

# LIPIDS AND GLUTATHIONE-DEPENDENT ENZYMES IN THE PIG NECK



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## 1. ABSTRACT

A pig neck is meat predominantly used for barbecues and the amount of lipids and cholesterol in relation to the activities of lipid peroxide reducing enzymes is important also for the prevention of oxysterol formation during a thermal preparation. We examined lipid peroxide reducing enzymes activities in the pig neck as well as the amount of lipids and cholesterol. We found high activity of both selenium-dependent glutathione peroxidase (GSH-Px; EC 1.11.1.9) and glutathione reductase (GR; EC 1.6.4.2) enzymes in the pig neck as well as high content of lipids and cholesterol.

## 3. MATERIALS AND METHODS

Meat samples were taken from five pigs (Swedish Landrace, fed for 145 -160 days, being slaughtered at body mass of 95-115 kg). Male pigs were in the period foreseen for castration, i.e. two weeks after farrowing. All pigs were fed with feed mixture (up to 3 kg daily), composition of which is shown in Table 1.

Fat content was determined according by JUS ISO method (1992) and cholesterol content was determined according to the method from China meat research centre (2000). Meat glutathione dependent enzyme activities were determined using a Shimadzu UV-160 spectrophotometer, according to the methods described by Nikolić *et al.*, (2006).

**Table 1.** Feed composition for pigs

	Pre-starter	Starter	Grower	Finisher I (25-60 kg)	Finisher II (60-100 kg)
Dry maize, grain	52.60	57.25	62.90	21.19	12.55
Maize silage, grain	-	-	-	30.00	37.00
Feed meal	-	3.00	3.0	5.00	10.00
Wheat	-	3.00	4.0	20.00	22.00
Sucrose	4.00	-	-	-	-
Soybean meal	20.60	16.40	19.3	12.50	11.50
Sunflower meal	-	2.50	3.5	3.50	3.50
Fish meal	5.00	4.50	4.0	2.50	-
Soybean groats	10.00	10.00	-	-	-
Premix (Prasilac)	5.00	-	-	-	-
Calcium carbonate	0.60	0.70	0.8	0.70	0.90
Dicalcium phosphate	1.20	1.20	1.0	0.90	0.80
Sodium chloride	0.10	0.10	0.2	0.31	0.40
Premix (vitamin-mineral)	0.50	1.00	1.0	1.00	1.00
Lysine	-	0.10	0.05	0.15	0.10
Minazel (Adsorbent)	0.40	0.25	0.25	0.25	0.25
Total	100.00 kg	100.00 kg	100.00 kg	100.00 kg	100.00 kg

## 5. CONCLUSIONS

We found high activity of the both (GSH-Px and GR) enzymes in the pig neck as well as high content of lipids and cholesterol. Balanced activity of GSH-Px and GR and lipid and cholesterol content in pig neck favour this type of meat for a thermal preparation such as barbecue.

## ACKNOWLEDGMENTS

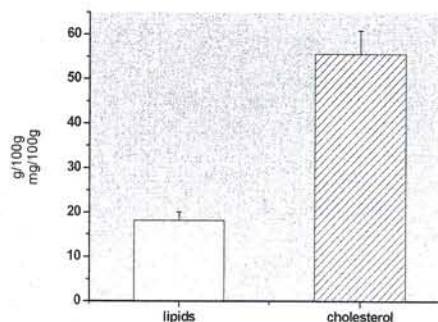
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## 2. INTRODUCTION

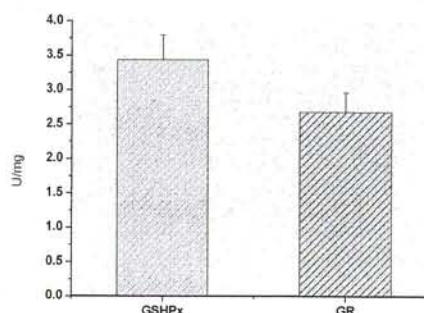
Pork neck is consisted of several muscles with typically red fibers that have expressed intensive oxidative metabolism. Organism deposits a large amount of fat in this area, especially intramuscular fats, which contribute to desirable sensory properties such as softness and tenderness. Lipid peroxides are a substrate for the selenium-dependent glutathione peroxidase (GSH-Px; EC 1.11.1.9). Glutathione reductase (GR; EC 1.6.4.2) catalyses the reduction of oxidised glutathione (GSSG) back into reduced glutathione (GSH), the latter being the co-substrate of GSH-Px (Nikolic *et al.*, 2006).

The aim of this work was to determine lipid peroxide reducing enzymes activities (GSH-Px and GR) in the pig neck as well as the amount of lipids and cholesterol. Our results are discussed in relation to the balance between synthesis, oxidation, and intracellular transport of fatty acids in muscles as the main factor responsible for muscle lipid content variations in animals undergoing a normal growth.

## 4. RESULTS



**Figure 1.** Lipids and cholesterol in pig neck ( $\bar{x} \pm SD$ )



**Figure 2.** Glutathione dependent enzymes in in pig neck ( $\bar{x} \pm SD$ )

## 6. REFERENCES

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- JUS ISO 1443/1992. Meat and meat products-Determination of total fat content (in Serbian)
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