

MEAT YIELD OF KIDS OF SERBIAN WHITE BREED DEPENDING ON THE BODY MASS PRIOR TO SLAUGHTERING **

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Abstract: Investigations were carried out on three groups of kids of Serbian White breed as follows: group of lighter kids, average body mass at slaughtering 12,65 kg (8,8 – 15,0 kg) and average age of 70 days; group of medium heavy kids, body mass of 17,61 kg (15,1 – 20,0 kg) and average age of 97 days, and group of heavy kids, body mass prior to slaughtering of 22,70 kg (20,1 – 25,7 kg) and average age of 129 days. Objective of this research was to determine the meat yield (dressing percentage) and share of some slaughtering products in the mass prior to slaughtering and share of giblets in the mass of chilled carcass. It was established that heavier kids have lower dressing percentage (55,01%) compared to lighter (57,21%) and medium heavy kids (58,21%), more favorable conformation evaluation (4,22 points in heavier, 3,77 points in medium heavy and 3,52 points in lighter kids), better covering of carcass with fat tissue (3,71 points in heavier, 3,66 points in medium heavy and 3,32 points in lighter kids) and better evaluation of the meat color (4,78 points in heavier, 4,66 points in medium heavy and 3,79 points in lighter kids). Share of edible giblets/offal (pre-stomach, small intestines, mesenterium) in the mass of carcass prior to slaughtering was higher in lighter kids (6,45%) compared to medium heavy (5,83%) and heavy kids (6,15%). Share of giblets/offal in chilled carcass was the lowest (15,91%) in heavy kids, slightly higher (17,16%) in medium heavy and the highest in lighter kids (18,86%).

Key words: Kids, body mass, meat yield, dressing percentage, carcass evaluation, giblets

Introduction

Kid meat is very important in human nutrition, especially in poor countries. Recently, there is great demand for kid meat because of its high biological value even in countries with high standard of living. In Serbia, no attention was directed to production of kid meat, since after the Second World War, in former Yugoslavia, rearing of goats was forbidden. From seventies of the XX century, interest in rearing of goats has increased, so number of this species of domestic animals is constantly increasing and on the market kids for slaughter predominantly lighter (8 – 12 kg), rarely heavier (above 15 kg) can be found. In domestic scientific literature there is almost no data relating to quality of kidcarcass, so it is useful to establish major properties of the carcass quality, especially depending on the age, and body mass prior to slaughtering. In order to contribute to determination of desired body mass of kids prior to slaughtering, taking into consideration eating habits of consumers (slaughtering of lighter kids), economical interest of producers nad production of meat of satisfactory quality, we carried out numerous researches and results are presented in this paper.

In international and domestic literature there is only few papers presenting results of research of different factors which influence the yield of kid meat. From available literature, we will state papers which relate to the topic/subject of our research. *Donner et al.* (1974) state results obtained in their research of the value of dressing percentage of kids slaughtered with approx. 15 kg of body mass, which were fed mother's milk, milk replacer and concentrate, and based on this data they concluded that kids fed mother's milk had higher dressing percentage. *Fehr et al.* (1975) investigated the effect of age (from 56 to 166 days) at slaughtering and concluded that higher body mass of Alpine breed kids resulted in statistically significant decrease in dressing percentage. *Ćeranić et al.* (1981) determined in kids of Domestic White Improved breed, salughtered with 21 kg, dressing percentage with giblets/offal of 53,39%. *Žujović et al.* (1983) investigated the effect of body mass (10, 15 and 24 kg) prior to slaughtering on meat yield of kids of Domestic White Improved breed and established that lighter kids had higher dressing percentage. *Morand – Fehr et al.* (1985) established that in carcasses of kids of Alpine and Saanen breed, slaughtered at higher body mass (8, 10, 12, 14, 18 and 24 kg) the quantity of fat tissue increased. *Yacoub et al.* (1987) established that body mass of kids prior to slaughtering has considerable effect on on value of dressing percentage. *Samini et al.* (1988) stated data relating to dressing percentage of Barbari and Jamnapari breed kids and concluded that breed had no significant effect on dressing percentage. *Chanin et al.* (1990) established that kids of larger goat breeds realize better dressing percentages. *Žujović et al.* (1998) established that

lighter kids – crosses of Domestic White and Saanen breed have higher dressing percentage than heavier kids. *Žujović et al. (2001)* investigated the effect of body mass of kids prior to slaughtering on major traits of meat quality. *Žujović et al. (2006)* stated that heavier kids have more favorable evaluation of carcass conformation, covering of carcass and kidneys with fat, colour of meat and tallow, and marbling of meat, whereas the structure of meat was better in lighter kids.

Material and methods

Investigations were carried out on goat farms of individual breeders on the territory of Stara Planina mountain, with male kids of Domestic White improved breed (Serbian White goat). Kids were reared with their mothers to weaning (approx. 90 days), and then fed ad libitum with hay and concentrate. For determination of meat yield 41 lighter kids (8,8 – 15,0 kg), 62 medium heavy (15,1 – 20,0 kg) and 34 heavier kids (20,1 – 25,7 kg) were slaughtered.

Body mass prior to slaughtering, also mass of warm carcass with giblets/offal, skin, pre-stomach, small intestines, abomasus and large intestines (content free and washed), front legs (cut at carpal) and rear legs (cut at tarsal joint), mesenterium and other remains (windpipe, sex organs, horns). Kid carcasses with heads, all giblets/offal and peritoneum were measured before cooling. Subsequent to cooling (18 – 20 hours), mass of cooled carcass was measured and carcass evaluated visually (scores from 1 to 5), conformation, covering of carcass and kidneys with fat tissue, colour of meat and tallow, where higher score is given to better properties. Heads were separated, giblets/offal taken out as well as fat tissue and everything was measured. Subsequently mass of carcasses without head and giblets/offal was measured and carcasses were cut along spine, tail remained on the right carcass side, and carcass sides were measured. Obtained data was processed according to method of variance analysis according to *Snedecor and Cochran(1989)*.

Results and discussion

Results of this research indicate that medium heavy kids (average body mass prior to slaughtering 17,61 kg) realize the best meat yield, i.e. higher dressing percentage of cooled carcass (55,85%) compared to light (average body mass prior to slaughtering 12,65 kg) whose dressing percentage was slightly ($P > 0,05$) lower 54,69%, and heavier kids (average body mass prior to

slaughtering 22,70 kg) whose dressing percentage was considerably ($P < 0.05$) lower 52.93% (Table 1).

Table 1. Average age, body mass prior to slaughtering, dressing percentage of carcass, mass and share of certain slaughtering by products of trial kids

Tabela 1. Prosečni uzrast, masa pred klanje, randman trupa, masa i udeo nekih pratećih proizvoda klanja oglednih jaradi

R.B.	Naziv/Name	Lakši/ Lighter		Srednje teški/ Medium heavy		Teški/ Heavy	
1.	Uzrast (dana) pred klanje/ Age (days) at slaughtering	70		97		129	
2.	Masa (kg) pred klanje/ Mass (kg) at slaughtering	12,65		17,61		22,70	
3.	Masa (kg) toplog trupa/ Mas (kg) of warm carcass	7,20		10,13		12,43	
4.	Randman (%) toplog trupa/ Dressing percentage (%) of warm carcass	57,21		58,21		55,01	
5.	Kalo (%) hlađenja/ Loss (%) at cooling	4,42		3,95		3,81	
6.	Masa (kg) hladnog trupa/ Mass (kg) of cooled carcass	6,89		9,83		11,96	
7.	Randman (%) hladnog trupa/ Dressing percentage (%) of cooled carcass	54,69		55,85		52,93	
8.	Jestive iznutrice/ Edible giblets/offal	(kg)	(%)	(kg)	(%)	(kg)	(%)
8.1.	Predželudac (prazan)/ Pre-stomach (empty)	0,28	2,25	0,38	2,12	0,58	2,42
8.2.	Tanka creva (prazna)/ Small intestines (empty)	0,39	3,23	0,49	2,75	0,62	2,75
8.3.	Opornjak (mezenterijum)/ Mesenterium	0,12	0,97	0,16	0,96	0,22	0,98
	Ukupno/Total 8. (8.1 +.. +8.3)	0,79	6,45	1,03	5,83	1,42	6,15
9.	Ostali prateći proizvodi/Other by products						
9.1.	Koža/Skin	0,95	7,74	1,31	7,45	1,66	7,33
9.2.	Sirište/Abomasus	0,10	0,79	0,11	0,62	0,13	0,61
9.3.	Otpadak (debela creva, noge)/Remains (large intestines, legs)	0,94	7,43	1,20	6,77	1,61	7,16
	Ukupno/Total 9. (9.1 + .. + 9.3.)	1,99	15,70	2,62	14,89	3,40	14,98
10.	Gubitak (kalo) pri klanju/Loss at slaughtering	2,77	22,04	3,88	22,07	5,62	24,71

Share of edible giblets/offal (pre-stomach, small intestines, mesenterium) was insignificantly higher (6,45%) in group of lighter kids compared to heavier (6,15%) and medium heavy kids (5,83%). Share of skin was practically the same in all three groups of kids (7,89% in group of lighter kids, 7,45% in group of medium heavy and 7,33% in group of heavy kids). Loss at slaughtering (content of digestion organs, blood) is higher in group of heavy kids (24,71%) compared to other two groups where it was practically the same (22,04% in light and 22,07% in medium heavy kids). Results of these investigations are in accordance with results stated by *Žujović et al.* (1983).

Heavier kids had more fat tissue on carcass, since greater thickness of subcutaneous tallow was determined (Table 2), on breasts (6,59 mm in heavy, 5,69 mm in medium heavy and 4,45 mm in lighter kids), on cross section above the back muscle at the level of 12th and 13th rib (4,49 mm in heavy, 2,23 mm in medium heavy and 1,72 mm in lighter kids) and on lateral side (4,46 mm in heavy, 4,35 mm in medium heavy and 3,17 mm in lighter kids). Difference in thickness of fat tissue of 2,77 mm (the greatest difference) was established between heavy and light kids, but it wasn't statistically significant ($P > 0,05$). Carcasses of heavier kids were evaluated more favorably in regard to conformation (carcasses of heavier kids had more favorable conformation, and medium heavy and lighter kids had medium conformation). Covering of carcass with fat tissue was evaluated with almost same score (slightly better in heavier kids), whereas covering of kidneys was considerably, but not statistically significant ($P > 0,05$) better in heavier kids (77,05%) compared to medium heavy (64,72%) and lighter kids (43,54%). Color of meat (muscle tissue) and color of tallow (kidney) were scored higher in heavier kids. Results of these investigations are in accordance with data stated by *Žujović et al.* (1983) and *Žujović et al.* (2006).

Share of giblets/offal in cooled carcass (Table 3) was statistically considerably ($P < 0,05$) lower in heavier kids (16,47%) compared to light kids (19,45%), whereas in comparison to medium heavy kids (17,14%) difference of 0,64 percentages was not significant ($P > 0,05$). Share of fat tissue (peritoneum and kidney fat) was higher in heavy kids (2,06%) compared to medium heavy (1,80%) and lighter kids (1,45%), but differences weren't statistically significant. Results of our research are in accordance with results stated by *Žujović et al.* (1983).

Table 2. Thickness of fat tissue and kid carcass evaluation**Tabela 2. Debljina masnog tkiva i ocena trupa jaradi**

R. broj/ No.	N a z i v / N a m e	Lakši/ Lighter	Srednje teški / Medium heavy	Teži/ Heavier
1.	Debljina masnog tkiva (mm)/ Thickness of fat tissue (mm)			
1.1.	Na grudima/Breasts	4,45	5,69	6,59
1.2.	Iznad lednog mišića/Above back muscle	1,72	2,93	4,49
1.3.	Na bočnoj strain/On lateral side	3,17	4,35	4,46
2.	Ocena trupa/Carcass evaluation			
2.1.	Konformacija (poena) * / Conformation (points) *	3,52	3,77	4,22
2.2.	Prekrivenost masnim tkivom / Covering with fat tissue of			
2.2.1.	Trupa (poena) **/Carcass (points)**	3,32	3,66	3,71
2.2.2.	Bubrega (%) ***/Kidneys (%)***	43,54	64,72	77,05
2.3.	Boja (poena)/Color (points) of			
2.3.1.	Mesa ****/Meat****	4,07	4,66	4,78
2.3.2.	Loja *****/Tallow****	3,79	4,22	4,41

Napomena/Note:

* Ocena: vrlo povoljna – 5; povoljna – 4; osrednja – 3; slaba – 2; loša – 1/ Score: very favorable – 5; favorable – 4; medium – 3; poor – 2; bad – 1

** Ocena: ravnomerna, debljina loja do 5 mm – 5; mestimično nema loja, debljina loja do 5 mm – 4; veće površine bez loja – 3; dosta velike površine bez loja i loj deblji od 5 mm – 2; trup skoro bez loja, debljina loja do 1 mm – 1 / Score: even - uniform, tallow thickness to 5 mm – 5; partially no tallow, tallow thickness to 5 mm – 4; more area without tallow – 3; substantial surface without tallow and tallow thicker than 5 mm – 2; carcass almost without any tallow, tallow thickness to 1 mm – 1

*** Ocena: 100% - bubreg potpuno prekriven lojem; 75% - lojem prekriveno oko 2/3 površine bubrega; 50% - lojem prekriveno oko 1/2 površine bubrega; 25% - lojem prekriveno oko 1/4 površine bubrega / Score: 100% - kidney fully covered with tallow; 75% - 2/3 of the kidney surface covered with tallow; 50% - 1/2 of the kidney surface covered with tallow; 25% - 1/4 of kidney surface covered with tallow

**** Ocena: svetlo crvena – 5; ružičasta – 4; svetloružičasta – 3; bledoružičasta - 2; tamna – 1/ Score: light red – 5; pink – 4; light pink – 3; pale pink - 2; dark – 1

***** Ocena: bela – 5; krem – 4; crvenkasta – 3; crvenokrem – 2; žutocrvena – 1 / Score: white – 5; light brown – 4; redish – 3; red-brown – 2; yellow-red – 1

Table 3. Mass and share of giblets/offal and fat tissue in cooled kid carcasse
Tabela 3. Masa i udeo iznutrica i masnog tkiva u ohlađenom trupu jaradi

Naziv/Name		Lakši/Lighter		Srednje teški/ Medium heavy		Teški/Heavier	
		(kg)	(%)	(kg)	(%)	(kg)	(%)
	Masa hladnog trupa sa iznutricama/Mass of cooled carcass with giblets/offal	6,889		9,829		11,959	
1	Iznutrice / Giblets						
1.1.	Glava/Head	0,618	8,97	0,774	7,87	0,894	7,49
1.2.	Jetra/Liver	0,292	4,24	0,404	4,08	0,501	4,18
1.3.	Pluća/Lungs	0,280	4,06	0,308	3,13	0,351	2,91
1.4.	Srce/Heart	0,056	0,82	0,080	0,79	0,094	0,77
1.5.	Slezina/Spleen	0,035	0,51	0,043	0,44	0,044	0,37
1.6.	Bubrezi/Kidneys	0,058	0,84	0,076	0,76	0,086	0,72
	Ukupno/Total 1 (1.1. + ... + 1.6.)	1,339	19,45	1,685	17,14	1,970	16,47
2	Masno tkivo/Fat tissue						
2.1.	Maramica/Peritoneum	0,054	0,78	0,094	0,95	0,139	1,17
2.2.	Bubrežno/Kidney fat	0,046	0,66	0,084	0,85	0,107	0,89
	Ukupno/Total 2 (2.1 + 2.2)	0,100	1,45	0,178	1,80	0,246	2,06
	Ukupno/Total 1 + 2	1,439	20,89	1,863	19,94	2,216	18,53
	Trup bez glave, iznutrica i masnog tkiva/Carcass without head, giblets and fat tissue	5,201		7,767		9,459	

Conclusion

Based on results obtained in the research of the effect of body mass of kids prior to slaughtering on meat yield, carcass evaluation and share of giblets/offal in cooled carcass, the following can be concluded:

- heavier kids have more favorable carcass evaluation in regard to conformation, covering of carcass and kidneys with fat tissue and lower share of giblets/offal (head, lungs, liver, heart) in cooled carcass;
- advantage of any of the weight groups of kids could not be established in regard to share of edible giblets (pre-stomach, small intestines), mass prior to slaughtering or scores for color of meat and tallow;

- lighter kids had higher dressing percentage (better meat yield), less fat tissue on carcass (covering of carcass and kidneys with fat tissue) and lower share of fat tissue (peritoneum, kidney fat) in cooled carcass;
- considering that medium heavy kids (average body mass prior to slaughtering 17,61 kg) had more favorable commercial value of carcass, kids bellow 15,00 kg should not be slaughtered.

Prinos mesa jaradi srpske bele koze u zavisnosti od telesne mase pre klanja

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Rezime

Ispitivanja su obavljena na tri grupe jaradi srpske bele koze i to: lakših, prosečne telesne mase pri kalanju 12,654 kg (8,8 – 15,0 kg) i prosečnog uzrasta od 70 dana; srednje teških telesne mase 17,61 kg (15,1 – 20,0 kg) i prosečnog uzrasta 97 dana i teških telesne mase pred klanje 22,70 kg (20,1 – 25,7 kg) i prosečnog uzrasta 129 dana. Cilj ovih ispitivanja bio je da se utvrdi prinos mesa (randman) i udeo nekih pratećih proizvoda klanja u masi pred klanje i udeo iznutrica u masi ohlađenog trupa. Utvrđeno je da teža jarad imaju manji randman (55,01%) u odnosu na lakše (57,21%) i srednje teške (58,21%), povoljniju ocenu konformacije (4,22 poena u težih, 3,77 poena u srednje teških i 3,52 poena u lakših), bolju prekrivenost trupa masnim tkivom (3,71 poena u težih, 3,66 poena u srednje teških i 3,32 poena u lakih) i bolju ocenu boje mesa (4,78 poena u reških, 4,66 poena u srednje teških i 3,79 poena u lakših). Udeo jestivih iznutrica (predželudac, tanka creva, opornjak) u masi trupa pred klanje je veći u lakih jaradi (4,45%) u poređenju sa srednje teškim (5,83%) i teškim jaradima (6,15%). Udeo iznutrica u ohlađenom trupu je najmanji (15,91%) u teških, nešto veći (17,16%) u srednje teških i najveći (18,86%) u lakih jaradi.

Ključne reči: Jarad, masa trupa, prinos mesa, randman, ocena trupa, iznutrice

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