slaughter and had 85 kg warm carcass weight in wrapped and 82 kg in unwrapped group. There were no significant differences between both groups of veal calves. Estimated conformation was 2.4 on average (between O and R class) in both groups. All slaughtered veal calves were classified into fatness class 2. Chilling loos in unwrapped group was 1.78 kg or 2.09%, whereas in wrapped group amounted only to 1.33 kg or 1.60%. Both differences were highly ($P<0.001$) significant. These chilling losses are relatively low compared to those reported by *Mandell et al.* (2001). They reported chilling losses from 2.4 to 3.1% in veal carcasses from 164 to 201 kg hot carcass weight. *Pommier et al.* (1995) reported chilling losses from 1 to 1.4%, but for veal calves with hide-on and hot carcass weight around 124 kg. So chilling losses found in present experiment are intermediate between those reported by *Pommier et al.* (1995) and *Mandell et al.* (2001).

In *Table 2* mean value for pH_{24} value and meat colour are presented. pH_{24} value in *longissimus dorsi* muscle was in unwrapped group 5.95 and in wrapped one 5.85. The difference between both groups was highly ($P<0.001$) significant. Hence the wrapping of the carcasses influenced the rate of pH-fall. In contrast, wrapping had no effect on meat colour measured on abdominal muscle. There were no significant differences between both groups in L, a and b values. Similar results were found by *Klont et al.* (1999) who reported that veal carcass colour was not related to the observed variation in post-mortem pH and temperature in the *longissimus lumborum* muscle.

Table 1

Mean value and standard deviation for some carcass and meat traits of wrapped and unwrapped veal calves

	Unwrapped n=25		Wrapped n=25		Effect of wrapping
	$\bar{x}$	SD	$\bar{x}$	SD	
Age, days	124	16	130	21	NS
Warm carcass weight, kg	85.28	6.50	82.52	6.62	NS
EUROP - conformation[1]	2.40	0.50	2.40	0.50	NS
EUROP – fatness	2.00	0	2.00	0	NS
Cold carcass weight, kg	83.50	6.47	81.19	6.47	NS
Chilling losses, kg	1.78	0.32	1.33	0.34	***
Chilling losses, %	2.09	0.39	1.60	0.37	***

[1] E=5, U=4, R=3, O=2, P=1; NS: P>0.05; *** P<0.001

Table 2

Mean value and standard deviation for pH_{24} and meat colour of wrapped and unwrapped veal calves

	Unwrapped n=25		Wrapped n=25		Effect of wrapping
	$\bar{x}$	SD	$\bar{x}$	SD	
pH_{24}	5.95	0.08	5.85	0.09	***
Meat colour, CIE L	50.10	3.46	50.71	3.76	NS
a	12.47	2.28	12.40	2.91	NS
b	6.07	2.11	5.65	3.15	NS

NS: P>0.05, *** P<0.001

CONCLUSIONS

On the basis of the presented results we can conclude that wrapping of veal carcasses in viscose folia can diminish chilling losses for about half percent. At the same time it accelerated post mortem glycolysis in *longissimus dorsi* muscle but it had no effect on meat colour of flank muscle.

REFERENCES

Bernues, A., Olaizola, A., Concoran, K. (2003). Extrinsic attributes of red meat as indicators of quality in Europe: an application for market segmentation. Food Quality and Preference. 14. 265-276.

Cozzi, G., Brscic, M., Gottardo, F. (2009). Main critical factors affecting the welfare of beef cattle and veal calves raised under intensive rearing systems in Italy: a review. Ital. J. Anim. Sci., 8 67-80.

Glitsch, K. (2000). Consumer perception of fresh meat quality: Cross-national comparison. British Food J., 102. 3. 177-194.

Honikel, K.O. (2004a). Glycolosis. In: Encyclopedia of meat science. W.K. Jensen, C. Devine, M. Dikeman (eds.) Elsevier Academic Press, Amsterdam.

Honikel, K.O. (2004b). Cold and heat shortening. In: Encyclopedia of meat science. W.K. Jensen, C. Devine, M. Dikeman (eds.) Elsevier Academic Press, Amsterdam.

Klont, R.E, Barnier, V.M.H., Smulders, F.J.M., Van Dijk, A., Hoving-Bolink, A.H., Eikelenboo, G. (1999). Post-mortem variation in pH, temperature, and colour profiles of veal carcasses in relation to breed, blood haemoglobin content, and carcass characteristics. Meat Sci., 53. 195-202.

Mancini, R.C., Hunt, M.C. (2005). Current research in meat color. Meat Sci., 71. 100-121.

Mandell, I.B., Maclaurin, T., Buttenhan, S. (2001). Effects of carcass weight class and postmortem aging on carcass characteristics and sensory attributes in grain-fed veal. J. Food Sci., 66. 5. 762–769.

Ngapo, T.M., Gariepy, C. (2006). Factors affecting the meat quality of veal. J. Sci. Food Agric., 86. 1412-1431.

Pommier, S.A., Lapierret, H., de Passill, A.M., Gariepy, C. (1995). Control of the bioavailability of iron in heavy veal production by different feeding management systems: Use of Ca-EDTA as an iron chelating agent. Can. J. Anim. Sci., 75. 37-44.

Savell, J.W., Mueller, S.L., Baird, B.E. (2005). The chilling of carcasses. Meat Sci., 70. 449-459.

SURS (2010). http://www.stat.si

SAS (2001). System for Windows, Release 8.02, SAS Institute Inc., Cary, North Carolina, USA.

Valin, C. (1991). Biochemical muscle characteristics and veal quality traits. In: New trends in veal calf production. J.H.M. Metz and C. M. Groenestein (eds.) Pudoc, Wageningen.

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