AT QUALITY TRAITS EFFECTED BY THE USE OF PORCINE SOMATOTROPIN (pST)

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MMARY: The objective of this paper is to investigate the effects of pST administration on slaughter parameter, carcass position, meat quality, fatty acid composition, the cellularity of backfat and to compare the effects of various sexes with erent final weights. Two hundred twenty eight (228) Landrace barrows, gilts, boars and heavy barrows were assigned within group to one of three treatment groups (o,2, 4 mg pST for 75 days and 2 increasing to 4 mg pST for 102 days to the heavy rows). The results indicate that long time treatment with pST improves carcasses without negative effects on the meat. The administration to barrows slaughtered at normal weights improves the meat attributes by 14 to 27 %, decreases the fat by 37 % that means 58 to 63 % controls. The effects in the different sexes are similar in the direction but in barrows higher than mals and boars. Heavy meaty carcasses are possible. An increase of unsaturated fatty acids in treated pigs was investigated. ncreased lean growth is achieved by decreased fat cell size.

RODUCTION: The consumers and the meat industry are interested in high quality carcasses and meat. Important factors he composition of the carcasses and the meat, the PSE status and the suitability for processing. Special factors for human tion are the content of fat and the declaration that the meat of treated animals is not harmful for consumers. European mers are very sensitive about these factors. In regard to the question of fat, the partitioning effect of pST is known. In erican (Machlin 1972, Chung et al., 1986. Etherton et al., 1987, Boyd et al., 1986) and also in European experiments (Kanis . 1988) an increase in protein content and a decrease in fat was found. More results from various European pig breeds are stay. In all the reported studies, however, no has reported on the effects on carcass composition and quality when pST is to extreme slaughter weights. All the reports in the literature use traditional live weight end points of 100 to 115 kg. Heavy ghter weights have a very practical significance with because of the likelihood of increased slaughter weights categorically in ountries which utilize pST due to improved efficiencies and decreased fat deposition. In addition, many countries, e.g. many and Italy, already utilize heavy slaughter weights for their speciality processed pork operations.
objective of this paper is
vestigate the effects of pST administration on slaughter parameters, carcass composition, meat quality and muscle structure
n European pigs
compare the effects of various sexes with different final weights

TERIALS AND METHODS: Two hundred twenty eight (228) Landrace gilts, barrows , boars and heavy barrows typical East Germany were randomly assigned within sex group to one of three treatment groups (table1). The three treatment groups isted of 0, 2, or 4 mg porcine somatotropin (pST) administered daily to the gilts, barrows and boars and 0, 2 increasing to d 4 mg pST administered daily to the heavy barrows. pST was administered daily for 74, 75, 68 or 102 days to . barrows, boars and heavy barrows, respectively, following a two week acclimation period. Injections were i.m. administered jected with a slow organic buffer solution while the pST injected groups were administered pST dissolved in buffer. The erimental diet composition is charactericed by about 15 MJ/kg DM metabolic energy, 190 g/ kgDM crude protein and 11,5 g / DM lysine. Before slaughtering a 7 days withdrawl periode was observed. To get an comparable final weight with the treated mals the controls were slaughtered one week later. One half of each carcass was used for carcass measurements and was then ded into meat cuts and tissues using the method of Ender and Hartung (1987). Chemical and histological analysis were done rding to standard methods.

SULTS: Because the controls of the different sexes were slaughtered one week later, the final carcass weights of the two atment groups were comparable to them (table 2). Therefore %-values are compared to all experimental groups. The pST ted animals in the two experimental groups have been characterized by about 1 - 2 % lower dressing percentage, respectively. result is typical for 30 - 40 kg lighter pigs. One of the reasons for this fact is the increased organ weights associated with . For instance, kidney weights increased up to 137 % of controls in barrows, respectively, the heart weight up to 108 % in and the liver weight up to 114 % in boars in the second treatment group. These percentages of organ weights are typical es for younger pigs. Kanis et al. (1988) published comparable results. The presumable reason is the metabolism-activating on of pST. The intestine percentage of these treated pigs is similar to untreated pigs with juvenile metabolism as seen in g fast growing animals. This observation is in agreement with the carcass composition which is also typical for younger mals with strong protein gain. Table 3 shows the results of the carcass composition. The amounts (muscle meat) of lean meat the higher pST dose experimental regime are 4,9 % 71 and 61 % to controls of boars, gilts and barrows. Of substantial rtance is the chemical composition of the carcass. The fat content of the whole carcass has decreased from 37,9 % to 21,8 % roup with the higher dose of barrows. This corresponds to a 42 % reduction in fat content as composed to controls (58 % ive to controls). The fat reduction was accompanied by an increase in the protein portion by 3,7 % up to 127 % of controls. means that by pST administration during growth, the carcass will be leaner with a lower fat content. These results are in gilts and boars with slightly lower effects. Heavy treated pigs look like normal weight untreated ones. This observation agreement with the levels of the carcass composition characteristics. The lean meat % in pST treated carcasses of the second p are + 4,9 % (111 %) to the normal weight controls and + 8,0 % (119 %) to the heavy weight controls. That means that works with the same activity at heavy weight. The meat percentage of the 40 kg heavier treated pigs (49,1 %) is higher pared with that of untreated barrows at normal weight (44,2 %). The decrease offat in the treated heavy carcasses to 63 % tively and to 72,8 % absolutely of the untreated normal controls is also impressive. In this way, the heavier treated pigs reach

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even an 8,1% lower level than untreated pigs at normal weight. The chemical composition of the carcass is of subs
importance. Fat content of the whole carcasses of pigs at normal weight decreased by 16,1 % (58 % of control), compared
16,5 % (62 % of control) in pigs at heavy weight. The analytical fat content of pST treated heavy pigs was 11,2 % lower
that of untreated ones at normal weight. Comparison of normal and heavy barrows shown that the effects do not decrease
increase of slaughter weight up to 152 kg. Table 4 indicates the data of the relative fatty acid composition of backfat
barrows. The saturated fatty acid C 18:2 and the polyunsaturated fatty acids (SPFA) are decreased with increasing of age
increased by pST. The level in the treated animals at the end of the trial is similar to the value at the beginning.
Restriction of backfat growth was achieved by the drastic reduction of fat cell hypertrophy which nearly stagnuated during
first five weeks of treatment as shown by adipocyte diameter development in barrows (figure 1). Already after five weeks
cell diameter was 20 % less.Increased meat and protein content with a decreased fat content generally includes the possible
negative effect on meat quality.For this reason the results ofmeat quality parameters of pST treated pigs shown in table 5
special interest. It is remarkable that there are no significant differences mostly. That means that there is no trend to lower
quality. Only the tenderness is effected negatively.

CONCLUSIONS: The results indicate that long time treatment with pST improves carcass without negative effects
meat. The effects are similar in all sexes and slightly increased in pigs with more fat.
Heavy meaty carcass are possible. The decrease of fat is accomparied by an increase of unsaturated fatty acid content and
size.

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Fig. 1: EFFECT OF PST ON FAT CELL HYPERTROPHY

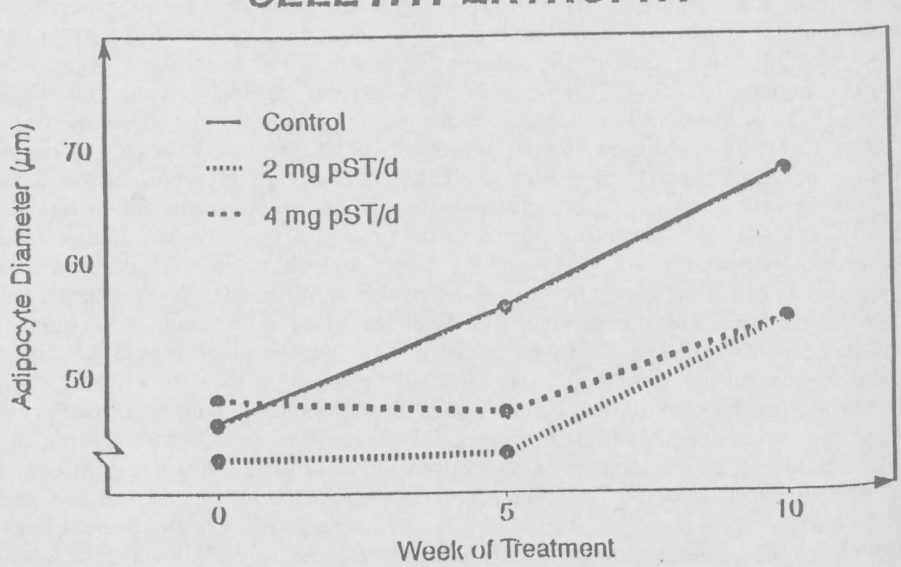

Table 1: Experimental Framework

	Control	2 mg pST/d	4 mg pST/d
No. of Animals			
gilts	20	18	20
barrows	19	20	18
boars	18	20	19
heavy barrows	19	18	16
total	77	76	75
Treatment Period (d)			
gilts	74	74	74
barrows	75	75	75
boars	68	68	68
heavy barrows	102	102	102
pST Dose (mg/day)			
gilts	0	2	4
barrows	0	2	4
boars	0	2	4
heavy barrows	0	2 - 4	4

One dose increased from 2 to 4 mg per day on day 42 of treatment

Table 2: Slaughtering Data

	Control	2 mg pST/d	% to control	4 mg pST/d	% to control
Carcass weigt (kg)					
gilts	94,0	95,0		98,2	
barrows	83,6	85,1		88,3	
boars	87,9	89,6		92,4	
heavy barrows	121,8	118,6		119,0	
Dressing Percent (%)					
gilts	80,0	79,1	99	77,8	97
barrows	77,8	75,5	97	76,3	98
boars	78,1	77,2	99	76,3	98
heavy barrows	80,9	78,1	97	77,9	96
Heart (%)					
gilts	0,39	0,40	102	0,42	108
barrows	0,43	0,48+	112	0,46	107
boars	0,43	0,44	105	0,46	110
heavy barrows	0,36	0,42	116	0,43	119
Liver (%)					
gilts	1,9	2,1+	111	3,3+	116
barrows	2,3	2,7+	117	3,7+	117
boars	2,2	2,4+	109	2,5+	114
heavy barrows	1,4	1,8+	129	2,0+	143
Kidney (%)					
gilts	0,40	0,46+	115	0,48+	120
barrows	0,40	0,50+	125	0,55+	138
boars	0,49	0,55	112	0,57+	116
heavy barrows	0,33	0,43+	130	0,47+	142

+ significant to control ($P < 0,05$)

Table 3: Carcass Composition

	Control	2 mg pST/d	% to control	4 mg pST/d	% to control
Lean Meat (%)					
gilts	46,3	49,9+	108	51,2+	111
barrows	44,2	50,1+	113	52,1+	118
boars	49,2	51,8+	105	53,7+	109
heavy barrows	41,1	48,0+	117	49,1+	119
Loin Muscle Area (cm^2)					
gilts	39,9	45,8+	115	46,5+	117
barrows	33,6	40,6+	121	40,8+	121
boars	35,4	38,1+	108	42,2+	119
heavy barrows	40,5	47,9+	118	48,2+	119
Analytical Fat (%)					
gilts	34,0	27,0+	79	24,0+	71
barrows	37,9	25,7+	70	21,8+	58
boars	25,1	20,0+	80	16,3+	65
heavy barrows	43,2	27,8+	64	26,7+	63
Analytical Protein (%)					
gilts	15,1	16,7+	111	17,2+	114
barrows	13,9	16,8+	121	17,6+	127
boars	16,6	17,9+	108	18,7+	113
heavy barrows	12,9	16,7+	129	16,8+	130
Intermuscular Fat (%)					
gilts	1,2	0,9+	75	0,9+	75
barrows	1,6	1,3	81	1,1+	69
boars	1,1	0,8+	73	0,8+	73
heavy barrows	1,7	0,9+	53	1,2+	71

+ significant to control ($P < 0,05$)

Table 4: Fatty acid composition of backfat

%	begin	end of trial		
		control	2 mg pST/d	4 mg pST/d
C 14 : 0	1,6	1,4	1,3	1,3
C 16 : 0	25,5	26,2	24,9	24,0
C 16 : 1	4,4	2,8	3,3	3,3
C 18 : 0	11,5	14,2	13,0	13,4
C 18 : 1	44,6	45,9	46,3	45,5
C 18 : 2	7,6	6,3	7,6	8,5
SPFA	9,0	7,2	8,6	9,7

*1 remission at 520 nm
*2 50 g meat in foil and stored refrigerated for 24 hours
*3 3 g meat pressed with constant pressure for five minutes
*4 40 g meat in boiling oil (160 °C) for five minutes
*5 Warner Bratzler shear value

Table 5: Longissimus dorsi Muscle Quality

	Control	2 mg pST/d	4 mg pST/d
Remission value*1 (%)			
gilts	31,7	29,4	27,9+
barrows	32,6	32,0	31,2
borars	30,1	31,4	32,3
heavy barrows	25,8	25,9	26,9
Drip loss*2 (%)			
gilts	5,1	4,2	5,0
barrows	5,5	5,4	5,1
boars	4,7	5,3	5,5
heavy barrows	3,2	3,6	2,6
Pressure Units*3			
gilts	42,2	40,1	39,2+
barrows	43,5	43,6	42,5
boars	43,4	43,5	42,3
heavy barrows	39,7	38,8	38,3
Fondue Loss*4 (%)			
gilts	41,8	41,2	42,0
barrows	42,4	41,5	42,2
boars	44,9	42,5+	42,5
heavy barrows	42,3	40,1+	40,4+
Tederness*5			
gilts	10,7	13,9+	13,4+
barrows	9,7	10,6	10,9
boars	11,8	11,2	11,2
heavy barrows	11,1	13,1+	13,9+