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Research Article

The Effects of Stocking Density on Some Meat Quality Parameters and Taste of Meat Turkeys

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Abstract. One of the most important factors in turkey meat production is the effects of stocking density on meat quality as it is a favored source of animal protein consumed in the world as it is in our country. This issue, may have important effects on meat quality, is also regarded as a parameter that can make a difference in terms of meat flavor. In the study, the subject was worked on both sides. In the study, Hybrid Converter white meat turkey poults were used after numbering right after hatch. The study was carried out on 200 turkeys with 30, 40, 50 and 60 kg live weights per square meter, with 25 different poults per pen, separated by male and female in different sized pens. The study was carried out for 16 weeks in females and 20 weeks in males. The slaughtering was carried out under Islamic conditions and the necessary data were obtained from the animals to determine the parameters related to meat quality. Findings obtained from the study were subjected to statistical analysis and the effects of meat quality and taste on the meat of these animals were evaluated in terms of general stocking density applications in our country and the results were evaluated. Despite the fact that the meat quality was not seriously affected in terms of stocking density, better results were obtained in terms of appearance of meat in thigh and generally in breast meat of females with decreasing stocking density.

Etlik Hindilerde Yerleşim Sıklığının Bazı Et Kalite Parametrelerine ve Et Lezzetine Etkileri

Anahtar kelimeler:
Hindi, yerleşim sıklığı, et kalitesi, et lezzeti, panel

Özet. Dünyada da ülkemizde olduğu gibi sevilerek tüketilen hayvansal protein kaynağı olan hindi etinin üretimi bakımından önemli olan bir husus da yerleşim sıklığıdır. Et kalitesi bakımından önemli etkileri olabilecek olan bu konu aynı zamanda et lezzeti açısından da fark oluşturabilecek bir parametre olarak değerlendirilmektedir. Çalışmada, konu her iki açıdan da çalışılmıştır. Çalışmada melez ticari etlik hindi hatlarından Hybrid Converter beyaz etlik hindi palazları, yumurtadan çıkışı takiben numaralandırılarak kullanılmıştır. Çalışma 200 hindi palazı, kesim yaşında metrekareye 30, 40, 50 ve 60 kg canlı ağırlık gelecek şekilde farklı ebatlarda yapılmış bölmelere erkek ve dişi ayrı olmak üzere, 25'er adet palaz konacak şekilde yerleştirilmiştir. Çalışma dişilerde 16 hafta, erkeklerde 20 hafta sürdürülmüş olup, kesim işlemleri İslami koşullarda gerçekleştirilmiş olup kesilen hayvanlardan et kalitesi ile ilgili parametrelerin tespiti için gerekli veriler alınmıştır. Çalışmadan elde edilen bulgular istatistik analize tabi tutularak ülkemizdeki genel yerleşim sıklığı uygulamaları bakımından hayvanların et kalitesi ve lezzetine etkileri incelenerek sonuçları değerlendirilmiştir. Hindilerde et kalitesinin ciddi şekilde etkilenmemiş olmasına rağmen yerleşim sıklığının artışına bağlı olarak et görünüşü bakımından erkeklerde fark olmamakla birlikte, dişilerde but etinde görsel, göğüs etinde de genel olarak yerleşim sıklığı düşük gruplarda daha iyi sonuçlar elde edilmiştir.

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INTRODUCTION

As being an important animal protein source, turkey meat production is also an important branch in the world poultry meat industry as it is in Turkey. Where the population grows in Turkey and also the world, animal protein need increases more than the increase in overall production. Turkey's population has increased where turkey meat production increased only Mton. This shows an increase in production gap for need of animal protein coming from turkey meat in the world as it is in Turkey, can clearly be seen on figure 1 (FAO, 2015; TUIK, 2016).

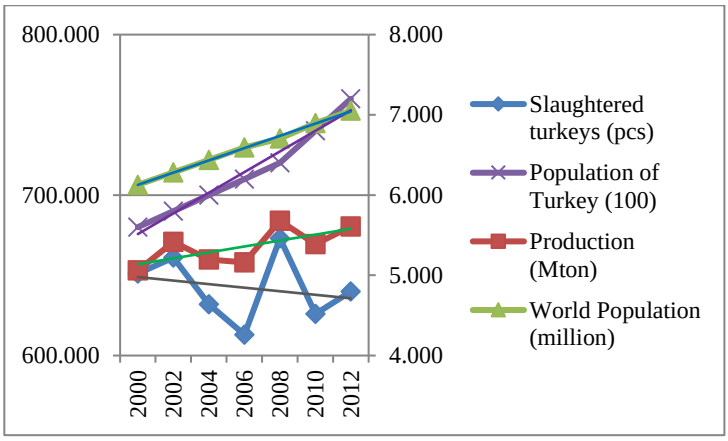

Figure 1. Turkey, World Population and turkey meat production from 2000 to 2012 (FAO, 2015; TUIK, 2016).
Şekil 1. 2000 – 2012 yılları arasında Türkiye'de ve dünyada hindi eti üretim miktarları.

Being a nutritive and precious source of animal protein, the properties of turkey meat can be seen on Figure 2. With a delicious unique aroma and taste, its protein level is similar to the one in cattle but also less in fat. This makes turkey meat a better option for people on a diet (Eratalar and Bulut 2007) as seen on Table 1.

Table 1. Nutritional value of 100g meat from different farm animals (Ertugrul, 1997, Ergün *et al.*, 2001).
Çizelge 1. Faklı çiftlik hayvanlarına ait 100 gram etin besin değeri.

	Broiler	Turkey	Cattle	Lamb
Energy kcal/kg	215	160	194	228
Protein g	18.60	20.40	20.00	14.00
Fat g	15.10	8.00	12.00	18.00

In Turkey, public request is mostly thigh and wing meat of poultry where European countries and United States mostly demand on breast meat providing the country to sell wings and legs in the country and export breast meat to Europe for better profits.

The genetic potential for growth and meat yield of turkeys can only be seen under the best environmental conditions. Stocking density is considered to be one of the most important primary factors affecting the birds' performance and meat production.

In a research, Noll *et al.* (1991) set 2.20 and 4.80 male turkeys per square meters. Researchers arrived at the data that the birds at higher stocking density had less live weight than the others. As well, a supporting research result comes from Dogrul *et al.* (2005). Researchers have designed a work with 3 and 4 birds m^{-2} and concluded that birds reared at higher stocking density (SD) resulted in worse growth performance.

Proudfoot *et al.* (1985) reported that with increasing stocking density slaughter weight decreases and skin lesions increased. Also in Label Rouge free range chickens Farmer *et al.* (1997) reported that unwanted smells were higher in the meat of the birds reared under lower stocking densities reporting that the difference may not be arising from stocking density but age of the birds.

Barbut (1998) has reported that the most important criterion for meat color is the L value itself.

Mirabito *et al.* (2002) reported that there has been found no difference between the meat of the different stocking density groups in terms of breast blisters, carcass deformation, injuries and total meat quality with SDs of 7 and 8.50 birds m^{-2}.

With a different production system of different cage stocking densities 0.23, 0.30 and 0.56 m^{-2} s there has been found no difference between the treatment groups in terms of meat quality parameters.

Riegel *et al*. (2004) has reported that as a meat quality parameter pH of the birds were found to be around 6.50±0.05, color parameter L were found to be around 16.40±1.00, breast protein was found to be around 25.00±0.10%, breast fat was found to be around 0.40±0.91% and dry matter was found to be around 15.90±0.10%.

Santos *et al*. (2004) reported that the thigh meat yield was found to be higher in males than the females where the breast meat yield was reported to be higher in females than males.

Thomas *et al*. (2004) reported that there has been found no significant difference between the treatment groups of chickens reared under different SDs.

Doğrul *et al*. (2005) reported that the turkey poults reared under lower stocking densities had higher carcass weight than the ones reared under higher SDs.

Molette *et al*. (2005) reported that the cold pH (24 hours) values of turkeys were found to be around 5.67±0.06, L values were found to be around 52.43±3.24, a values were found to be around 4.77±1.02 and b values were found to be around 2.23.

Peryam *et al*. (1957) reported that the taste of meat can be scored from 1 to 9 with a hedonic scale and constructed the first meat scoring technique by which the panel was also based on in the experiment.

Poste (1990) has reported that the job should be properly explained to the panelists who will taste the meat before the procedure begins. In the experiment the method was explained with detail before the panel started as it was briefed by the researcher.

Turhan (1992) has constructed an experimented on chickens including a tasting panel and cooked the chicken meat, breast and thigh separately for 50 minutes in steel cookers. The samples were given to the panelists with bread and water to eliminate the former taste of the samples.

Gatchalian (1999) reported that the treated parameters should be smell, taste, structure, look and softness. Xu (1999) has also reported that in panels there should be more than 100 amateur panelists or more than 3 professional panelists to get better results from panel experiments.

Reilly *et al*. (2001) also explained the environment for a better panel to achieve best results from tasting panel experiments as this experiment was also conducted in the direction of these reports.

As seen there have been several experiments about SD for chickens and turkeys. However, there is no similarity of these researches with our experiment in terms of degustation (tasting) panel, meat quality parameters etc. This research is important for introducing the present condition for determining the stocking density effect on meat quality levels and taste of meat of these turkeys in the aspect of turkey production in Turkey.

MATERIAL AND METHOD

The turkey poults forming the animal material of this research was obtained from a private turkey meat production company integration founded in Bolu, located in the northern part Turkey. The hatching eggs which the poults hatched from were obtained from 42 week old Hybrid Converter breeders reared in the same breeder house. 200 hatching eggs of these breeders were hatched in the company's hatchery and were transferred to the production farm of the company immediately prior to automatic vaccination, sexing and beak trimming which were done at the hatchery right after hatch. The birds were randomly wing-banded, numbered from 1 to 200. So, all the birds would be personally tested as a replicate for the related parameters investigated.

Research took place in commercial company's turkey farm and cages were built in before the research was set. Female cages were 8.245 m^2, 6.179 m^2, 4.943 m^2 and 4.125 m^2 for 30, 40, 50 and 60 kg m^{-2} estimated live weight at the slaughter age of the birds at 16th week of rearing period. Male cages were 15.443 m^2, 11.575 m^2, 9.363 m^2 and 7.727 m^2 for 30, 40, 50 and 60 kg m^{-2} estimated slaughter weight of the poults at 20th week of rearing period.

Birds were placed in 8 pens 4 male pens and 4 female pens with 25 birds in each pen. In the first 2 weeks birds were reared in rings for better start and the rings were removed at the 2nd week. So, the SD (stocking density) effect was put on in the 2nd week. The SD levels were arranged for the birds' estimated slaughter weights of 30, 40, 50 and 60 kg m^{-2}.

The slaughter weights (SW) of the birds came up higher but not more than 2.5% than the estimated SW set at the beginning of the study.

Vaccination program for the birds used by the company is shown at Table 2.

Table 2. The vaccination program used in the experiment.
Çizelge 2. Denemede kullanılan aşılama programı.

Time	Vaccine	Type	Method	The Disease
After hatch	HB1	Active	Spray	Newcastle D.
7. Day	TRT	Active	Spray	TRT
21. Day	Clone 30	Active	Spray	Newcastle D.
35. Day	TRT	Active	Spray	TRT
56. Day	Lasota	Active	Spray	Newcastle D.

Male birds were fed with 8 different types of feed where females were fed with 7 different feed in the rearing period. Males were slaughtered at the 20th week where females were at 16th week which were the suitable and the present application at the time of the study. This rearing period is as well up to date and used by the industry still (Housmand *et al.*, 2012; Qaid *et al.*, 2016).

Feed and water were given ad-libitum. All the feed were obtained from Bolca Hindi's feed mill. The chemical and physical composition of the feed is shown in Table 3.

Table 3. Feeds' chemical and physical contents for the rearing period.
Çizelge 3. Yetiştirme dönemi boyunca kullanılan yemin fiziksel ve kimyasal özellikleri.

Feed No	301	302	303	304	305	306	307	308
Weeks	0-2	2-4	4-6	7-9	10-12	13-14	15-16	17+
Crude Protein (%)	28.50	27.50	26.00	23.50	21.50	19.50	18.00	17.00
ME (Kcal kg^{-1})	2750	2850	2950	3050	3125	3225	3350	3400
Methionine	0.74	0.69	0.63	0.56	0.50	0.44	0.40	0.37
Meth. + Syst.	1.21	1.17	1.07	1.00	0.90	0.80	0.72	0.68
Lysine	1.85	1.8	1.66	1.55	1.40	1.20	1.02	0.90
Calcium	1.45	1.40	1.40	1.30	1.20	1.10	1.00	1.00
Digestible Phosphorus	0.78	0.75	0.75	0.65	0.60	0.55	0.50	0.50
Sodium	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18
Threonine	1.11	1.10	1.04	1.00	0.93	0.76	0.64	0.58
Tryptophan	0.34	0.30	0.27	0.25	0.23	0.20	0.18	0.17
Arginine	1.98	1.94	1.79	1.63	1.44	1.24	1.05	0.93
Structure of the Feed	Crumble	Pellet	Pellet	Pellet	Pellet	Pellet	Pellet	Pellet

Lighting program was the same for all the birds with a beginning of 100 lux florescent light at bird level and after 2nd day dark period began with 30 minutes and increased 30 minutes every day up to 6 hours of dark and 18 hours of light which was continued till the end of the rearing period. 100 lux was decreased to 75 lux at day 7 and it was decreased to 50 lux at the 2nd week and went on till slaughter age.

The poults arrived at the farm were reared at 37.00±0.50 °C and the temperature was decreased 0.50 °C daily till the rearing environment is finally 20.00 °C and this temperature (20.00±0.50 °C) was kept till the slaughter age.

Proper ventilation was obtained by an automatic environment control system controlling the side curtains during the whole period of the study.

Health control was done by the company's veterinarian where no drugs and feed additives were used during the whole study.

Dry pinewood shavings were used as the litter material which was disinfected and spread about 5 kg m^{-2} to the ground homogeneously.

The data achieved were analyzed with Minitab 14 statistical analysis software program using variance analysis and Duncan Test (Düzgüneş *et al.*, 1987; Sheskin, 2000; Minitab, 2014).

All samples were analyzed separately by a linear model as shown below.

$Y_{ij} = \mu + \alpha_i + e_{ij}$

Y_{ij} : ith stocking density group, jth week observed value

μ : population mean for the parameter

α_i : ith stocking density group effect

e_{ij} : random error

RESULTS AND DISCUSSION

From the data of the experiment it was found that there has been no statistically significant (P>0.05) change between the treatment groups in terms of slaughter weight, hot and cold carcass weights and, hot and cold carcass yield data as seen in Table 4. The data is not in line with other researchers conducted by Proudfoot *et al*. (1985), Dogrul *et al*. (2005), Azzam and Gogary (2015) and Noll *et al*. (1991) where live weight and slaughter weight of turkeys were reported to be decreasing with increased SDs. This may be arising because these researchers used more compelling SD levels than used in our trial.

Table 4. Carcass weight and carcass yield of male and female turkeys reared under different SDs.
Çizelge 4. Farklı yerleşim sıklıklarında yetiştirilen erkek ve dişi hindilerde karkas ağırlığı ve randımanı.

Sex	Stocking density (kg m^{-2})	Carcass weight (g) ($\bar{x}\pm S_{\bar{x}}$)			Carcass yield (%)	
		Slaughter weight	Hot carcass weight	Cold carcass weight	Hot carcass yield	Cold carcass yield
Males	60	19620±136.56	15370±169.46	15100±157.32	78.36±1.22	76.98±1.14
	50	19220±563.26	15308±570.99	15023±577.50	79.57±0.64	78.07±0.73
	40	19390±288.70	15087±460.77	14832±449.85	77.75±1.55	76.44±1.51
	30	19840±404.78	15314±229.04	14963±203.33	77.23±0.89	75.47±0.86
	$S_{\bar{x}}$	183.21	182.27	179.41	0.55	0.55
	F	0.501	0.101	0.085	0.791	0.961
	P	> 0.05	>0.05	>0.05	>0.05	>0.05
Females	60	10949±370.26	8800±398.31	8386±259.28	80.36±2.41	76.63±0.74
	50	10158±341.70	8014±290.26	7902±291.23	78.87±0.78	77.77±0.83
	40	10684±560.37	8622±273.52	8485±267.30	81.32±3.75	80.04±3.73
	30	9768±740.41	8264±458.66	8126±455.00	85.41±3.69	83.98±3.63
	$S_{\bar{x}}$	264.16	180.88	159.34	1.45	1.38
	F	1.003	0.945	0.643	0.918	1.480
	P	>0.05	>0.05	>0.05	>0.05	>0.05

Hot and cold carcass pH values were found to be stable and unchanging (P<0.05) between the treatment groups which are in line with other research reporting that different SDs not affecting meat quality by Mirabito *et al*. (2002) and Rieger *et al*. (2004) also reporting that pH values were found to be around 6.50 which seems to be higher than the values obtained from our experiment may be resulting because of the different ages of the slaughtered birds. Results reported of a research conducted by Molette *et al*. (2005) are around 5.67 which are also very parallel to the research data also reporting similarly as there has been no change in pH as the SD increased. WHC of turkeys reared under different SDs were found to be unaffected by SDs of 30 – 60kg m^{-2} in our experiment as can be seen in Table 5.

Table 5. Hot and cold carcass pH and, WHC values of male and female turkeys reared under different SDs.
Çizelge 5. Farklı yerleşim sıklıklarında yetiştirilen erkek ve dişi hindilerde sıcak ve soğuk karkas pH'sı ve STK değerleri.

Stocking Density	Males		Females		Males		Females	
(kg m^{-2})	Hot Carcass pH	Cold Carcass pH	Hot Carcass pH	Cold Carcass pH	Thigh WHC	Breast WHC	Thigh WHC	Breast WHC
60	5.79±0.07	5.69±0.02	5.27±0.06	5.49±0.03	48.02±1.33	52.86±4.50	37.97±2.02	58.09±4.79
50	5.88±0.09	5.73±0.01	5.28±0.08	5.50±0.04	53.47±1.70	56.03±4.43	33.75±1.27	52.24±1.12
40	5.84±0.07	5.71±0.02	5.32±0.09	5.46±0.04	46.63±1.43	53.70±2.28	43.88±2.10	55.48±1.54
30	6.03±0.06	5.68±0.03	5.40±0.05	5.57±0.03	59.44±2.67	52.82±1.89	38.22±4.08	54.10±1.61
Sx	0.04	0.01	0.03	0.02	1.04	1.62	1.44	1.33
F	1.759	0.838	0.490	1.409	2.588	0.186	2.571	0.829
P	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05

As the chemical properties of turkeys reared under different SDs were analyzed, no significant (P>0.05) differences between treatment groups were found except the protein ingredient of female turkeys (P<0.05) reared under highest SD which was found to have the highest protein level as well. The data of protein and fat values are in line with other research conducted by Rieger *et al*. (2004). The data obtained from the research can be seen in Table 6.

Table 6. Some chemical properties of male and female turkeys reared under different SDs.
Çizelge 6. Farklı yerleşim sıklıklarında yetiştirilen erkek ve dişi hindilerde bazı kimyasal özellikler.

Sex	Stocking density (kg m^{-2})	Thigh meat chemical properties ($\bar{x}\pm S_{\bar{x}}$)			Breast meat chemical properties ($\bar{x}\pm S_{\bar{x}}$)		
		Protein (%)	Fat (%)	Dry Matter (%)	Protein (%)	Fat (%)	Dry matter (%)
Males	60	20.78±.034	3.88±0.55	24.83±0.37	23.49±0.10	0.88±0.04	24.96±0.58
	50	21.00±0.32	3.24±1.04	23.80±0.57	23.78±0.40	1.36±0.37	25.03±0.32
	40	19.85±0.37	4.21±1.53	24.50±0.89	23.66±0.23	0.77±0.14	24.13±0.27
	30	20.10±0.36	3.35±0.34	33.43±1.20	24.26±0.28	0.77±0.30	25.20±0.26
	$S_{\bar{x}}$	0.20	0.43	0.29	0.14	0.12	0.20
	F	2.377	0.215	1.264	1.418	1.240	1.559
	P	> 0.05	>0.05	>0.05	> 0.05	>0.05	>0.05
Females	60	19.98±0.50	8.70±0.50	31.13±0.73 a	26.26±0.38 a	0.96±0.48	26.80±0.50
	50	20.84±0.39	7.23±2.42	29.60±0.30 ab	24.72±0.26 b	1.16±0.04	25.93±0.12
	40	20.56±0.07	8.66±1.70	29.53±1.18 ab	25.54±0.36 ab	0.83±0.18	27.10±0.35
	30	20.15±0.04	7.26±0.76	27.63±0.78 b	25.53±0.05 ab	0.49±0.20	27.26±0.81
	$S_{\bar{x}}$	0.17	0.69	0.51	0.20	0.13	0.26
	F	1.434	0.285	3.092	4.423	1.005	1.330
	P	>0.05	>0.05	>0.05	<0.05	>0.05	>0.05

The statistically different data is shown with small characters and P values are as given.

As the color properties' data were investigated, it was found that there were no significant (P>0.05) differences between treatment groups of the experiment. These findings are close to other researches' results done by Molette *et al*. (2005).

Table 7. Color properties of male and female turkeys reared under different SDs.
Çizelge 7. Farklı yerleşim sıklıklarında yetiştirilen erkek ve dişi hindilerde renk özellikleri.

Sex	Stocking density (kg m^{-2})	Thigh meat color ($\bar{x}\pm S_{\bar{x}}$)			Breast meat color ($\bar{x}\pm S_{\bar{x}}$)		
		L	a	b	L	a	b
Males	60	40.95±2.50	11.28±0.33	11.28±0.33	41.03±1.18	10.87±1.48	5.47±0.65
	50	38.21±1.22	12.81±0.72	12.81±0.72	43.15±1.24	10.35±1.22	5.42±0.62
	40	40.87±2.01	12.08±0.59	12.08±0.59	43.40±1.01	13.47±0.92	6.22±0.37
	30	40.27±1.07	12.16±0.46	12.16±0.46	39.92±1.30	10.89±1.73	6.05±0.22
	$S_{\bar{x}}$	0.86	0.28	0.28	0.64	0.68	0.24
	F	0.503	1.303	0.808	1.987	1.043	0.659
	P	> 0.05	>0.05	>0.05	> 0.05	>0.05	>0.05
Females	60	48.57±0.90	7.93±0.57	6.92±0.53	45.54±1.34	7.05±1.47	5.95±0.20 b
	50	47.11±1.23	7.66±0.25	6.12±0.40	46.93±0.70	7.90±1.60	6.30±0.59 ab
	40	47.71±0.70	7.76±0.57	6.67±0.36	45.55±0.76	5.85±0.30	6.99±0.35 ab
	30	46.87±0.78	7.87±0.71	6.54±0.11	45.00±1.19	9.96±1.42	7.25±0.24 a
	$S_{\bar{x}}$	0.45	0.25	0.19	0.50	0.69	0.21
	F	0.668	0.048	0.744	0.629	1.741	2.496
	P	>0.05	>0.05	>0.05	>0.05	>0.05	<0.05

The statistically different data is shown with small characters and P values are as given.

When organoleptic parameters investigated in the trial were analyzed, it can be told that in general the scores are getting better visually as SD decreases but these differences were found to be insignificant (P>0.05). Only visual scores of female thigh meats and general scores of female breast meats were found to be increasing with decreasing SD significant statistically (P<0.05). The data of the experiment can be seen in Table 8.

Table 8. Organoleptic properties of male and female turkeys reared under different SDs.
Çizelge 8. Farklı yerleşim sıklıklarında yetiştirilen erkek ve dişi hindilerde tadım özellikleri.

	Stocking Density	Thigh Meat Organolepic Parameters				
Sex	(kg m^{-2})	Color	Visual	Aroma	Crustiness	General
	60	7.28±0.64	7.28±0.52	6.71±0.74	6.42±0.78	7.14±0.55
	50	5.85±0.63	6.14±0.70	5.71±0.83	5.71±1.14	6.71±0.52
	40	6.71±0.35	6.57±0.64	7.00±0.65	6.42±0.61	6.42±0.64
Males	30	6.14±0.67	5.85±0.85	7.42±0.42	6.57±0.42	7.28±0.42
	Sx	0.29	0.34	0.34	0.37	0.26
	F	1.151	0.802	1.135	0.240	0.526
	P	> 0.05	>0.05	>0.05	>0.05	>0.05
	60	6.80±0.96	4.80±1.06 b	5.80±0.73	5.40±0.81	5.40±0.67
	50	6.60±0.50	5.20±0.66 ab	7.20±0.37	6.60±0.50	6.40±0.60
	40	6.60±0.50	6.60±0.40 ab	6.60±0.67	6.20±0.96	6.80±0.58
Females	30	5.60±0.81	7.20±0.66 a	6.80±0.58	7.20±0.66	7.20±0.37
	Sx	0.35	0.40	0.30	0.37	0.30
	F	0.553	2367	0.937	0.991	1836
	P	>0.05	<0.05	>0.05	>0.05	>0.05
		Breast Meat Organolepic Parameters				
Sex	(kg m^{-2})	Color	Visual	Aroma	Crustiness	General
	60	7.28±0.60	7.28±0.42	6.57±0.89	6.85±0.59	7.28±0.60
	50	6.42±0.36	6.42±0.48	7.00±0.53	6.42±0.81	6.57±0.61
	40	6.14±0.50	6.28±0.86	6.71±0.52	5.57±0.81	6.71±0.42
Males	30	6.14±0.82	6.42±0.36	6.85±0.85	5.57±0.84	7.14±0.26
	Sx	0.29	0.27	0.34	0.37	0.24
	F	0.502	0.592	0.978	0.565	0.707
	P	>0.05	>0.05	>0.05	>0.05	>0.05
	60	6.40±0.92	5.80±1.11	5.20±0.73	5.40±0.50	5.40±0.67 b
	50	6.40±0.50	6.40±0.50	7.00±0.44	6.60±0.24	7.60±0.24 a
	40	7.20±0.37	7.20±0.58	7.00±0.83	6.00±0.63	6.80±0.48 ab
Females	30	7.60±0.74	7.80±0.37	6.60±0.74	6.40±0.87	7.20±0.73 a
	Sx	0.33	0.36	0.36	0.29	0.32
	F	0.791	1.562	1.460	0.757	2.821
	P	>0.05	>0.05	>0.05	>0.05	<0.05

The statistically different data is shown with small characters and P values are as given.

CONCLUSION

Stress and welfare are two of the main points of animal production and product quality. In Turkey birds are reared under stocking densities of 30 – 60 kg m^{-2}. The experiment was designed to evaluate the current situation in the country on the term of some carcass parameters and meat quality to find out if there is a change in quality and taste of the meat of animals reared under different actual SDs.

In the experiment hot and cold carcass weights of birds, WHC, pH and color of breast and thigh meats of turkeys were investigated primarily to understand how SD affects meat quality.

In general, there has been found no significant change in carcass yield and investigated meat quality parameters but only some gustative parameters were found to be getting better by decreasing SD. This in fact can make a difference in public demand of this meat source and should be taken into attention.

Mainly it can be told that, the investigated SD levels do not have a significant effect on the investigated parameters, and can be applied by the industry by taking animal welfare issues and economy into consideration. Final conclusive decision to use the appropriate SD should be decided by taking these criteria of economy, welfare and performance together.

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