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QUALITATIVE AND QUANTITATIVE CHARACTERISTICS OF NEW ZEALAND WHITE RABBIT MEAT

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SUMMARY

New Zealand white rabbits were used as a material for the study. Rabbits were fed ad libitum with commercial pelleted feed, with the addition of small amounts of green feed and hay. The experiment included 30 rabbits, 15 males and 15 females. Previously defined live weight of 1800 to 2000 g was achieved within 75 days and after that they were immolated. Study results presented in this paper show fattening and slaughter properties of New Zealand white rabbit, as well as meat composition and meat. The achieved average weight of male rabbits was 1963.67 g and meat-to-bone ratio was 44.93%, 1907.00 g and 45.08% respectively in female rabbits. Average participation of the lower part of the body in male/female rabbits was 33.27% / 32.34%, back part 34.90% / 34.43%, and front part 22.57% / 22.45%. Average water content in

the meat of male/female rabbits was 74.93% / 74.39%; protein content 22.02% / 21.79%; fat content 0.48% / 0.96%, and content of the minerals 1.26% / 1.17%.

Key words: New Zealand white rabbit, meat quality

INTRODUCTION

Constant growth of human population all over the world imposes the obligation of intensification of food production, primarily of biologically most valuable proteins. Rabbit breeding in this concept of food production is very important. A large number of pure and hybrid breeds are used in the production of rabbit meat. New Zealand white rabbit is the prevailing breed in Bosnia and Herzegovina, and it is used exclusively for meat production.

In general, basic characteristics of rabbits are high fertil-

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ity, very intensive growth, high biological value of meat and high feed conversion rate (Hammond and Marshall, 1925; Harned and Casida, 1969; Hafez, 1970; Urošević et al., 1983; Urošević et al., 2000; Škandro et al., 2004; Kapitan, 2006). Special attention should be paid to rabbit nutrition in order to obtain these results. Best feed for a rabbit is industrially produced pelleted feed based on cereals and other agricultural cultures, with the addition of vitamins, minerals and protective agents. Control of hygienic quality of rabbit feed is of utmost importance (Dodaci, 2001, Sinovec and Šefer, 2005).

Fattening and slaughter properties of rabbits have been widely investigated (Kovačević and Rašeta, 1983; Gjurić, 1985; Čaklovica et al. 1986; Urošević et al., 1986; Tafo et al., 1989; Omrčen, 1995; Panić et al., 1986; Panić and Petrović, 1989; Škandro et al., 2004; Tarig, 2007). Chemical composition of rabbit meat has been especially investigated (Ouhayoun, 1974; Živković and Hadžiosmanović, 1976; Dickerson, 1978; Adrian et al., 1981; Paunović, 1984; Rajić and Ševković, 1984; Panić et al., 1986a, b; Urošević et al., 1986; Dalle Zotte et al., 1996; Hernández et al., 1998; Gondret et al, 1998; Wood et al., 2003; Pascual et al, 2004; Polak et al., 2006, and Ali, 2007). Study results gave the following values: water content 59.85 to 75.40%, protein content 18.20 to 25.0%, fat content 0.30-18.45%, mineral substances 0.40-4.01%, including significant amounts of group B vitamins, depending on the rabbit age and fattening status. Furthermore, according to some recently conducted studies the composition of fat, fatty acids respectively, in rabbit meat is the following: monounsaturated acids 34.15%, polyunsaturated acids 25.10%, and saturated fatty acids 40.9% (Polak et al., 2006). However, whatever the variations, this meat has an exceptionally favourable ratio of proteins and fat in comparison with other types of meat. Optimum indicator of rabbit meat quality is its exceptionally low cholesterol level, that ranges between 45 and 85 mg/100 g of fresh meat (Živković and Hadžiosmanović, 1976; Lukefahr et al., 1989; Lukefahr and Ozimba, 1991; Sourci et al., 2000; Dalle Zote, 2002; Polak et al., 2006). Consequently, the structure of rabbit meat makes it an almost ideal food for human consumption in comparison to other types of commonly used meat.

Good digestibility of 90% (Paunović, 1984), high protein content and lower caloric value (427-849 kJ/100 g of fresh meat), makes the rabbit meat equally suitable for patients, pregnant and nursing women, children and others whose goal is healthy food (Adrian et al., 1981; Rajić and Ševković, 1984; Gjurić, 1985; Grahovac and Kurtov, 1997; Štruklec and Kermauner, 1997; Dalle Zotte, 2002).

Considering the taste and appearance of rabbit meat and relatively easy preparation for various meals (Škandro,

1998), it stands to reason why this type of meat is popular and widely represented in human diet in many countries all over the world. However, the tradition of use of rabbit meat has not been established in our regions, particularly as regards the preparation of certain special local meals.

The objective of this work was to present both the fattening and slaughter properties and composition of meat of New Zealand white rabbit, based on this study results and available literature data.

MATERIAL AND METHODS

New Zealand white rabbits were used as a material for the study. The investigation included 30 rabbits, 15 males and 15 females. The animals were fed ad libitum with commercial pelleted feed, i.e. complete feed mix for rabbit fattening, and with the addition of small amounts of green feed and hay.

Until reaching the planned body weight of 1800 -2000 g, the animals were kept in individual cages. Feed was withdrawn 20 hours before slaughter. After the veterinary examination and stunning, each animal was bled by cutting of the neck blood vessels (H.Beganović, 1983; Gjurić, 1985; Regulations – Directive, 1992; Škandro et al., 2004; Ali, 2007). Cooled carcasses with internal organs (heart, lungs, liver and spleen) were weighed and then cut in three parts, hind, back and fore part.

Meat samples for chemical analyses were transported to a laboratory in a portable refrigerator. Chemical analysis included the following assays: water content by drying to constant weight, fat content by extraction method after Grossfeld, protein content after Kjeldahl's method, and ash content by ignition in a furnace at 440°C (AOAC, 1998; Regulations – Directive, 1992).

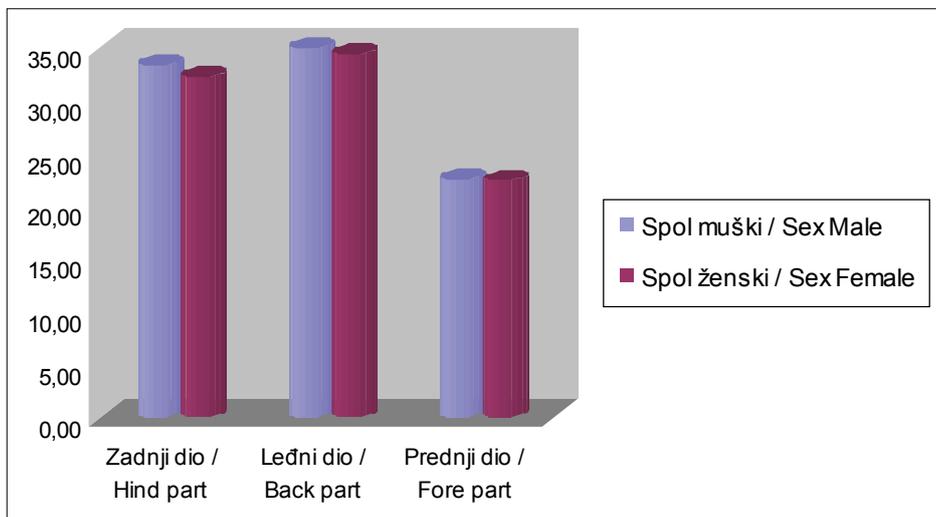
Meat-to-bone ratio (slaughter weight expressed in percentage) was calculated in compliance with the recommended processing procedure (Gjurić, 1985, Čaklovica et al., 1986, Omrčen, 1995, Škandro et al., 2004, Ali, 2007).

Descriptive statistical data processing was carried out using the computer program Microsoft Excel® 2003 (Microsoft Inc., USA). Study results were compared with similar results reported in both the national and foreign publications.

▼ **Table 1.** Live weight and meat-to-bone ratio in male/female rabbits

	Srednja vrijednost	
	MALE	FEMALE
LIVE WEIGHT (g)	1963,67	1907,00
MEAT-TO-BONE RATIO (%)	44,93	45,08

▼ **Graph 1.** Participation of major meat categories in carcass composition (Mean values)



22.57% / 22.45% on average, respectively. Results obtained in this study are similar to results reported by other authors (Gjurić, 1985; Panić et al. 1986; Panić and Petrović, 1989; Škandro et al., 2004; Ali, 2007). Their results showed the following range: hind part 31.4 - 36.5%, back part 34.0 - 39.3%, and fore part 22 - 24%.

Values recorded in meat samples of male/female rabbits were as follows: water content 74.93% / 74.39%, protein content 22.02% / 21.79%, fat content 0.48% / 0.96%, and content of mineral

RESULTS AND DISCUSSION

Mean values of live weight of male/female rabbits after completion of 75-day-fattening period are presented in Table 1. It is evident that mean values of live weight recorded in this study are slightly higher compared to the findings of other authors who reported a live weight of 1850.00 g for that age category of rabbits (Tafro et al., 1989). In comparison with female rabbits, males had a higher live weight, what is consistent with the results reported by Čaklović et al. (1986).

Mean values of meat-to-bone ratio (slaughter weight in %) in male/female rabbits amounted to 44.93% / 45.08% (Table 1) and are similar to results reported by other authors, range 40 to 51% (Gjurić, 1985; Čaklović et al., 1986; Omrčen, 1995; Škandro et al., 2004; Ali, 2007). Higher meat yield was recorded in female animals, identically as in other studies (Kovačević and Rašeta, 1983, Urošević et al, 1986, Ali, 2007).

Graph 1 presents the proportion of major meat categories in the composition of male and female carcasses. In male/female rabbits the hind part of carcass accounted for 33.27% / 32.34%, back part 34.9% / 34.43%, fore part

22.57% / 22.45% (Table 2). These results are in accordance with those reported by other authors (Ouhayoun, 1974; Živković and Hadžiosmanović, 1976; Dickerson, 1978; Adrian et al., 1981; Paunović, 1984; Rajić and Ševković, 1984; Panić et al., 1986a and b; Urošević et al., 1986; Dalle Zotte et al., 1996; Hernández et al., 1998; Gondret et al., 1998; Wood et al., 2003; Pascual et al, 2004; Polak et al., 2006; Ali, 2007). The above mentioned authors reported the following average values: water content between 59.85 and 75.46%, protein content between 18.20 and 25.0%, fat content between 0.30 and 18.45%, and content of mineral substances between 0.40 and 4.01%. With regard to animal sex, males had higher contents of water, proteins and mineral substances in comparison with female rabbits. On the other hand, female rabbits had a higher fat content than male rabbits, as reported by other authors as well (Dalle Zotte et al., 1996; Gondret et al., 1998; Polak et al., 2006, Ali 2007).

CONCLUSION

Based on results of investigation of qualitative and quantitative characteristics of meat of New Zealand white

▼ **Tablica 2.** Rezultati kemijske pretrage uzoraka mesa kunića (%)

Values	Water %		Proteins %		Fat %		Mineral compound %	
	Male	Female	Male	Female	Male	Female	Male	Female
Mean	74,93	74,39	22,02	21,79	0,48	0,96	1,26	1,17
Minimum	74,00	73,90	21,5	21,2	0,44	0,74	1,19	1,13
Maximum	75,50	74,80	22,9	22,5	0,54	1,15	1,32	1,22

rabbit, it may be concluded as follows:

- Average carcass dressing percentage, without head, was higher in female rabbits,
- Participation of hind and back parts, considered as the most qualitative parts of meat in dressed and cooled carcass, was higher in male rabbits,
- Results of chemical analyses of rabbit meat confirmed its high protein value and significantly low fat content,
- There were no significant differences between sexes as regards basic chemical composition of rabbit meat.

ZUSAMMENFASSUNG QUALITATIV-QUANTITATIVE EIGENSCHAFTEN DES FLEISCHES VON NEUSEELÄNDISCHEN WEISSEN KANINCHEN

Als Material für das Experiment dienten die Einzelwesen der neuseeländischen weißen Kaninchen, die ad libitum mit pelletiertem Industriefutter mit Zusatz von kleineren Grünfütter- und Heumengen gefüttert wurden. Das Experiment umschloss 30 Kaninchen, 15 Männchen und 15 Weibchen. Die Kaninchen erreichten die definierte lebendige Masse von 1800 bis 2000 g innerhalb 75 Tage, danach wurden sie geschlachtet. In dieser Arbeit sind die Untersuchungsergebnisse der Zucht- und Schlachteigenschaften dargestellt, sowie Zusammensetzung und Eigenschaften des Fleisches von neuseeländischen weißen Kaninchen. Die erreichte durchschnittliche lebendige Masse bei männlichen Kaninchen betrug 1963,67 g, randman 44,93 %, bei weiblichen Kaninchen betrug die erreichte durchschnittliche lebendige Masse 1907,00 g, randman 45,08 %. Der durchschnittliche Teil des hinteren Körperteiles betrug bei männlichen/weiblichen Kaninchen 33,27 % / 32,34 %, des Rückenteiles 34,90 % / 34,43 %, des vorderen Teiles 22,57 % / 22,45 %. Der Wassergehalt im Fleisch von männlichen/weiblichen Kaninchen war im Durchschnitt 74,93 % / 74,39 %; Eiweißgehalt 22,02 % / 21,79 %, Fettgehalt 0,48 % / 0,96 %, Mineralgehalt 1,26 % / 1,17 %.

Schlüsselwörter: neuseeländisches weißes Kaninchen, Fleischqualität

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CATTLE DRINKING WATER QUALITY - WELFARE INDICATOR

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SUMMARY

The paper describes the importance of hygienic quality of drinking water and its influence on health, productivity and welfare of cattle. Quality of water from four different sources was determined in a laboratory by testing the organoleptic, physico-chemical and bacteriologic parameters. Samples that were not in compliance with the

requirements of the Croatian standards for drinking water were disinfected, in vitro, with chlorine and hydrogen peroxide based disinfectants. In a field study such disinfected water was offered to cattle. The study results, obtained by monitoring the drinking behaviour of cattle, have shown no preferences of non-disinfected over disinfected water with possible changed taste or odour.

Key words: water, disinfection, watering, cattle

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