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Title: Effect of Porcine Somatotropin on the Lipid Profile of Tissues in Pigs

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Sixteen crossbred barrows were injected daily with either 3 mg porcine somatotropin (pST) in buffer or buffer without pST from an initial weight of approximately 54 kg to an approximate final weight of 106 kg to determine the effects of pST on the lipid profile of selected tissues (subcutaneous [SC] backfat, intermuscular [IM] fat, raw longissimus muscle and cooked loin roast). Total lipid content, fatty acid profile, and cholesterol content were measured on fresh samples and after 4 months of storage at -20°C. PST decreased the total lipid content of SC fat, IM fat, raw muscle and cooked loin 6% ($p=0.0006$), 4% ($p=0.05$), 22% ($p=0.04$) and 33% ($p=0.001$), respectively. The content of the fatty acids 16:0, 18:0 and 18:1(n-9)c was decreased ($p<0.05$) and that of 18:2(n-6) was unchanged by pST treatment in all tissues. The cholesterol content of muscle was not influenced by pST treatment. There was no interaction between treatment and storage. Storage did not affect the total lipid content. Small changes in the levels of some fatty acids were seen with storage, but the changes were not consistent among all tissues. After storage, the cholesterol content of treated raw muscle and cooked loin roast decreased 12% ($p=0.009$) and 19% ($p=0.0006$), respectively. The data suggest that pST treatment, by reducing total fat content and altering fatty acid composition, produces a favorable product when viewed in light of current dietary recommendations.

Effect of Porcine Somatotropin on the Lipid Profile of Tissues in Pigs

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INTRODUCTION

A current goal of the pork industry is the production of leaner pigs through the administration of porcine somatotropin (pST), also known as growth hormone (NRC, 1988a). Research has shown that pST administration to pigs increases average daily gain, improves feed efficiency, and changes carcass composition so that the content of lean meat is increased and fat is decreased (Table 1). These changes in carcass composition are reflected in decreased backfat thickness, increased loin eye area (LEA), and, in selected muscles, decreased fat content and increased protein content. Although Prusa (1989) reports a decrease in the total fat content of the longissimus muscle from pST-treated pigs, there was no significant effect on the fatty acid composition. However, he states that in a similar study he saw a slight increase in the polyunsaturated fat content. He did not, however, provide information about the changes produced in individual fatty acids. The effect of pST treatment on cholesterol content of muscle is unclear. One study indicated a slight increase in the cholesterol content of longissimus muscle with pST treatment (Prusa et al., 1989a), whereas another study showed no effect on it (Prusa, 1989).

Table 1. Summary of effects of pST supplementation in pigs on growth and carcass characteristics

Study	Weight range (kg)	pST dose (mg/d)	ADG[a] (kg)	Feed intake (kg/d)	Feed: gain	Back-fat (cm)	LEA[b] (cm^2)	Carcass Pro[c] (%)	Carcass Fat (%)
			Inc[d]	Inc	Dec[e]	Dec	Inc	Inc	Dec
Machlin (1972)	47-88	5.9-12.2	16%	NR[f]	13%	20%	20%	NR	NR
Chung et al. (1985)	32-61	0.7-1.3	10%	NS[g]	4%	NS	NS	NR	NR
Etherton et al. (1986)	50-79	1.5-2.4	11%	NR	19%	NS	21%	8%	18%
Etherton et al. (1987)	40-77	0.4-0.8	NS	NR	7%	NS	NS	NS	NS
		1.2-2.3	NS	NR	10%	NS	NS	11%	NS
		2.8-5.3	14%	NR	17%	NS	23%	13%	25%
Campbell et al. (1988)	25-55	2.5-5.5	16%	10%	24%	24%	13%	11%	29%
Evock et al. (1988)	27-110	0.9-3.9	11%	NS	12%	NS	25%	19%	30%
		1.9-7.7	19%	8%	21%	29%	21%	23%	32%
		3.9-15.4	13%	17%	24%	50%	46%	36%	68%
Campbell et al. (1989a)	30-60	3.0-6.0	36%	NS	28%	16%	16%	6%	33%
Campbell et al. (1989b)	60-100	6.0-10.0	16%	23%	33%	45%	13%	19%	34%
Gardner et al. (1989)	NR-104	0.71	NR	NR	NR	15%	NS	NR	NR
		1.43	NR	NR	NR	25%	NS	NR	NR
		2.86	NR	NR	NR	37%	NS	NR	NR
		4.29	NR	NR	NR	33%	NS	NR	NR

[a]ADG = average daily gain
[b]LEA = loin eye area
[c]Pro = protein
[d]Inc = increase
[e]Dec = decrease
[f]NR = not reported
[g]NS = not significant at $p<0.05$

Consequently, the treatment of pigs with pST may produce a pork product that is more in accord with current dietary recommendations by decreasing total fat content and altering fatty acid composition. The present study was designed to investigate the effect of daily pST administration to pigs on the total lipid content and fatty acid composition of two fat sites (subcutaneous backfat and intermuscular fat) and the total lipid content, fatty acid composition, and cholesterol content of raw longissimus muscle and cooked loin roast. Additionally, since an increase in polyunsaturated fat content might influence storage stability (Hertzman et al., 1988), the effect of storage on these properties was investigated.

REVIEW OF LITERATURE

Somatotropin (ST), also known as growth hormone, a protein secreted by the anterior pituitary gland, has many biological effects. It has both anabolic and catabolic capabilities. In general, ST, either directly or indirectly, stimulates cell division, skeletal growth and protein synthesis, and at the same time increases fat catabolism (lipolysis), inhibits the transport of glucose into body tissues and inhibits fat synthesis (lipogenesis) (Hart and Johnson, 1986). Because of its potential to enhance growth and alter carcass composition, ST has been investigated for use in farm animals. In pigs, supplementation with porcine somatotropin (pST) has been shown to improve growth rate and feed efficiency (Table 1). The same studies show altered carcass composition such that fat content decreased 18-65% and protein content increased 6-35%.

Cimaterol, a beta-adrenergic agonist, has been shown to have similar results on growth in pigs (Jones et al., 1985). In addition, cimaterol has been shown to alter the fatty acid composition of the subcutaneous adipose tissue in sheep (Hu et al., 1988). In this study, myristic acid content (14:0) decreased 64%, palmitic acid (16:0) 41%, and stearic acid (18:0) 26%; palmitoleic acid content [16:1(n-7)] increased 70% and oleic acid [18:1(n-9)] 9%. Overall, the level of total saturated fatty acids decreased 29% and that of unsaturated fatty acids increased 22%. Except for Prusa (1989, 1989a), few investigators have addressed the change in the fatty acid composition of tissue in pST-treated swine.

The mechanism by which pST alters growth is not well established. In studying the dose-response relationship of pST treatment in pigs, it has been shown that not all growth parameters are affected to the same extent (Etherton et al., 1987). The changes in growth rate are less pronounced than those in feed efficiency and carcass composition (Etherton et al., 1987). The maximum effective dose of pST that will alter growth rate is less than the maximum effective dose that changes carcass composition (Evock et al., 1988). Therefore, it has been suggested that more than one mechanism is responsible for the effects of pST (Etherton et al., 1987; Evock et al., 1988). Campbell et al. (1990) and Goodband et al. (1990) add further support to this hypothesis. Campbell et al. (1990) reported that pST's effect on protein deposition was influenced by the protein content of the diet, whereas its effect on fat accretion was not. Similarly, Goodband et al. (1990) found that pST's effect on protein deposition was influenced by dietary lysine, but its effect on fat accretion was not. These results led both investigators to suggest that pST's effect on protein deposition and fat accretion may not be interrelated. Rather, two separate mechanisms may be involved.

A decrease in adipose tissue in pST-treated pigs could result from a decrease in lipogenesis, an increase in lipolysis, or a combination of the two. ST has been shown to have lipolytic properties. Bovine somatotropin (bST) stimulates lipolysis in vitro in rats (Hart et al., 1984) and in vivo in bST-treated cows (McCutcheon and Bauman, 1986). However, an increase in lipolytic activity has not been demonstrated in pST-treated pigs (Etherton, 1988). Accordingly, the decrease in fat accretion in pST-treated pigs seems to be a result of pST's effect on lipogenesis.

PST's impact on lipogenesis may involve its influence on insulin. In pigs, insulin stimulates lipogenesis (Walton and Etherton, 1986). Several studies using pigs have shown that pST treatment increased serum insulin (Campbell et al., 1989a; Chung et al., 1985; Etherton et al., 1986, 1987; Evock et al., 1988; Gopinath and Etherton, 1989a). This suggests that lipogenesis should also increase with pST treatment. However, in vitro studies have shown that pST inhibits the ability of insulin to stimulate lipogenesis in swine adipose tissue (Walton and Etherton, 1986; Walton et al., 1986). This would suggest that insulin function is impaired in the presence of pST.

An increase in serum glucose is also noted in pST-treated pigs (Campbell et al., 1989a; Etherton et al., 1986), indicating that tissue sensitivity to insulin is decreased (Chung et al., 1985). Gopinath and Etherton (1989b), however, have also seen increased glucose output by the liver in pST-treated pigs, suggesting that increased gluconeogenesis or glycogenolysis may also contribute to increased serum glucose. From these data one concludes that the role of insulin may not be central, or is at best confusing, in explaining changes in lipogenesis in pST-treated pigs.

PST may also influence lipogenesis by affecting lipogenic enzymes (Walton and Etherton, 1986). Studies in rats show that somatotropin (ST) directly inhibits the activity of malic enzyme, fatty acid synthetase, ATP-citrate lyase and glycerol-3-phosphate dehydrogenase (Schaffer, 1985). In studies in pigs, pST decreased lipogenic enzyme activity, especially acetyl-CoA carboxylase and fatty acid synthetase (Etherton, 1988). This coincides with a decrease of lipogenesis in vivo (Etherton, 1988). Etherton (1988) has suggested that pST may affect the genes that code for lipogenic enzymes because short incubations with pST do not affect the lipogenic ability of adipose tissue.

In addition to changes in adipose tissue deposition, pST treatment has a significant impact on muscle deposition. However, the increased muscling in pST-treated pigs is thought to be an indirect result of pST treatment. The mechanism proposed is as follows. PST-treated pigs show increased serum levels of somatomedin, also called insulin-like growth factor I (IGF-I) (Chung et al., 1985). Serum IGF-I levels are pST dependent (Etherton et al., 1987; Sillence and Etherton, 1987; Walton and Etherton, 1989). The injection of rats with IGF-I has been shown to stimulate muscle growth (Froesch et al., 1985; Hizuka et al., 1986). Likewise, cultured muscle cells from pST-treated swine show increased proliferation rates commensurate with relative IGF-I levels (Kotts et al., 1987). Campbell et al. (1990) found a significant correlation between plasma IGF-I levels and protein deposition in control and pST-treated pigs. They also noted that an adequate protein intake was necessary for pST to influence plasma IGF-I concentrations, and suggested that adequate dietary protein is necessary for either IGF-I synthesis or its release by pST. The data strongly support the idea that IGF-I is the factor responsible for the increased protein deposition observed in pST-treated pigs.

In addition to increased muscle growth, pST-treated pigs show evidence of decreased muscle catabolism. Blood urea nitrogen in pST-treated pigs is decreased (Chung et al., 1985; Etherton et al., 1986; Etherton et al., 1987), indicating that hepatic amino acid oxidation is decreased and amino acids from muscles may be spared by glucose carbon normally used in fat deposition (Etherton, 1988).

Although the exact mechanism by which pST increases protein deposition and decreases fat accretion is not resolved, data suggest that its effect on muscle is largely an indirect action mediated through its effect on IGF-I, while its effect on adipose tissue is for the most part a direct result. Even so, these two separate actions reinforce each other. A decrease in fat synthesis may redirect nutrients towards muscle synthesis or an increase in protein synthesis may limit energy available for fat synthesis.

The use of pST by the pig industry may prove beneficial to both the producer and the consumer. A decrease in production costs due to increased growth rate and feed efficiency in pST-treated pigs would increase profits for producers (Hayenga et al., 1989; Lemieux and Wohlgenant, 1989). Additionally, leaner pork products from pST-treated pigs may increase consumer demand and allow these carcasses to be priced higher, further improving profits (Hayenga et al., 1989).

From the consumer's view point, pork from pST-treated pigs may be more desirable in terms of health concerns. The American Heart Association (AHA, 1986) and the National Research Council (1989) both recommend that 30% or less of the calories in the diet should come from fat. The AHA further recommends that these calories be broken down into 10% or less saturated fat, 10% or less polyunsaturated fat, and the remainder as monounsaturated fat. A recent decrease in consumption of all red meats might be in response to these recommendations and the view that red meats are high in saturated fat. Saturated fats have been shown to increase serum cholesterol (Mattson and Grundy, 1985), which is a risk factor for coronary heart disease. Investigators have begun to focus on the relationship between individual fatty acids and heart disease. In a recent review, Grundy and Denke (1990) report that palmitic acid (16:0) and stearic acid (18:0), the two main fatty acids in pork, have very different effects on serum cholesterol levels. They conclude that data indicate that palmitic acid in the diet raises serum cholesterol levels and stearic acid has no effect. Pork from pST-treated pigs may be lower in fat and saturated fat (possibly 16:0) and thus will have more market value to the health conscious consumer.

A shift in the fatty acid profile of tissues from pST-treated pigs could potentially change storage stability. An increase in the polyunsaturated fatty acid (PUFA) content of the tissues may increase lipid oxidation during storage. Rhee et al. (1988) reported a correlation between the content of the main PUFA in pork, 18:2(n-6), and lipid oxidation. Lipid oxidation in meats leads to rancidity or off-flavor and discoloration (Rhee et al., 1988). Additionally, lipid oxidation products can react with amino acids and proteins, causing damage and altering functional properties (Pearson et al., 1983; Smith, 1987). Since there is some evidence that pST treatment increases the PUFA content, the storage stability of products from pST-treated pigs needs to be addressed.

From the consumer's view point, safety of pST use is also an issue. There seems, however, to be little risk to the consumer because pST is a protein that is digested by gastric and intestinal proteases and is also species specific (Norcross et al., 1989). Since pST treatment, however, potentially increases the production of IGF-I, the safety of IGF-I must also be addressed. IGF-I is a short chain peptide that potentially could be absorbed by the gut, especially in infants, and it is also not believed to be species specific (Norcross et al., 1989). Schams et al. (1989) evaluated blood levels of pST and IGF-I prior to and at slaughter of pigs treated with 14 mg pST twice weekly. They found that at 26-27 hours after injection there was no difference between pST levels in treatment and control animals. IGF-I levels, however, were significantly higher in the treated animals. IGF-I levels in the treatment animals returned to control levels at least 4.5 days after injection of the pST. PST itself appears to be of little risk to consumers since it is digested by the gut, is species specific, and does not remain in the circulation of treated animals long. The safety of IGF-I, on the other hand, is more of a concern. More studies are needed to address this issue; however, it appears that pST supplementation in pigs could prove to be a valuable tool benefiting both the producer and the consumer. The present study will investigate the total lipid content, fatty acid profile and cholesterol content in several tissues to determine if the daily administration of pST to pigs produces pork products that are more favorable in light of current dietary recommendations. To determine if pST treatment influences keeping quality, the lipid analyses will be repeated after storage.

MATERIALS AND METHODS

Animals

Sixteen crossbred barrows (castrated male pigs) of a meat-type breed (Hampshire, Duroc, Berkshire, Spotted Poland) were obtained from Bischof Pig Farm, Sherwood, OR. The pigs were assigned according to weight to one of two groups, treatment and control. The weights at the beginning of the study for control and treated animals were 54.5±2.2 kg and 53.9±1.4 kg, respectively. The pigs were housed four to a pen; two pens contained control animals, two contained treated animals. The pens were constructed inside an unheated barn on the OSU campus with wire fencing for barriers and cedar shavings for the floor. Each pen was equipped with a water spigot and feeder, so that all pigs had ad libitum access to food and water. A standard corn-soybean meal based diet (Table 2) was fed to both groups. Since an increase in lean tissue deposition was expected, the diet was formulated to contain amino acids in excess of the requirements for pigs (NRC, 1988b).

Both groups received daily injections. The treatment pigs were injected with 3 mg of porcine somatotropin (pST), (Pitman-Moore, Terre Haute, IN). The pST was solubilized in a carbonate buffer (0.025M $NaHCO_3$, 0.025M Na_2CO_3) to contain 3 mg pST per ml buffer, so that treatment pigs were given 1 ml of the solution. Control pigs were injected with 1 ml of the carbonate buffer only. The injection site was the

Table 2. Diet Composition

Ingredient	Wt % of Diet
Ground yellow corn	67.67
Soybean meal (47% CP[a])	25.60
DYNAFOS (phosphorus)	3.04
Limestone	0.68
Salt (sodium chloride)	0.40
Vitamin/mineral mix[b]	0.25
Fat (beef tallow)	2.00
L-lysine HCL	0.36
<u>Feed Analysis</u>[c]	
Moisture	15.13
Crude Protein	17.65
Fats	4.05
Calcium	0.63
Phosphorus	0.84
Potassium	0.71
Lysine[d]	1.15

[a]CP = crude protein

[b]OSU Swine Premix, Shamrock, Inman and Co., Inc.; per 5 lbs of mix: vitamin A, 3,000,000 IU; vitamin D-3, 1,000,000 IU; vitamin E, 1,000 IU; vitamin B-12, 10 mg; vitamin K, 2,000 mg; riboflavin, 4,000 mg; pantothenic acid, 7,360 mg; niacin, 20,000 mg; choline chloride, 250,000 mg; selenium, 90 mg; ethoxyquin, 56.75 g.

[c]Analysis performed by Pitman-Moore, Inc., Terre Haute, IN

[d]Analysis performed by Hazelton Laboratories, Inc., Madison, WI

subcutaneous fat posterior to the base of the ear. Treatments were given between 0930 and 1030.

The pigs were weighed weekly and food intake per pen was recorded. Pigs were slaughtered when they reached market weight (approximately 106 kg or 234 lbs). Eight pigs, two from each pen were slaughtered on day 50 and the remaining pigs were slaughtered on day 57. Slaughter times were a week apart in order to minimize the range of slaughter weights. All pigs were slaughtered at the Clark Meat Science Laboratory, Oregon State University (OSU).

After chilling for 20 hours at 4°C, traditional carcass measurements were collected by Bob Dickson at the Clark Meat Science Laboratory. Data collected were live weight (weight at time of slaughter), hot weight (weight of dressed carcass prior to chilling), cold weight (weight of chilled carcass), carcass length, backfat thickness, loin eye area, color score, marbling score, dressing percentage, and percentage carcass muscle. Hot weight was estimated by adding 5 lbs to the measured cold weight, a procedure routinely employed at the Meat Science Laboratory. The remaining measurements followed standard procedures in the industry (Boggs and Merkel, 1990). Carcass length was measured with a metal tape from the cranial edge of the first rib to the cranial edge of the aitch bone. Backfat thickness was measured at the tenth rib. The depth of fat, including the skin, was measured as 3/4 of the lateral length of the loin eye muscle perpendicular to the skin surface. Measurement at the tenth rib was used because it is more accurate at this site; the fat at this site forms a flat surface and is well defined (Boggs and Merkel, 1990). Loin eye area was measured on the cross section of the longissimus muscle at the tenth rib interface. Color and marbling were scored on a numerical basis from 1 to 3 on the longissimus muscle at the tenth rib interface. Color was evaluated as follows: pale (white, gray) color was given a score of 1; grayish pink to moderately red a score of 2; and dark red a score of 3. Marbling scores were evaluated as follows: trace to slight marbling was given a score of 1; small to moderate marbling a score of 2; and abundant marbling a score of 3. Both these scores come from the National Pork Producers Council Quality Standards and are part of the USDA Grade Standards for pork carcasses (Boggs and Merkel, 1990). Dressing percentage was calculated by dividing the chilled carcass weight by the live weight and multiplying by 100. Percentage carcass muscle was estimated using the following equation:

$$[10.5 + (0.5 \times \text{hot weight}) + (2 \times \text{loin eye area}) - (14.9 \times \text{10th rib backfat})] / \text{hot wt} \times 100$$

(Boggs and Merkel, 1990).

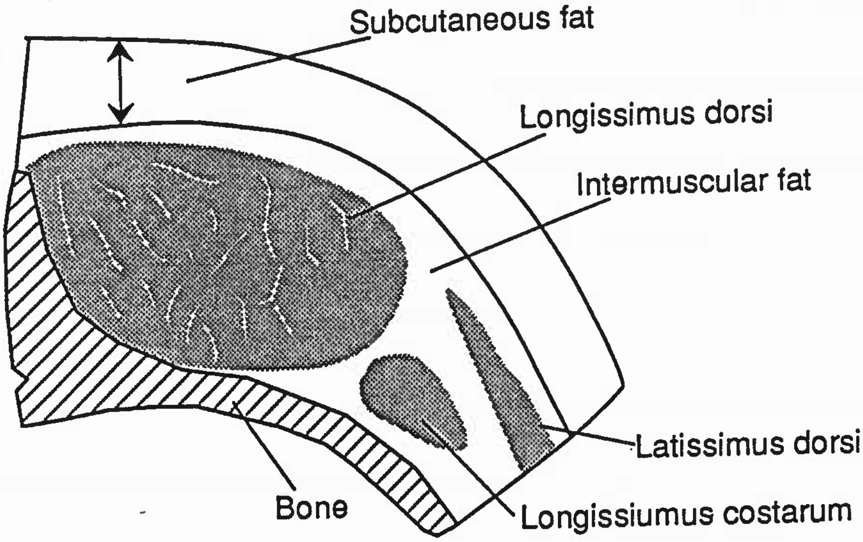
After carcass parameters were collected, samples from the left and right sides of each pig carcass were cut. Loin roasts were cut between the second and tenth vertebrae. Surface fat on the roasts was trimmed to 0.64 cm (1/4"), which is standard practice for this cut in the retail pork industry (National Association of Meat Purveyors, 1976). Chops with skin and all backfat attached were cut from the tenth vertebrae. Chops and loin roasts were individually wrapped in film-lined freezer paper and stored at -20°C until used. Samples from the right side were stored no longer than 2 1/2 weeks before analysis. Samples from the left side were stored for 4 months before analysis.

Sample Preparation

The chops were separated into subcutaneous (SC) adipose tissue, intermuscular (IM) adipose tissue and muscle tissue at the time of analysis (Figure 1). The SC adipose tissue samples were taken from the two layers of fat directly beneath the skin. The IM adipose tissue samples were taken between the latissimus dorsi, longissimus dorsi, and longissimus costarum muscles. The longissimus dorsi muscle was trimmed of all outer fat and used as the muscle tissue sample (Figure 1). All three tissue samples were frozen in liquid nitrogen and powdered in a kitchen blender (Cycle Blend Pulse-Matic 10, Osterizer, Milwaukie, WI). Powdered samples were wrapped in foil, enclosed in freezer bags, and stored at -20°C until further analysis.

At the time of analysis, loin roasts were heated in 191°C electric oven to a final internal temperature of 92°C. Sample cores were removed from cooked roasts and powdered (Zondagh et al., 1986). Powdered samples were stored in

Figure 1. Diagrammatic representation of muscle and adipose tissue in chop



glass jars at -40°C until further analysis. Cooking and preparation of the loin roast samples used for the analyses discussed in this paper (total lipids, fatty acid profile, and cholesterol content) were done by Zoe Ann Holmes and Elaine Schrumpf (Department of Nutrition and Food Management, OSU), who also used the loin roasts for additional objective and subjective sensory evaluations.

Moisture Determination

Moisture was determined on ground samples of SC fat, muscle, and cooked loin roasts. Moisture in the meat samples was determined following AOAC method 950.46 (AOAC, 1990). Samples weighing about 6 grams were dried for 5 hours in a vacuum oven at a temperature of 95-100°C and a pressure of ≤100 mm Hg. Moisture in SC fat was determined following AOAC method 926.12 (AOAC, 1990). Samples weighing about 5 grams were dried for 5 hours in a vacuum oven at a temperature of 70-75°C and a pressure of ≤100 mm Hg. Moisture analysis in the cooked loin roasts was performed by Zoe Ann Holmes and Elaine Schrumpf (Department of Nutrition and Food Management, OSU).

Total Lipids

Fat was extracted from the powdered samples of SC fat, IM fat, muscle, and cooked loin samples following the method of Bligh and Dyer (1959) using methanol and chloroform. About 0.2 g of sample was used for the extraction of fat tissues and about 1.5 g for the extraction of the muscle tissues. Samples were sealed in test tubes with Teflon-lined caps and extracted at room temperature for one hour in a monophasic mixture of methanol, chloroform, and water in the ratio 2.0:1.0:0.8. After extraction chloroform and water were added to make a biphasic system with the ratio of methanol, chloroform, and water 1.0:1.0:0.9. The chloroform layer containing the lipid was removed to a clean test tube. Chloroform was evaporated under nitrogen in a 50°C water bath and the remaining lipid was resuspended in iso-octane, sealed with Teflon-lined caps, and stored at -20°C until used for total lipids or fatty acid profile. Total lipids were measured gravimetrically on an aliquot of the lipid extract after removal of chloroform under nitrogen and overnight drying in 70°C oven.

Fatty Acid Profile

Another aliquot of the fat extract was used to determine the fatty acid profile in SC fat, IM fat, muscle, and cooked loin. The fat extracts were methylated using 10% boron trichloride in methanol (Sigma Chemical Co., St. Louis, MO), (Song and Wander, 1991). The resulting methyl esters were identified by comparison to authentic standards (Nu Chek Prep, Inc., Elysian, MN) using capillary column gas chromatography. The methyl ester of heptadecanoic acid (17:0) (Nu Chek Prep, Inc., Elysian, MN) was used as an internal standard to determine the amounts of identified fatty acids. A Hewlett Packard 5890 Gas Chromatograph (GC) interfaced with a 30m x 0.25mm i.d., 0.25 micron film thickness SP 2330 column (Supelco, Inc., Bellefonte,PA) was used. Helium was the carrier gas at a flow rate of 0.6 ml/min and with a split ratio of 1:150. Hydrogen and air flow rates were 33 ml/min and 370 ml/min, respectively. Injector and detector temperatures were 235°C and 240°C, respectively. The column was programmed for 4 minutes at 170°C and then increased at a rate of 3°C/min to a maximum temperature of 225°C. The GC was interfaced with a Hewlett-Packard 18550A microprocessor which reported retention time, peak area, and area percent for each component. These data were transferred directly to a microcomputer via a commercial communication program (Masterlink, Infometrix Inc., Seattle, WA). The transferred data were imported into Lotus 1-2-3 (Release 2.01, 1986 Lotus Development Corporation, Cambridge, MA). For each tissue, a composite worksheet with calculations for the weight percent and the weights of the identified fatty acids was constructed.

Cholesterol Determination

Cholesterol content was determined on powdered muscle and cooked loin samples. About 0.5 grams of a sample were saponified using potassium hydroxide and ethanol according to the procedure of Kovacs et al. (1979). The sample, potassium hydroxide, ethanol, and a stir bar were tightly sealed in a test tube with a Teflon-lined cap. The test tubes were placed in a beaker of boiling water on top of a hot plate with a magnetic stirrer and allowed to saponify for one hour. The unsaponifiable fraction was extracted with hexane. An aliquot of the extract (¼ of the extract) was evaporated under nitrogen and immediately resuspended in 0.20 ml pyridine and derivitized with 0.20 ml BSTFA (bis-trimethylsilyl-trifluoracetamide) plus 1% TMCS (trimethylchlorosilane) (Regis Chemical Company, Morton Grove, Illinois). After addition of the derivitizing agent, the samples were promptly analyzed using capillary column gas chromatography. Cholesterol was the only sterol identified by comparison to authentic standards (Brassicasterol, stigmasterol, campesterol, ß-sitosterol, Supelco, Inc., Bellefonte, PA, and cholesterol, Nu Chek Prep, Inc., Elysian, MN). The Hewlett Packard 5890 GC equipped with a 30m x 0.245mm i.d., 0.15 micron film thickness DB-17 column (J and W Scientific, Folsom, CA) was used. Helium was the carrier gas at a flow rate of 2 ml/min and a split ratio of 1:55. Hydrogen and air flow rates were 35 ml/min and 400 ml/min, respectively. The injector and detector temperatures were 245°C and 250°C, respectively. The column oven was operated isothermally at 240°C. For quantitation of cholesterol, 5-alpha cholestane (Matreya, Inc., Pleasant Gap, PA) was added as an internal standard prior to saponification.

Recovery of cholesterol and its esters was determined by adding cholesterol and cholesteryl palmitate (Nu Chek

Prep, Inc., Elysian, MN) to samples prior to saponification. Recovery for free cholesterol and cholesteryl palmitate was 98% and 95%, respectively.

Statistical Analysis

Data were analyzed for statistical significance of pST treatment and storage using Statistical Analysis System (6.03 Statistical Pak, SAS Institute Inc., Cary, NC). The effect of pST treatment on carcass parameters was assessed using a two-tailed Student's t-test (Snedecor and Cochran, 1989). For color and marbling scores, the Wilcoxon rank sum test was used (Snedecor and Cochran, 1989). Moisture, total lipids, individual fatty acids, and cholesterol were assessed by two way analysis of variance in a design of two treatments (control and pST treatment) and two storage times (0 months and 4 months) (Snedecor and Cochran, 1989). For all analyses, statistical significance was defined as $p \leq 0.05$.

RESULTS

Animals

Since pigs were housed four to a pen, individual feed intake data were not obtained. Therefore, growth performance data for each of the four pens, which are presented in Table 3 as average values per pig for each of the four pens, were not treated statistically.

The average initial weights were 55.9±2.0 and 53.1±2.3 kg for control pens 1 and 3, and 53.1±2.0 and 54.7±0.8 kg for treatment pens 2 and 4. At the time of slaughter the average weights for the pigs in the control pens 1 and 3 were similar (106.5±2.9 and 104.1±3.0 kg, respectively); that in the treatment pens 2 and 4 averaged 110.8±1.1 kg and 103.1±3.3 kg, respectively. The lower slaughter weight of the pigs in pen 4 may be due to the fact that for part of the study two pigs in this pen were ill. During week 5 of the study the growth of pigs #284 and #290 deviated from the established growth curve of the pigs in pen 4 (see Figure 2d). This deviation in growth rate was not observed in any of the pigs from the other pens (see Figures 2a, 2b, 2c).

In pen 4, pig #284 appeared sick at the beginning of the third week of the study. During this week an antibiotic (Tylan 50) was administered. Towards the end of the fourth week this pig still appeared sick so a different antibiotic (Naxcel) was given. A weight gain of less than 0.5 kg was achieved by this pig during the fifth week. Antibiotic

Table 3. Effect of pST on growth performance[a]

	Control		pST	
	Pen 1 n=4	Pen 3 n=4	Pen 2 n=4	Pen 4 n=4
Initial Wt (kg)	55.9±2.0	53.1±2.3	53.1±2.0	54.7±0.8
Final Wt (kg)	106.5±2.9	104.1±3.0	110.8±1.2	103.1±3.3
Gain (kg)[b]	50.6±1.3	51.0±0.8	57.7±1.8	48.4±3.0
Days on Study[c]	52.5	52.5	52.5	52.5
ADG (kg/day)[d]	0.97±0.05	0.98±0.05	1.10±0.02	0.93±0.09
Feed Intake (kg)[e]	163.0	143.3	162.5	163.7
Feed Efficiency[f]	3.23±0.09	2.81±0.05	2.82±0.09	3.42±0.22

[a]Values are means ± SEM
[b]Average total gain per pig
[c]On day 50, 2 pigs from each pen were slaughtered and the remaining pigs were slaughtered on day 57
[d]Average daily gain per pig
[e]Feed intake per pig was calculated as total intake per pen divided by 4
[f]Feed efficiency per pig was the ratio of feed intake (kg) to gain (kg)

Figure 2a. Control pen 1

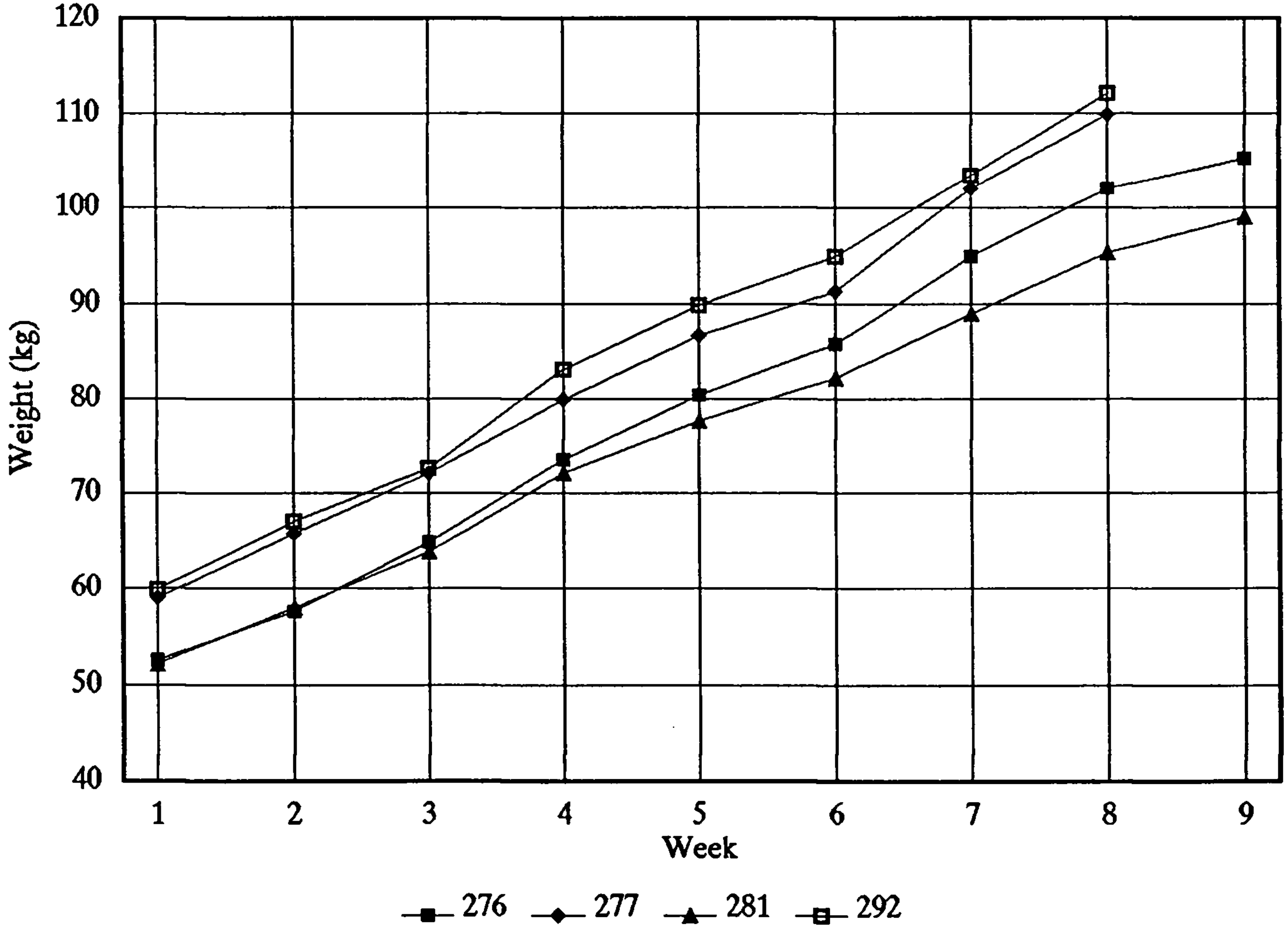


Figure 2b. Control pen 3

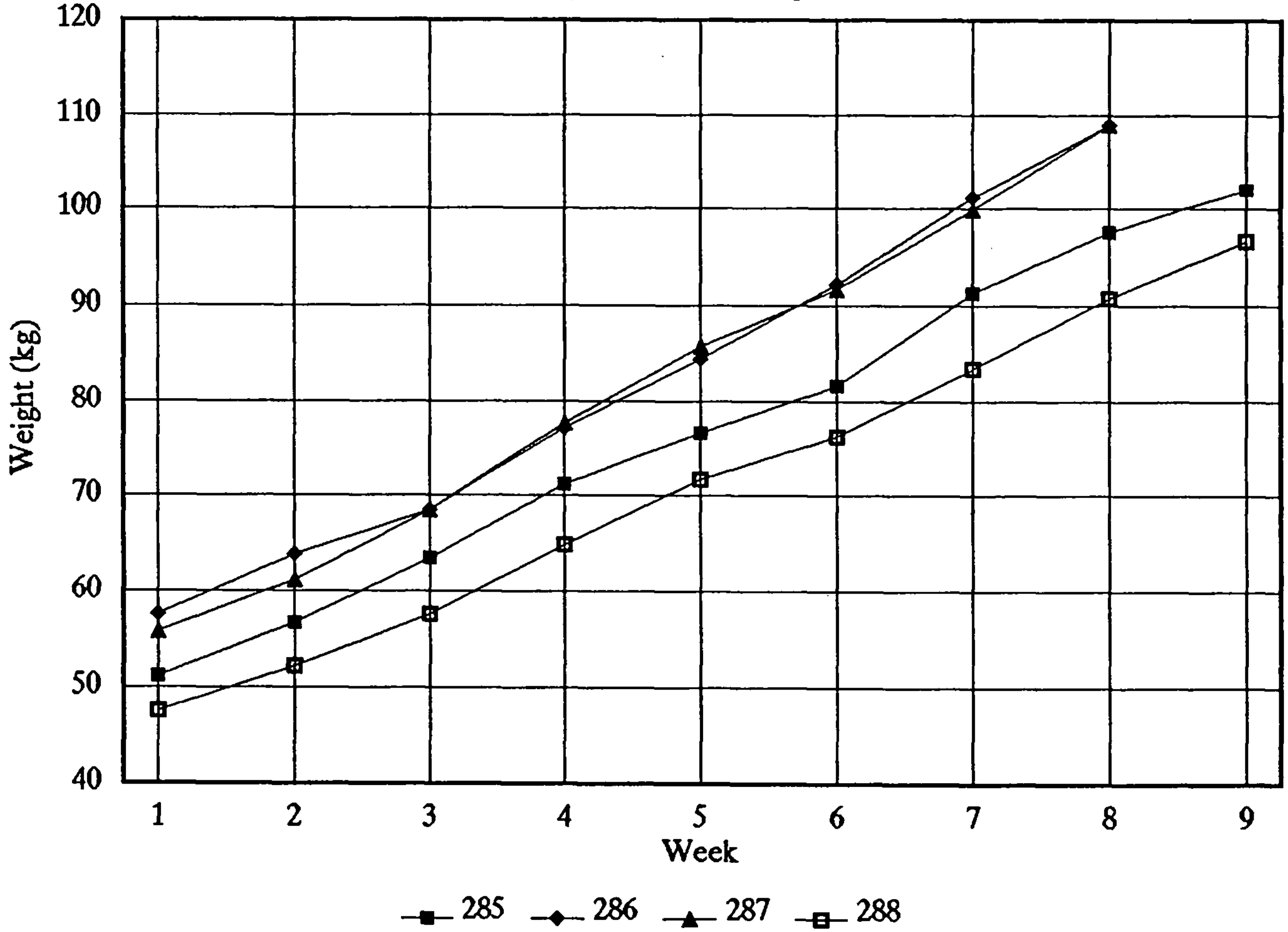


Figure 2c. Treatment pen 2

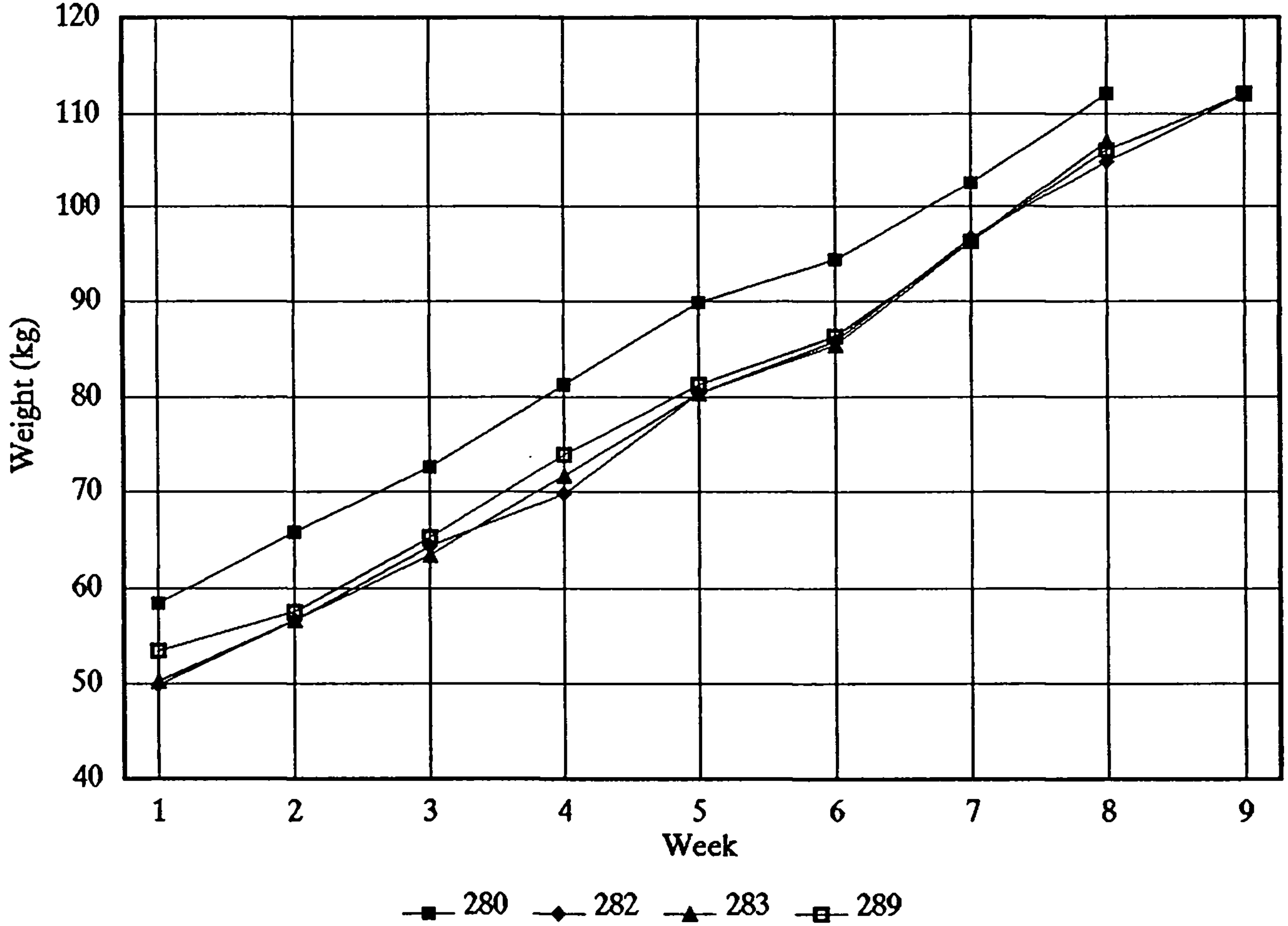
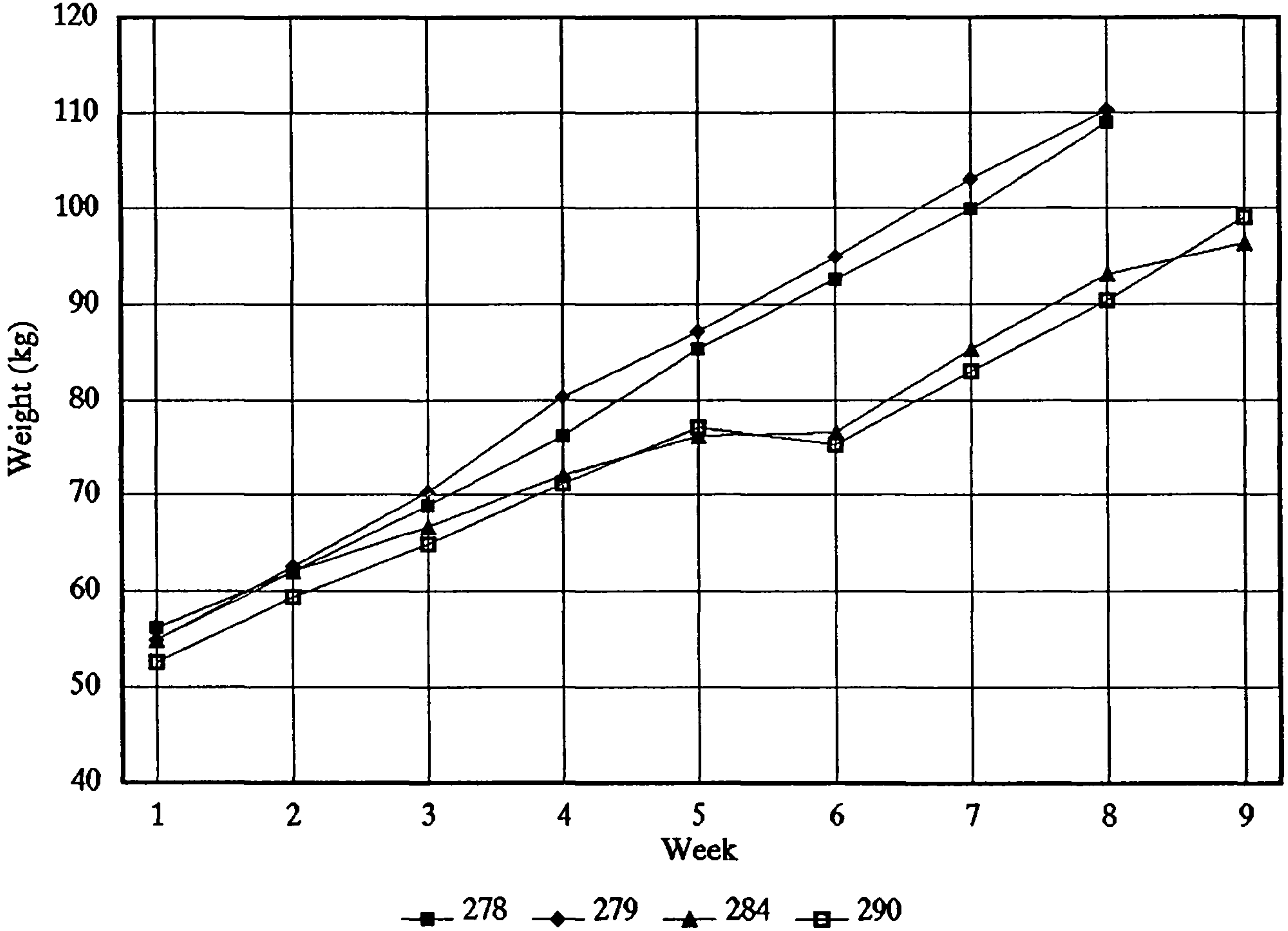


Figure 2d. Treatment pen 4



treatment was completed and the weight gain the following week improved to 3.6 kg. Pig #290 from this same pen failed to gain weight during the fifth week, and in fact had a loss of 1.8 kg. The following week, however, the pig's appetite appeared normal and a weight gain of 7.7 kg was recorded so no antibiotic treatment was given.

The poor weight gain for the two pigs in treatment pen 4, during the fifth week of the study, reduced the average slaughter weight that was attained by this pen, compared to the other pens. Average total gain per pig was also affected by the poor gain in treatment pen 4 during the fifth week. Average gain for treatment pen 4 was 48.4±3.0 kg, whereas average gain for treatment pen 2 was 57.7±1.8 kg. Average gain for control pens 1 and 3 was similar (50.6±1.3 and 51.0±0.8 kg, respectively). If pen 4 is excluded, treatment pigs gained nearly 13% more weight than control pigs. If gain is expressed as average daily gain (ADG), taking into account the number of days each pig was on the study, the relationship is the same. ADG for treated pigs in pen 2 was 1.10±0.02 kg/day, 13% higher than the ADG of 0.97±0.05 and 0.98±0.05 kg/day for control pens 1 and 3, respectively.

Feed intake was similar for all pens except for control pen 3, which showed nearly a 12% decrease in feed intake when compared to the other pens (143 kg feed/pig vs 163 kg feed/pig). A treatment effect on feed intake was not observed. If feed intake is used to calculate feed efficiency, kilograms of feed required per kilogram of gain, the result is similar for control and treatment groups. This information must be interpreted cautiously, however, considering the fact that feed intake is an averaged value, feed intake of pen 3 was unexpectedly low, and the animals in pen 4 had a poor weight gain.

At the time of slaughter, it was noted that four pigs, two in control pen 3 and one in each of the treated pens 2 and 4, each had one testicle. Because growth rate and lean composition are generally higher in boars (intact males) compared to barrows (castrated males) (Boggs and Merkel, 1990), the pigs with one testicle were eliminated from all statistical analyses. They were not eliminated from the growth performance data because feed intake was measured on the entire pen and then calculated for each pig.

The carcass parameters for the animals are given in Table 4. There was no significant difference in live weight, hot weight, cold weight, carcass length, loin eye area (LEA), color score, and marbling score between the control and treated pigs. There were significant changes in dressing percentage, backfat thickness, and carcass muscle percentage. Dressing percentage decreased 4% (75.97±1.73 vs 73.22±1.53, p=0.02), backfat thickness decreased 37% (3.43±0.27 vs 2.16±0.11 cm, p=0.001), and muscle percentage increased 10% (49.50±2.74 vs 54.48±1.05, p=0.005) in

Table 4. Effect of pST on carcass parameters[a]

Measurement	Control	pST	P-value[b]
Live Weight (kg)	106.1±2.0	106.1±2.8	NS
Hot Weight (kg)	80.6±1.2	77.6±2.1	NS
Cold Weight (kg)	78.2±1.1	75.4±2.1	NS
Dressing (%)[c]	76.0±1.7	73.2±1.5	0.02
Loin Eye Area (LEA, cm^2)	28.1±2.4	31.7±1.2	NS
Carcass Length (cm)	77.4±0.8	77.3±0.7	NS
Backfat Thickness (cm)[d]	3.4±0.3	2.2±0.1	0.001
Carcass Muscle (%)[e]	49.5±2.7	54.5±1.1	0.005
Color Score	3.0±0.0	3.0±0.0	NS
Marbling Score	1.3±0.5	1.0±0.0	NS

[a]Values are means ± SEM; n=6
[b]NS = not significant at $p<0.05$
[c]Dressing % = Cold Weight/Live Weight x 100
[d]Backfat thickness measured at the 10th rib
[e]Carcass Muscle % =

$$\frac{10.5+(0.5\text{xHot Wt})+(2\text{xLEA})-(14.9\text{x10th Rib Backfat})}{\text{Hot Wt}} \times 100$$

pST-treated pigs.

Moisture

The percent moisture for the SC fat, raw muscle, and cooked loin roast samples are given in Table 5. There was an insufficient quantity of tissue to determine percent moisture in IM fat. Moisture increased 23% in SC fat with treatment (9.91±0.36 vs 12.83±0.58, p=0.0001), but was unchanged by storage. Neither storage nor treatment affected the moisture content of raw muscle. Moisture in the cooked loin was not influenced by treatment, but was increased slightly (3.5%) after storage (63.16±0.71 vs 65.36±0.70, p=0.006).

Total Lipids

Since there was a change in moisture with pST-treatment in SC fat and with storage in cooked loin, total lipid content is expressed on both a wet and dry weight basis (Table 6). There was no effect of storage on the total lipid content in any of the tissues on either basis. There was, however an effect of pST-treatment. When expressed as a percentage of wet tissue, total lipids in SC fat, IM fat, raw muscle, and cooked loin from treated animals decreased 6% (p=0.0006), 4% (p=0.05), 22% (p=0.04), and 33% (p=0.001), respectively. In a 100 gram portion of sample this represented fat losses of 4.6 g in SC fat, 3.5 g in IM fat, 0.6 g in raw muscle, and 1.8 g in cooked loin.

Table 5. Effect of pST and storage on percent moisture (g/100g wet weight)[a]

	0 Months		4 Months		P-value[b]		
Tissue	Control	pST	Control	pST	Trt	Stor	TrtxStor
SC Fat	9.9±0.4	12.3±0.5	10.0±0.4	13.3±0.6	0.0001	NS	NS
Raw Muscle	73.4±0.5	73.6±0.2	73.7±0.3	73.6±0.3	NS	NS	NS
Cooked Loin	62.5±0.9	63.8±0.5	65.9±0.7	64.9±0.7	NS	0.006	NS

[a]Values are means ± SEM; n=6
[b]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage

Table 6. Effect of pST and storage on total lipids[a]

	0 Months		4 Months		P-value[b]		
Tissue	Control	pST	Control	pST	Trt	Stor	TrtxStor
			g/100g Wet Weight				
SC Fat	81.8±0.8	75.7±1.0	81.5±1.6	78.4±0.9	0.0006	NS	NS
IM Fat	77.5±1.0	75.6±2.2	81.1±0.9	75.9±2.1	0.05	NS	NS
Raw Muscle	2.6±0.3	2.3±0.2	3.2±0.5	2.2±0.2	0.04	NS	NS
Cooked Loin	5.7±0.6	3.7±0.1	5.4±0.6	3.7±0.4	0.001	NS	NS
			g/100g Dry Weight				
SC Fat	90.8±0.8	86.4±0.9	92.4±2.9	90.5±0.6	NS[c]	NS	NS
Raw Muscle	9.8±1.2	8.6±0.5	12.0±1.7	8.4±0.6	0.04	NS	NS
Cooked Loin	15.2±1.4	10.3±0.4	15.6±1.6	10.6±1.2	0.0007	NS	NS

[a]Values are means ± SEM; n=6

[b]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage

[c]$p=0.06$

When the total lipid content of SC fat is expressed as a percentage of dry tissue, there is still a decrease with treatment; however, it is only modestly significant ($p=0.06$). The total lipid content of raw muscle and cooked loin expressed as a percentage of dry tissue decreased 22% (10.91 ± 1.41 vs 8.51 ± 0.54, $p=0.04$) and 32% (15.39 ± 1.49 vs 10.44 ± 0.84, $p=0.0007$).

Fatty Acid Profile

The fatty acid profile was measured for four tissues, subcutaneous fat, intermuscular fat, raw longissimus muscle, and cooked loin. Fatty acid profile data are presented in the literature in three formats (grams per 100 grams wet weight of tissue, grams per 100 gram dry weight of tissue, and relative weight percent), depending upon the intended use. All three formats are given here.

Subcutaneous fat. The fatty acid profile for SC fat is given as grams of fatty acid per 100 grams of wet tissue in Table 7 and grams fatty acid per 100 grams dry tissue in Table 8. In Table 9, individual fatty acids are reported as weight percentages of all fatty acids. Fatty acids are reported to two decimal places only to show those fatty acids present in small quantities and does not imply accuracy.

Expressed on a wet weight basis, 16:0 (palmitic, $p=0.0006$), 18:0 (stearic, $p=0.002$), 18:1(n-9)t (elaidic, $p=0.05$), 18:1(n-9)c (oleic, $p=0.002$), and 20:1(n-9) (11-

Table 7. Effect of pST and storage on the fatty acid composition of raw subcutaneous adipose tissue (g/100g wet weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	0.85±0.04	0.84±0.01	0.83±0.01	0.83±0.03	NS	NS	NS
16:0	18.71±0.44	16.36±0.51	16.65±0.39	15.83±0.35	0.0006	0.003	NS
16:1(n-7)	1.50±0.08	1.67±0.10	1.48±0.05	1.62±0.10	NS	NS	NS
18:0	9.56±0.41	7.91±0.22	8.85±0.44	8.08±0.22	0.002	NS	NS
18:1(n-9)t	0.36±0.02	0.34±0.02	0.56±0.03	0.48±0.03	0.05	0.0001	NS
18:1(n-9)c	30.77±0.62	27.25±0.65	28.97±1.02	27.26±0.46	0.002	NS	NS
18:1(n-7)	3.18±0.25	2.95±0.11	2.51±0.07	2.57±0.07	NS	0.002	NS
18:2(n-6)	10.93±0.38	10.80±0.23	10.30±0.41	10.56±0.26	NS	NS	NS
18:3(n-3)	0.49±0.02	0.48±0.03	0.52±0.02	0.52±0.02	NS	NS	NS
20:0	0.18±0.00	0.10±0.00	0.16±0.02	0.14±0.01	NS	NS	NS
20:1(n-9)	0.65±0.04	0.57±0.02	0.77±0.04	0.69±0.03	0.02	0.0008	NS
20:2(n-6)	0.44±0.02	0.42±0.02	0.51±0.03	0.50±0.02	NS	0.005	NS
20:4(n-6)	0.20±0.03	0.18±0.01	0.20±0.04	0.22±0.02	NS	NS	NS
Total SFA[d]	29.15±0.83	25.14±0.64	26.49±0.83	24.58±0.47	0.0005	0.03	NS
Total MUFA[e]	36.45±0.88	32.78±0.79	34.29±1.11	32.62±0.65	0.006	NS	NS
Total PUFA[f]	11.92±0.40	11.86±0.24	11.49±0.47	11.81±0.28	NS	NS	NS
Total FA[g]	77.52±1.54	69.78±1.45	72.27±1.88	69.00±1.16	0.002	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of wet sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt =pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:4(n-6)
[g]Total FA = SFA + MUFA + PUFA

Table 8. Effect of pST and storage on the fatty acid composition of raw subcutaneous adipose tissue (g/100g dry weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	0.94±0.04	0.96±0.01	0.92±0.01	0.95±0.03	NS	NS	NS
16:0	20.75±0.45	18.66±0.54	18.49±0.41	17.91±0.31	0.006	0.002	NS
16:1(n-7)	1.66±0.09	1.91±0.11	1.64±0.07	1.87±0.11	0.02	NS	NS
18:0	10.60±0.44	9.02±0.25	9.83±0.47	9.32±0.22	0.009	NS	NS
18:1(n-9)t	0.40±0.02	0.39±0.02	0.62±0.03	0.55±0.03	NS	0.0001	NS
18:1(n-9)c	34.03±0.66	31.08±0.68	32.18±1.15	31.44±0.41	0.02	NS	NS
18:1(n-7)	3.52±0.28	3.37±0.12	2.79±0.08	2.97±0.07	NS	0.002	NS
18:2(n-6)	12.12±0.43	12.32±0.27	11.45±0.49	12.19±0.30	NS	NS	NS
18:3(n-3)	0.54±0.03	0.55±0.03	0.57±0.02	0.60±0.03	NS	NS	NS
20:0	0.20±0.00	0.12±0.00	0.18±0.02	0.16±0.01	NS	NS	NS
20:1(n-9)	0.72±0.04	0.65±0.02	0.85±0.04	0.80±0.03	NS	0.0004	NS
20:2(n-6)	0.49±0.03	0.48±0.02	0.56±0.03	0.58±0.02	NS	0.003	NS
20:4(n-6)	0.22±0.03	0.21±0.01	0.23±0.04	0.26±0.03	NS	NS	NS
Total SFA[d]	32.33±0.85	28.68±0.67	29.42±0.87	28.35±0.38	0.004	0.04	NS
Total MUFA[e]	40.43±0.94	37.39±0.83	38.09±1.25	37.63±0.61	NS	NS	NS
Total PUFA[f]	13.23±0.44	13.53±0.29	12.77±0.56	13.63±0.32	NS	NS	NS
Total FA[g]	85.98±1.57	79.59±1.52	80.28±2.12	79.60±0.95	0.04	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of dry sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 +20:0
[e]Total MUFA = 16:1(n-7) +18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:4(n-6)
[g]Total FA = SFA + MUFA + PUFA

Table 9. Effect of pST and storage on the fatty acid composition of raw subcutaneous adipose tissue lipid (weight percent)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	1.09±0.04	1.20±0.01	1.14±0.03	1.19±0.02	0.02	NS	NS
16:0	24.05±0.37	23.26±0.27	22.89±0.38	22.33±0.23	0.05	0.004	NS
16:1(n-7)	1.93±0.09	2.38±0.12	2.03±0.08	2.33±0.12	0.002	NS	NS
18:0	12.28±0.46	11.26±0.33	12.16±0.52	11.63±0.36	NS	NS	NS
18:1(n-9)t	0.46±0.03	0.49±0.02	0.78±0.06	0.68±0.03	NS	0.0001	NS
18:1(n-9)c	39.54±0.40	38.76±0.29	39.73±0.58	39.20±0.27	NS	NS	NS
18:1(n-7)	4.07±0.28	4.20±0.12	3.45±0.05	3.70±0.06	NS	0.002	NS
18:2(n-6)	14.04±0.40	15.37±0.23	14.14±0.41	15.19±0.26	0.002	NS	NS
18:3(n-3)	0.63±0.02	0.68±0.04	0.71±0.02	0.75±0.03	NS	0.02	NS
20:0	0.22±0.00	0.15±0.01	0.22±0.02	0.20±0.01	NS	NS	NS
20:1(n-9)	0.83±0.04	0.81±0.04	1.05±0.03	1.00±0.05	NS	0.0001	NS
20:2(n-6)	0.57±0.03	0.61±0.03	0.69±0.03	0.72±0.03	NS	0.0007	NS
20:4(n-6)	0.26±0.02	0.26±0.02	0.28±0.05	0.32±0.03	NS	NS	NS
Total SFA[d]	37.45±0.78	35.76±0.42	36.40±0.89	35.35±0.47	0.05	NS	NS
Total MUFA[e]	46.83±0.59	46.63±0.43	47.05±0.57	46.91±0.42	NS	NS	NS
Total PUFA[f]	15.32±0.40	16.88±0.30	15.78±0.49	16.98±0.26	0.002	NS	NS

[a]Expressed as the weight percent of the fatty acid methyl esters
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:4(n-6)

eicosaenoic acid, p=0.02) all decreased approximately 11% with pST-treatment. Since the contents of 18:1(n-9)t and 20:1(n-9) are each less than 1% of the total sum of the fatty acids, these changes are quite small, 0.05 g for 18:1(n-9) and 0.08 g for 20:1(n-9). The fatty acids 16:0, 18:0, and 18:1(n-9)c together, on the other hand, represent about 75% of the total fatty acids. The decreases in these fatty acids represented a 1.6 g change in 16:0, a 1.2 g change in 18:0, and a 2.6 g change in 18:1(n-9)c. There were no significant changes produced in the amount of 14:0 (myristic), 16:1(n-7) (palmitoleic), 18:1(n-7) (vaccenic), 18:2(n-6) (linoleic), 18:3(n-3) (linolenic), 20:0 (arachidic), 20:2(n-6) (11,14-eicosadienoic), and 20:4(n-6) (arachidonic) by pST treatment. Reflecting changes in individual fatty acids, total saturated fatty acids (SFA) decreased 11% (27.82±0.83 vs 24.86±0.56 g/100g, p=0.0006), total monounsaturated fatty acids (MUFA) decreased 8% (35.37±1.00 vs 32.70±0.72 g/100g, p=0.006), and total polyunsaturated fatty acids (PUFA) were unchanged with treatment. The sum of all identified fatty acids decreased 7% with treatment, a loss of 5.5 g per 100 g of tissue.

Since subcutaneous fat contains relatively little moisture, expressing the data on a dry weight basis caused small increases in the amount of each fatty acid. The effect of treatment, however, remained very similar. Again the fatty acids which contributed the larger amounts to the total amount of fatty acids, 16:0, 18:0, and 18:1(n-9)c, decreased, although the average decrease was slightly smaller (8%). The results in regards to minor fatty acids differed slightly from the results expressed on a wet weight basis. On a dry weight basis there was a 15% increase in 16:1(n-7) (1.65±0.08 vs 1.89±0.11 g/100g) which was significant ($p=0.02$), whereas on a wet weight basis the 10% increase in 16:1(n-7) was not significant. On a dry weight basis the decreases in 18:1(n-9)t and 20:1(n-9) were not significant, whereas they were on a wet weight basis. Similarly the 5% decrease in total MUFA seen on a dry weight basis (39.26±1.01 vs 37.51±0.72 g/100g) was not significant while the 8% decrease when the data were expressed on a wet weight basis was.

When the data were expressed on a relative weight percent basis, a somewhat different picture emerged. The percent of 14:0 increased 7.5% ($p=0.02$); 16:1(n-7) increased 18.9% ($p=0.002$); and 18:2(n-6) increased 8.4% ($p=0.002$) with pST treatment. The relative weight percent of 16:0 decreased 2.9% ($p=0.05$). Overall, the percent of SFA decreased 3.7% ($p=0.05$) and that of PUFA increased 8.9% ($p=0.002$). There was no change in the percent of MUFA.

The effect of storage on SC fat was the same, expressed on both a wet and dry weight basis (Table 7, 8) in keeping with the fact that there was no change to the moisture content with storage. On a wet weight basis, there was a 7%

decrease or a loss of 1.3 g in 16:0 (p=0.003), a 17% decrease or a loss of 0.53 g in 18:1(n-7) (p=0.002), and a 49% increase or a gain of 0.2 g in 18:1(n-9)t (p=0.0001). There were nearly 20% increases in both 20:1(n-9) (p=0.0008) and 20:2(n-6) (p=0.005). Since these two fatty acids, like 18:1(n-9)t, were present in small amounts the changes were less than 0.2 g for each fatty acid. Total SFA decreased 6%, a loss of 1.6 g (p=0.03), and total MUFA and PUFA were unchanged with storage.

When the storage effects on SC fat were investigated based on weight percents (Table 9), there were increases in the percent of 18:1(n-9)t (53.7%, p=0.0001), 18:3(n-3) (11.4%, p=0.02), 20:1(n-9) (25.0%, p=0.0001), and 20:2(n-6) (19.5%, p=0.0007). The percent of 16:0 and 18:1(n-7) both decreased with storage (4.4%, p=0.004 and 13.5%, p=0.002, respectively). Storage had no effect on the percent of SFA, MUFA, or PUFA.

Intermuscular fat. The fatty acid profile of IM fat is given only on a wet weight basis (Table 10) since, as stated earlier, there was insufficient material to measure the moisture content. The changes that occurred were similar to those that occurred in subcutaneous fat. With pST treatment, 16:0 (p=0.002), 18:0 (p=0.01), 18:1(n-9)c (p=0.01), and 20:1(n-9) (p=0.03) all decreased about 11% and 20:0 (arachidic, p=0.04) decreased 22%. This represented changes of 2.12 g for 16:0, 1.17 g for 18:0, 2.19 g for

Table 10. Effect of pST and storage on the fatty acid composition of raw intermuscular adipose tissue (g/100g wet weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	0.88±0.05	0.81±0.04	0.91±0.03	0.85±0.05	NS	NS	NS
16:0	19.46±0.35	17.24±0.66	18.45±0.45	16.44±0.83	0.002	NS	NS
16:1(n-7)	1.49±0.05	1.50±0.11	1.48±0.05	1.49±0.10	NS	NS	NS
18:0	10.26±0.49	9.05±0.28	10.22±0.48	9.08±0.42	0.01	NS	NS
18:1(n-9)t	0.33±0.01	0.31±0.03	0.45±0.02	0.44±0.02	NS	0.0001	NS
18:1(n-9)c	29.27±0.45	27.11±0.90	29.04±0.62	26.83±0.99	0.01	NS	NS
18:1(n-7)	3.37±0.46	3.30±0.30	2.13±0.13	2.15±0.15	NS	0.0006	NS
18:2(n-6)	9.44±0.42	9.84±0.13	9.56±0.43	10.07±0.36	NS	NS	NS
18:3(n-3)	0.45±0.03	0.41±0.03	0.50±0.01	0.51±0.02	NS	0.007	NS
20:0	0.18±0.01	0.13±0.00	0.17±0.01	0.15±0.01	0.04	NS	NS
20:1(n-9)	0.58±0.04	0.53±0.02	0.73±0.03	0.64±0.03	0.03	0.0004	NS
20:2(n-6)	0.37±0.02	0.36±0.01	0.47±0.02	0.46±0.02	NS	0.0001	NS
20:4(n-6)	0.14±0.00	0.16±0.00	0.20±0.02	0.23±0.02	NS	NS	NS
Total SFA[d]	30.69±0.88	27.14±0.91	29.74±0.95	26.52±1.27	0.003	NS	NS
Total MUFA[e]	35.04±0.83	32.70±1.10	33.83±0.71	31.56±1.24	0.03	NS	NS
Total PUFA[f]	10.29±0.42	10.63±0.13	10.73±0.46	11.26±0.38	NS	NS	NS
Total FA[g]	76.02±0.98	70.47±2.03	74.30±1.06	69.34±2.79	0.01	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of wet sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:4(n-6)
[g]Total FA = SFA + MUFA + PUFA

18:1(n-9)c, 0.04 g for 20:0, and 0.07 g for 20:1(n-9). Total SFA decreased 11% (30.22±0.77 vs 26.83±1.09 g/100g, p=0.003), total MUFA decreased 7% (34.44±0.77 vs 32.13±1.17 g/100g, p=0.03), and total PUFA was unchanged. The total sum of all identified fatty acids decreased 7% with treatment, a loss of 5.25 g per 100 g of tissue.

Expressing the data as weight percent, two fatty acids in IM fat were effected by pST treatment (Table 11). There was a decrease in 16:0 (4.8%, p=0.009) and an increase in 18:2(n-6) (12.7%, p=0.001). Changes in the percentage of total SFA and total PUFA were also observed. Total SFA decreased 4.8% (p=0.03) and total PUFA increased 12.8% (p=0.001) with pST treatment.

With storage 18:1(n-9)t (p=0.0001), 18:3(n-3) (p=0.007), 20:1(n-9) (p=0.0004), and 20:2(n-6) (p=0.0001) all increased and 18:1(n-7) (p=0.0006) decreased on a wet weight basis (Table 10). Of these changes the greatest was for 18:1(n-7), which decreased by 1.2 g after storage. For the other fatty acids, the changes were each less than 0.2 g per 100 g of tissue.

The storage effects for IM fat on a weight percent basis were similar (Table 11). The percent of 18:1(n-9)t (p=0.0001), 18:3(n-3) (p=0.005), 20:1(n-9) (p=0.0001) and 20:2(n-6) (p=0.0001) all increased and 18:1 (n-7) (p=0.0004) decreased with storage. In addition, there was a 7.1% increase in the percent of PUFA (p=0.03).

Table 11. Effect of pST and storage on the fatty acid composition of raw intermuscular adipose tissue lipid (weight percent)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	1.16±0.06	1.14±0.04	1.22±0.04	1.21±0.03	NS	NS	NS
16:0	25.50±0.43	24.31±0.33	24.71±0.55	23.49±0.33	0.009	NS	NS
16:1(n-7)	1.96±0.08	2.12±0.11	1.99±0.08	2.13±0.09	NS	NS	NS
18:0	13.45±0.60	12.79±0.26	13.67±0.55	13.00±0.31	NS	NS	NS
18:1(n-9)t	0.43±0.02	0.44±0.05	0.60±0.03	0.64±0.01	NS	0.0001	NS
18:1(n-9)c	38.37±0.53	38.26±0.29	38.88±0.51	38.46±0.33	NS	NS	NS
18:1(n-7)	4.41±0.58	4.65±0.39	2.85±0.19	3.07±0.12	NS	0.0004	NS
18:2(n-6)	12.35±0.47	13.92±0.26	12.81±0.59	14.44±0.24	0.001	NS	NS
18:3(n-3)	0.59±0.04	0.58±0.04	0.67±0.02	0.73±0.03	NS	0.005	NS
20:0	0.24±0.00	0.19±0.02	0.23±0.02	0.22±0.02	NS	NS	NS
20:1(n-9)	0.76±0.05	0.74±0.02	0.98±0.03	0.92±0.05	NS	0.0001	NS
20:2(n-6)	0.49±0.03	0.51±0.02	0.64±0.02	0.66±0.03	NS	0.0001	NS
20:4(n-6)	0.19±0.00	0.25±0.00	0.26±0.02	0.33±0.03	NS	NS	NS
Total SFA[d]	40.22±1.08	38.31±0.44	39.82±1.08	37.92±0.52	0.03	NS	NS
Total MUFA[e]	45.92±0.96	46.14±0.42	45.30±0.67	45.22±0.36	NS	NS	NS
Total PUFA[f]	13.46±0.45	15.05±0.33	14.38±0.63	16.16±0.28	0.001	0.03	NS

[a]Expressed as the weight percent of the fatty acid methyl esters
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:4(n-6)

Raw longissimus muscle. When the fatty acid profile of raw longissimus muscle was expressed either on a wet or dry weight basis (Tables 12 and 13), the effect of treatment and storage did not change in keeping with the fact that treatment and storage did not influence the moisture content of this tissue. On a wet weight basis 16:0 ($p=0.02$), 18:0 ($p=0.02$), 18:1(n-9)c ($p=0.03$), and 18:1(n-7) ($p=0.04$) all decreased about 32%, 14:0 ($p=0.04$) decreased 50%, and 16:1(n-7) ($p=0.05$) decreased 22% with treatment. For 18:1(n-9)c, the fatty acid present in the greatest quantity, this accounted for a loss of 0.41 g per 100 g of tissue. The next largest change was for 16:0 which decreased by 0.24 g per 100 g of tissue. There were decreases of 0.12 g in 18:0, 0.05 g in 18:1(n-7), and 0.02 g in both 14:0 and 16:1(n-7). Total SFA decreased 32% (1.17 ± 0.20 vs 0.80 ± 0.09 g/100g, $p=0.02$), total MUFA decreased 31% (1.53 ± 0.26 vs 1.05 ± 0.12 g/100g, $p=0.03$), and total PUFA was unchanged with treatment. The total sum of all identified fatty acids decreased 28%, a loss of 0.87 g per 100 g of tissue.

The effects of pST treatment and storage on the fatty acid composition of raw muscle is reported as changes in the weight percents of individual fatty acids in Table 14. The percent of 16:0 and 18:1(n-9)c both decreased with pST treatment (3.7%, $p=0.009$ and 5.3%, $p=0.006$, respectively). There were nearly 20% increases in the percent of 18:2(n-6) ($p=0.005$), 18:3(n-3) ($p=0.03$) and 20:2(n-6) ($p=0.002$), and a

Table 12. Effect of pST and storage on the fatty acid composition of raw longissimus muscle (g/100g wet weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	0.03±0.01	0.02±0.00	0.04±0.01	0.02±0.00	0.04	NS	NS
16:0	0.71±0.10	0.53±0.06	0.82±0.15	0.52±0.06	0.02	NS	NS
16:1(n-7)	0.08±0.01	0.07±0.01	0.10±0.02	0.06±0.01	0.05	NS	NS
18:0	0.33±0.05	0.24±0.03	0.39±0.07	0.24±0.03	0.02	NS	NS
18:1(n-9)t	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00	NS	NS	NS
18:1(n-9)c	1.15±0.17	0.85±0.10	1.37±0.26	0.85±0.10	0.03	NS	NS
18:1(n-7)	0.14±0.02	0.11±0.01	0.17±0.03	0.11±0.01	0.04	NS	NS
18:2(n-6)	0.24±0.02	0.23±0.02	0.27±0.03	0.24±0.01	NS	NS	NS
18:3(n-3)	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00	NS	NS	NS
20:0	trace	trace	0.01±0.00	0.01±0.00	NS	0.008	NS
20:1(n-9)	0.02±0.00	0.02±0,00	0.03±0.01	0.02±0.00	NS	NS	NS
20:2(n-6)	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00	NS	NS	NS
20:3(n-6)	trace	trace	trace	trace	NS	NS	NS
20:4(n-6)	0.03±0.00	0.03±0.00	0.04±0.00	0.04±0.00	NS	NS	NS
Total SFA[d]	1.08±0.16	0.80±0.09	1.26±0.23	0.79±0.09	0.02	NS	NS
Total MUFA[e]	1.39±0.21	1.05±0.12	1.67±0.31	1.05±0.12	0.03	NS	NS
Total PUFA[f]	0.29±0.02	0.29±0.02	0.33±0.03	0.29±0.02	NS	NS	NS
Total FA[g]	2.77±0.38	2.13±0.22	3.26±0.57	2.13±0.22	0.03	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of wet sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:3(n-6) + 20:4(n-6)
[g]Total FA = SFA + MUFA + PUFA

Table 13. Effect of pST and storage on the fatty acid composition of raw longissimus muscle (g/100g dry weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	0.12±0.02	0.09±0.01	0.15±0.03	0.09±0.01	0.04	NS	NS
16:0	2.66±0.36	2.00±0.20	3.11±0.55	1.98±0.21	0.02	NS	NS
16:1(n-7)	0.31±0.04	0.25±0.03	0.37±0.06	0.24±0.03	0.05	NS	NS
18:0	1.22±0.18	0.90±0.09	1.47±0.27	0.91±0.10	0.02	NS	NS
18:1(n-9)t	0.02±0.00	0.02±0.00	0.04±0.01	0.02±0.00	NS	NS	NS
18:1(n-9)c	4.29±0.61	3.21±0.35	5.20±0.95	3.21±0.36	0.02	NS	NS
18:1(n-7)	0.51±0.07	0.41±0.03	0.63±0.11	0.42±0.05	0.04	NS	NS
18:2(n-6)	0.90±0.06	0.88±0.05	1.03±0.11	0.89±0.05	NS	NS	NS
18:3(n-3)	0.03±0.00	0.03±0.00	0.04±0.01	0.03±0.00	NS	NS	NS
20:0	0.02±0.00	0.01±0.00	0.03±0.00	0.02±0.00	NS	0.01	NS
20:1(n-9)	0.08±0.01	0.06±0.01	0.10±0.02	0.07±0.01	NS	NS	NS
20:2(n-6)	0.03±0.00	0.03±0.00	0.04±0.01	0.03±0.00	NS	NS	NS
20:3(n-6)	0.02±0.00	0.02±0.00	0.02±0.00	0.02±0.00	NS	NS	NS
20:4(n-6)	0.12±0.00	0.13±0.01	0.14±0.01	0.14±0.00	NS	NS	NS
Total SFA[d]	4.02±0.56	3.00±0.30	4.76±0.85	2.99±0.32	0.02	NS	NS
Total MUFA[e]	5.20±0.74	3.95±0.43	6.33±1.14	3.96±0.44	0.02	NS	NS
Total PUFA[f]	1.10±0.07	1.08±0.06	1.26±0.13	1.11±0.05	NS	NS	NS
Total FA[g]	10.31±1.36	8.04±0.78	12.35±2.12	8.06±0.80	0.03	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of dry sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:3(n-6) + 20:4(n-6)
[g]Total FA = SFA + MUFA + PUFA

Table 14. Effect of pST and storage on the fatty acid composition of raw longissimus muscle lipid (weight percent)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST	Control	pST	Trt	Stor	TrtxStor
14:0	1.13±0.07	1.07±0.06	1.15±0.05	1.09±0.06	NS	NS	NS
16:0	24.86±0.35	23.96±0.26	24.31±0.29	23.41±0.34	0.009	NS	NS
16:1(n-7)	2.90±0.13	2.94±0.22	2.93±0.13	2.87±0.21	NS	NS	NS
18:0	11.34±0.51	10.77±0.28	11.44±0.42	10.84±0.34	NS	NS	NS
18:1(n-9)t	0.20±0.03	0.25±0.04	0.27±0.01	0.29±0.02	NS	0.03	NS
18:1(n-9)c	39.97±0.68	38.20±0.73	40.36±0.62	37.88±0.71	0.006	NS	NS
18:1(n-7)	4.76±0.26	4.92±0.17	4.91±0.13	4.93±0.18	NS	NS	NS
18:2(n-6)	8.91±0.83	10.79±0.61	8.49±0.58	10.95±0.72	0.005	NS	NS
18:3(n-3)	0.28±0.01	0.30±0.02	0.28±0.01	0.36±0.03	0.03	NS	NS
20:0	0.15±0.01	0.14±0.01	0.22±0.01	0.22±0.02	NS	0.0001	NS
20:1(n-9)	0.71±0.05	0.72±0.03	0.80±0.05	0.79±0.04	NS	NS	NS
20:2(n-6)	0.30±0.01	0.37±0.01	0.33±0.02	0.39±0.02	0.0002	NS	NS
20:3(n-6)	0.15±0.02	0.20±0.01	0.15±0.04	0.23±0.05	NS	NS	NS
20:4(n-6)	1.28±0.18	1.64±0.14	1.18±0.13	1.74±0.19	0.01	NS	NS
Total SFA[d]	37.46±0.92	35.89±0.49	37.12±0.70	35.45±0.61	0.03	NS	NS
Total MUFA[e]	48.51±0.69	47.00±0.88	49.27±0.73	46.77±0.98	0.02	NS	NS
Total PUFA[f]	10.92±1.02	13.29±0.74	10.44±0.71	13.67±0.94	0.004	NS	NS

[a]Expressed as the weight percent of the fatty acid methyl esters
[b]Values are means ± SEM; n=6
[c]NS = not significant at p<0.05; Trt = pST treatment; Stor = storage
[d]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[e]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[f]Total PUFA = 18:2(n-6) +18:3(n-3) + 20:2(n-6) + 20:3(n-6) + 20:4(n-6)

37.4% increase in 20:4(n-6) (p=0.01). The percent of both SFA and MUFA decreased nearly 4% (p=0.03 and p=0.02, respectively).

The only significant effect of storage in raw muscle on both wet and dry weight basis (Tables 12 and 13) was an increase in 20:0. This fatty acid, however, was present at a level of less than 0.01 g per 100 g of wet tissue. The increase in 20:0 with storage was also significant when expressed as a weight percent of all fatty acids (Table 14). On a weight percent basis there was also a small but significant increase in the percent of 18:1(n-9)t with storage.

Cooked loin roasts. The fatty acid profiles for the cooked loin roasts based on wet and dry weights are given in Tables 15 and 16. On a wet weight basis, 18:1(n-7) decreased 33% (p=0.002), 14:0 (p=0.003), 16:0 (p=0.001), 16:1(n-7) (p=0.004), 18:0 (p=0.002), 18:1(n-9)c (p=0.001), and 20:1(n-9) (p=0.008) all decreased nearly 41%, and 18:1(n-9)t (p=0.03), 18:3(n-3) (p=0.01), and 20:2(n-6) (p=0.03) decreased 50% with pST-treatment. The largest change by weight was a 0.90 g loss in 18:1(n-9)c. There was also a 0.53 g loss in 16:0, 0.28 g loss in 18:0, 0.09 g loss in 18:1(n-7), and 0.06 g loss in 16:1(n-7). Changes of less than 0.05 g per 100 g of tissue were observed for 14:0, 18:1(n-9)t, 18:3(n-3), 20:1(n-9), and 20:2(n-6). Total SFA (p=0.002) and MUFA (p=0.001) both decreased 39% with

Table 15. Effect of pST and storage on the fatty acid composition of cooked loin roast (g/100g wet weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST[d]	Control	pST	Trt	Stor	TrtxStor
14:0	0.07±0.01	0.04±0.00	0.06±0.01	0.04±0.01	0.003	NS	NS
16:0	1.47±0.15	0.87±0.07	1.31±0.19	0.84±0.11	0.001	NS	NS
16:1(n-7)	0.16±0.02	0.10±0.01	0.15±0.02	0.10±0.02	0.004	NS	NS
18:0	0.70±0.08	0.40±0.04	0.66±0.11	0.40±0.06	0.002	NS	NS
18:1(n-9)t	0.01±0.00	0.01±0.00	0.02±0.00	0.01±0.00	0.03	NS	NS
18:1(n-9)c	2.30±0.24	1.33±0.10	2.19±0.32	1.37±0.20	0.001	NS	NS
18:1(n-7)	0.30±0.03	0.19±0.01	0.24±0.03	0.16±0.02	0.002	NS	NS
18:2(n-6)	0.46±0.03	0.38±0.02	0.38±0.04	0.35±0.03	NS	NS	NS
18:3(n-3)	0.02±0.00	0.01±0.00	0.02±0.00	0.01±0.00	0.01	NS	NS
20:0	0.01±0.00	0.01±0.00	0.01±0.00	0.01±0.00	0.004	NS	NS
20:1(n-9)	0.04±0.01	0.03±0.00	0.05±0.01	0.03±0.00	0.008	NS	NS
20:2(n-6)	0.02±0.00	0.01±0.00	0.02±0.00	0.01±0.00	0.03	NS	NS
20:3(n-6)	0.01±0.00	0.01±0.00	trace	trace	NS	0.0003	NS
20:4(n-6)	0.05±0.00	0.05±0.00	0.04±0.00	0.04±0.00	NS	0.03	NS
Total SFA[e]	2.26±0.24	1.32±0.12	2.04±0.30	1.29±0.18	0.002	NS	NS
Total MUFA[f]	2.81±0.29	1.65±0.12	2.64±0.38	1.68±0.24	0.001	NS	NS
Total PUFA[g]	0.55±0.04	0.46±0.02	0.46±0.05	0.42±0.04	NS	NS	NS
Total FA[h]	5.62±0.55	3.44±0.25	5.15±0.72	3.39±0.45	0.002	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of wet sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage
[d]n=5
[e]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[f]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[g]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:3(n-6) + 20:4(n-6)
[h]Total FA = SFA + MUFA + PUFA

Table 16. Effect of pST and storage on the fatty acid composition of cooked loin roast (g/100g dry weight)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST[d]	Control	pST	Trt	Stor	TrtxStor
14:0	0.19±0.02	0.12±0.01	0.19±0.03	0.12±0.02	0.003	NS	NS
16:0	3.92±0.38	2.41±0.20	3.80±0.49	2.41±0.32	0.001	NS	NS
16:1(n-7)	0.44±0.05	0.28±0.03	0.43±0.05	0.30±0.05	0.005	NS	NS
18:0	1.87±0.21	1.11±0.12	1.89±0.28	1.15±0.16	0.002	NS	NS
18:1(n-9)t	0.03±0.00	0.02±0.00	0.04±0.01	0.03±0.01	0.03	NS	NS
18:1(n-9)c	6.11±0.58	3.66±0.31	6.33±0.83	3.91±0.56	0.0009	NS	NS
18:1(n-7)	0.80±0.08	0.52±0.03	0.71±0.09	0.47±0.06	0.002	NS	NS
18:2(n-6)	1.21±0.07	1.05±0.05	1.12±0.10	0.99±0.09	NS	NS	NS
18:3(n-3)	0.04±0.00	0.03±0.00	0.04±0.00	0.03±0.00	0.01	NS	NS
20:0	0.03±0.00	0.02±0.00	0.04±0.00	0.02±0.00	0.002	0.01	NS
20:1(n-9)	0.11±0.01	0.07±0.01	0.13±0.02	0.08±0.01	0.006	NS	NS
20:2(n-6)	0.05±0.00	0.03±0.00	0.05±0.01	0.04±0.00	0.02	NS	NS
20:3(n-6)	0.02±0.00	0.02±0.00	0.01±0.00	0.01±0.00	NS	0.0005	NS
20:4(n-6)	0.14±0.01	0.14±0.00	0.12±0.01	0.12±0.01	NS	NS	NS
Total SFA[e]	6.01±0.61	3.65±0.33	5.92±0.79	3.70±0.50	0.001	NS	NS
Total MUFA[f]	7.49±0.71	4.55±0.36	7.65±0.98	4.80±0.68	0.001	NS	NS
Total PUFA[g]	1.46±0.08	1.27±0.06	1.35±0.11	1.20±0.11	NS	NS	NS
Total FA[h]	14.95±1.34	9.48±0.73	14.92±1.86	9.70±1.27	0.001	NS	NS

[a]Expressed as grams of the fatty acid methyl ester per 100 grams of dry sample
[b]Values are means ± SEM; n=6
[c]NS = not significant at p<0.05; Trt = pST treatment; Stor = storage
[d]n=5
[e]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[f]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[g]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:3(n-6) + 20:4(n-6)
[h]Total FA = SFA + MUFA + PUFA

treatment, losses of 0.84 g and 1.06 g, respectively. Total PUFA was unchanged with treatment. The sum of all fatty acids decreased 37% with treatment, a loss of nearly 2 g per 100 g of tissue. Expressing fatty acids on a dry weight basis did not alter these effects.

The fatty acid composition of cooked loin roasts as weight percents is given in Table 17. Reported in this manner, there were decreases in 16:0 (7.2%, p=0.02) and 18:1(n-9)c (6.2%, p=0.0006) and increases in 18:2(n-6) (34.4%, p=0.001), 20:2(n-6) (15.6%, p=0.04), 20:3(n-3) (homogamma linolenic, 57.1%, p=0.0001) and 20:4(n-6) (58.3%, p=0.008) with pST treatment. Overall, there was a 4.5% decrease in the percent of SFA (p=0.03), a 4.5% decrease in the percent of MUFA (p=0.008), and a 35.4% increase in the percent of PUFA (p=0.002).

The effect of storage on the fatty acid composition of cooked loin on a wet and dry weight basis is given in Tables 15 and 16. After storage, 20:3(n-6) (p=0.0003) and 20:4(n-6) (p=0.03) both decreased when fatty acids were expressed on a wet weight basis, but the changes were less than 0.01 g per 100 g of tissue. On a dry weight basis the decrease in 20:3(n-6) remained significant (p=0.0005) whereas the decrease in 20:4(n-6) did not. In addition, there was an increase in 20:0 (p=0.01) which was not seen when fatty acids were expressed by wet weight. Again this change was less than 0.01 g per 100 g of tissue.

Table 17. Effect of pST and storage on the fatty acid composition of cooked loin roast lipid (weight percent)[a,b]

	0 Months		4 Months		P-value[c]		
Fatty Acid	Control	pST[d]	Control	pST	Trt	Stor	TrtxStor
14:0	1.24±0.04	1.16±0.05	1.21±0.04	1.16±0.06	NS	NS	NS
16:0	25.50±0.37	24.49±0.33	24.82±0.33	24.07±0.29	0.02	NS	NS
16:1(n-7)	2.85±0.14	2.88±0.24	2.86±0.14	2.92±0.21	NS	NS	NS
18:0	12.09±0.51	11.29±0.48	12.23±0.53	11.50±0.33	NS	NS	NS
18:1(n-9)t	0.22±0.01	0.20±0.01	0.28±0.01	0.33±0.02	NS	0.0001	0.04
18:1(n-9)c	39.77±0.32	37.26±0.51	41.29±0.44	38.75±0.95	0.0006	0.02	NS
18:1(n-7)	5.20±0.19	5.36±0.32	4.68±0.14	4.71±0.13	NS	0.009	NS
18:2(n-6)	8.18±0.67	10.83±0.56	7.67±0.69	10.47±0.85	0.001	NS	NS
18:3(n-3)	0.28±0.02	0.30±0.03	0.30±0.02	0.32±0.01	NS	NS	NS
20:0	0.17±0.01	0.16±0.02	0.24±0.02	0.22±0.01	NS	0.001	NS
20:1(n-9)	0.74±0.05	0.71±0.05	0.84±0.05	0.85±0.04	NS	0.02	NS
20:2(n-6)	0.30±0.02	0.35±0.02	0.34±0.02	0.39±0.02	0.04	NS	NS
20:3(n-6)	0.12±0.01	0.19±0.01	0.09±0.01	0.14±0.01	0.0001	0.008	NS
20:4(n-6)	0.93±0.13	1.46±0.10	0.87±0.14	1.39±0.27	0.008	NS	NS
Total SFA[e]	39.00±0.89	37.10±0.68	38.50±0.84	36.92±0.56	0.03	NS	NS
Total MUFA[f]	48.77±0.45	46.42±0.75	49.95±0.50	47.55±1.22	0.008	NS	NS
Total PUFA[g]	9.82±0.83	13.14±0.67	9.27±0.87	12.71±1.14	0.002	NS	NS

[a]Expressed as the weight percent of the fatty acid methyl esters
[b]Values are means ± SEM; n=6
[c]NS = not significant at p<0.05; Trt = pST treatment; Stor = storage
[d]n=5
[e]Total SFA = 14:0 + 16:0 + 18:0 + 20:0
[f]Total MUFA = 16:1(n-7) + 18:1(n-9)t + 18:1(n-9)c + 18:1(n-7) + 20:1(n-9)
[g]Total PUFA = 18:2(n-6) + 18:3(n-3) + 20:2(n-6) + 20:3(n-6) + 20:4(n-6)

The effect of storage on the weight percent of the fatty acids in cooked loin is given in Table 17. An interaction between storage and treatment was seen for one fatty acid, 18:1(n-9)t. With storage, the percent of this fatty acid increased 45.2% (p=0.0001), and the increase with storage was greater for pST treated roasts. Increases in 18:1(n-9)c (3.9%, p=0.02), 20:0 (39.4%, p=0.001), and 20:1(n-9) (16.6%, p=0.02), and decreases in 18:1(n-7) (11.1%, p=0.009), and 20:3(n-6) (25.8%, p=0.008) were also seen with storage.

Cholesterol. The cholesterol content of raw muscle and cooked loin roast given on both a wet and dry weight basis (Table 18) was not affected by treatment, but there was a storage effect. Cholesterol content before storage (control and pST-treated pigs are pooled since there was no treatment effect) for raw muscle and cooked loin was 54.5 and 78.2 mg per 100 g of tissue, respectively. After storage the cholesterol content of raw muscle (p=0.009) and cooked loin (p=0.0006) decreased 12% and 19%, respectively. In 100 g of tissue this represented a loss of 6.6 mg of cholesterol in muscle and 14.9 mg of cholesterol in cooked loin. Expressed on a dry weight basis the decrease in cholesterol after storage for raw muscle and cooked loin remained significant, 12% (p=0.009) and 14% (p=0.003), respectively.

Table 18. Effect of pST and storage on cholesterol content[a]

	0 Months		4 Months		P-value[b]		
Tissue	Control	pST	Control	pST	Trt	Stor	TrtxStor
			mg/100g Wet Weight				
Raw Muscle	53.4±1.3	55.5±2.8	47.8±2.2	48.1±2.5	NS	0.009	NS
Cooked Loin	78.5±2.8	77.9±4.2	62.1±4.7	64.5±2.6	NS	0.0006	NS
			mg/100g Dry Weight				
Raw Muscle	200.7±5.2	209.8±10.6[c]	181.5±8.3	181.9±8.3	NS	0.009	NS
Cooked Loin	209.1±2.8	214.6±8.9	182.1±13.5	183.4±6.0	NS	0.003	NS

[a]Values are means ± SEM; n=6

[b]NS = not significant at $p<0.05$; Trt = pST treatment; Stor = storage

[c]n=5

DISCUSSION

Since our animals were housed four in each pen rather than individually, the data that reflect growth performance only suggest a trend and cannot be used definitively. However, using the average gain in weight of each pig as an indicator of growth and eliminating the treatment that contained the two sick pigs from the analysis, the findings indicate that the administration of only 3 mg pST daily per head to growing pigs increased their growth rate compared to animals that had not been treated. This observation has been reported in several other studies (Machlin, 1972; Chung et al., 1985; Etherton et al., 1986, 1987; Evock et al., 1988; Campbell et al., 1988, 1989a, 1989b; Gardner et al., 1989; see Table 1).

In a similar vein our data suggest that there was no change in feed intake, a finding that has not been consistently reported. Campbell et al. (1988, 1989a, 1989b) showed that pST doses of 100 ug per kg of body weight administered to pigs weighing from 25 to 55 kg (a dose ranging from 2.5 to 5.5 mg pST per day) and to pigs weighing from 60 to 100 kg (a dose ranging from 6.0 to 10.0 mg pST per day) significantly decreased feed intake. Chung et al. (1985), however, treated growing pigs weighing approximately 32 to 61 kg with 0.22 ug pST per kg of body weight (0.7 to 1.3 mg pST per day) and showed no significant change in feed intake. Likewise Evock et al. (1988) showed no significant change in feed intake when the pST dose was 35 ug per kg of body weight for growing pigs. In Evock's experiment the pigs ranged in weight from about 27 kg initially to 110 kg at the end of the experiment. This corresponds to an intake of pST that ranges from 0.95 to 3.9 mg daily. If the dose, however, was increased to 70 or 140 ug pST per kg body weight (which corresponds to an intake of 1.9 to 7.7 mg and 3.8 to 15.4 mg pST per day, respectively), a decrease in feed intake was evident.

It seems likely that our dose of 3.0 mg pST per day (this corresponds to an average administration of 60 ug pST per kg body weight at the beginning of the treatment period and 30 ug per kg body weight at the end) was too low to affect feed intake. In addition, the interpretation of our feed intake data is complicated by the fact that our pigs were not housed individually. According to Boggs and Merkel (1990), one can have reliable feed intake data under circumstances in which pigs are not housed individually only if the pigs are grouped with their litter mates or by sire. As our pigs were grouped neither by litter mates nor sire, but instead by weight, our average values of feed intake are of limited usefulness.

Our study did not suggest a clear effect of pST on feed efficiency. Other investigators have shown an improvement in feed efficiency with pST treatment (Machlin, 1972; Chung et al., 1985; Etherton et al., 1986, 1987; Evock et al., 1988; Campbell et al., 1988, 1989a, 1989b; and McLaren et al., 1990). Since feed intake data are used to determine feed efficiency, it is not surprising that our results are unclear. In addition, having some pigs with one testicle in some of the pens may have further complicated this measurement. In general, boars require less food per pound of gain than barrows (Boggs and Merkel, 1990).

In contrast to the data associated with growth performance, that obtained from the carcass analyses could be treated statistically. The most notable change seen in carcass measurements was the decrease in backfat thickness. Although Etherton et al. (1986, 1987) and Chung et al. (1985) reported no change in backfat thickness, the length of the treatment was shorter (30, 30, and 35 days, respectively) and the pigs were in earlier stages of growth (30 to 60 kg, 50 to 79 kg, and 40 to 77 kg, respectively) than in our study. We initiated treatment when the pigs were about 54 kg and terminated it at about 106 kg; the length of the treatment averaged 52.5 days. Our data suggest that the effect of pST on backfat thickness may be dependent upon the total dose administered and/or that the response may be greater at later stages of the growth cycle. Campbell et al. (1988), however, showed a decrease in backfat thickness in the earlier phase of growth at a similar dose of pST. Regardless of the mediating mechanism, the final value for backfat thickness was still in the normal range (1.8 to 4.6 cm or 0.7 to 1.8 in) for pig carcasses as reported by Boggs and Merkel (1990).

Although pST treatment has been shown repeatedly to increase loin eye area (Machlin, 1972; Etherton et al., 1986, 1987; Evock et al., 1988; and Campbell et al., 1988, 1989a, 1989b), we measured no significant change. Many of the studies that reported an increase in loin eye area, however, started with younger pigs and when older pigs (closer to the age of the pigs in our study) were used, the dose of pST used was much higher than the dose we used. Perhaps we would have seen more of an effect on loin eye area with younger pigs or an increased pST dose.

Dressing percentage is influenced by the contents of the stomach and intestines, by the degree of muscling, and by the degree of fatness. Heavily muscled pigs dress more than light pigs and very fat pigs tend to dress more when compared to lean pigs (Boggs and Merkel, 1990). The decrease in dressing percentage with pST treatment in our study may have been due to the decreased fat in these pigs as suggested by the backfat thickness measurements. Other investigators have also reported a decrease in dressing percentage with pST treatment (Machlin, 1972; and Evock et al., 1988). However, although dressing percentage was lowered, it was still in the normal range (68-77%) (Boggs and Merkel, 1990) for pig carcasses.

Percentage carcass muscle was increased with pST treatment, but was also in the normal range (45-64%) (Boggs and Merkel, 1990). Carcass muscle was estimated in our study as it was by Gardner et al. (1989), who also reported an increase in carcass muscle percentage with pSt treatment. Other investigators have shown an increase in muscle percentage by actual carcass analysis (Chung et al., 1985; Etherton et al., 1986, 1987; Evock et al., 1988; and Campbell et al., 1988, 1989a, 1989b) or by analysis of a particular cut, such as the ham (Machlin, 1972).

Although pST treatment increased percent moisture in SC fat, the moisture content of the muscle samples (raw longissimus and cooked loin roast) was not influenced by pST. Other studies have shown an increase in percent carcass moisture with pST treatment (Evock et al., 1988; and Campbell et al., 1988, 1989a, 1989b). These studies also showed an increase in muscle deposition and a decrease in fat deposition (or an increase in percent carcass protein and a decrease in percent carcass fat). Since muscle tissue contains more water than does fat tissue, the increase in the moisture content of the carcass may result from increased muscle deposition. The increase in moisture composition seen in SC fat from pST treated pigs in our study is most likely due to a decrease in fat so that water and collagen (connective tissue) content of the fat is concentrated. Wood et al. (1989) studied fat composition of the backfat from pigs with varied thicknesses of backfat and found that the composition of the fat from leaner pigs had an increase in water and collagen content. Similar to our findings in muscle tissue, Prusa et al. (1989a) saw no change in the moisture content of raw and broiled rib chops from pigs treated with either 4 or 8 mg pST per day growing from about 45 to 100 kg.

There was no loss in moisture with storage in either SC fat or raw longissimus muscle which indicates that the packaging, storage temperature, and length of storage were sufficient to preventing drying. There was, however, an unexpected increase in moisture content of cooked loin roasts after storage. The cause is unknown but it is suspected that a shorter cooking time of roasts after storage resulted in less moisture loss.

Total lipids were decreased by pST treatment in SC fat, IM fat, raw longissimus muscle, and cooked loin roast samples. Other studies have shown a decrease in percent carcass fat (Etherton et al., 1986, 1987; Evock et al., 1988; and Campbell et al., 1988, 1989a, 1989b). Fat content in SC fat (defined as the two layers of backfat beneath the skin) in our study decreased from about 82% to 77% with pST treatment. Fat contents were lower than the USDA Handbook 8-10 value for total lipids in backfat of 88.69% (USDA, 1983). Moisture content, however, was also higher in our study (9.9% in control samples and 12.8% in treatment samples) compared to USDA Handbook 8-10 (7.69%) which accounts for part of the discrepancy in total lipids. Additionally, our study measured total lipids in the backfat at one site (10th rib) and not the backfat in its entirety as Handbook 8-10 does. In IM fat, the fat content decreased from 79.3% to 75.8% with pST treatment. This is close to the fat content given for raw separable fat in USDA Handbook 8-10, which lists total lipids at 76.71%. Our study, however, took intermuscular fat at only one location and does not include total separable fat as Handbook 8-10 does. Considering differences in sampling, the values for total lipids in SC fat and IM fat in our study seem reasonable.

Similar to the changes seen in the total lipid content of raw muscle in our study, Prusa et al. reported a decrease in fat content with treatment of 4 and 8 mg pST per day in raw longissimus rib chops (1989a) as well as several other raw muscle sites (triceps brachii, semimembranosus, semitendinosus, and biceps femoris) (1989b). Prusa et al. (1989a) reported a decrease in fat content from 2.9% to 2.1% in raw rib chops from pigs treated with 4 mg pST daily growing from 45 kg to 100 kg. This is similar to the decrease from 2.9% to 2.3% fat in raw longissimus muscle chops seen in our study. Our results agree with Prusa's. Although the fat content in both studies was already lower than that of USDA Handbook 8-10, pST treatment decreased it further.

In our study, fat content of cooked loin roasts decreased from 5.6% to 3.4% with treatment of 3.0 mg pST daily. Fat contents were low in comparison to USDA Handbook 8-10 which lists total lipids of roasted pork loin, center rib, separable lean at 13.80 g/100 g wet weight. Our results are similar to Prusa et al. (1989a), who observed a decrease from 4.3% to 2.4% fat in broiled rib chops from pigs supplemented with 4 mg pST daily from about 99 lbs to 220 lbs. Prusa, however, saw the decrease in fat content in broiled rib chops when pigs were removed from pST treatment 7 days prior to slaughter. There was no withdrawal period in our study.

Although our study showed a decrease in total lipid content of two fat sites (SC and IM), raw longissimus muscle, and cooked loin roast, an increased moisture content in the SC fat samples with pST treatment may have accounted for part of this decrease. Whether this was true of the IM samples or not, we are unable to tell because there was too little sample to measure the moisture content. However, the decrease in the total lipid content in the two muscle samples was not due to a change in moisture. This is evident from the fact that the total lipid content also decreased when the data are expressed on a dry weight basis.

Few studies have looked at the fatty acid composition of pST treated pigs. To address the question of the effect produced by pST on the fatty acid content of the tissues, one must look at the data expressed on a dry weight basis. In this format any effect produced by a change in moisture content is removed and the effect produced is a result of a change in tissue composition. On the other hand, from the consumers' point of view, data expressed on a wet weight basis are more convenient, as they reflect consumed amounts. Finally, data expressed on a relative weight percent basis have little usefulness in a study such as this because the information is not expressed in a form such that the actual amounts present in the tissue are known. For instance, when expressed on a relative weight percent basis, this study showed a decrease in saturated and monounsaturated fatty acids and an increase in polyunsaturated fatty acids. This does not represent an increase in the amount of polyunsaturated fatty acids present in the tissue, but only an increase in its amount relative to the amount of the other fatty acids. However, since the relative weight percent method is traditionally used for expressing fatty acid data, it is valuable in that it allows us to compare our results to those obtained in other studies.

In our study a remarkably consistent picture emerged across the tissue samples. We showed consistent decreases in total saturated fatty acids (SFA), monounsaturated fatty acids (MUFA), and no change in polyunsaturated fatty acids (PUFA) with pST treatment in all tissues studied (SC fat, IM fat, raw longissimus muscle, and cooked loin roast), expressed as mg fatty acid per 100 g wet tissue. The changes for the same tissues expressed on dry weight basis (mg fatty acid per 100 g dry tissue) were similar except for SC fat in which the decrease in MUFA was no longer significant.

As a percent of fatty acids (relative weight percent basis), SFA decreased and PUFA increased in SC fat and IM fat samples. In raw muscle and cooked loin samples the percentage of SFA and MUFA decreased and PUFA increased. Prusa (1989, 1989a) failed to show significant changes with pST treatment on fatty acid composition (relative weight percent basis) of raw and cooked longissimus rib chops from pigs treated with 4 or 8 mg pST per day. Other reports, however, indicate that pST treatment in pigs results in slightly higher PUFA content (relative weight percent basis), as was seen in our study, but data were not given (Bos, 1989; Prusa, 1989). Additionally, the shift in fatty acid composition we saw when comparing pST-treated pigs with controls is similar to the shift in the fatty acid composition seen when Wood et al. (1989) compared lean and fat pigs.

We not only saw changes in total SFA and MUFA, but also in some of the individual fatty acids. We are not aware of other reports detailing pST's effect on individual fatty acids in pigs. In our study, the most important changes seen in all of the samples (SC fat, IM fat, raw longissimus muscle, and cooked loin roast) were the decreases in the amounts (mg per 100 g wet tissue) of 16:0, 18:0, and 18:1(n-9)c, since these three fatty acids account for nearly 75% of the total fatty acids. Also of interest is the fact that 18:2(n-6), a fatty acid that accounts for between 8% and 14% of the total fatty acids in these tissues, was unchanged with pST treatment.

Some studies conclude that the mechanism by which pST decreases fat content in pigs is by inhibiting lipogenesis (Walton et al., 1986; Walton and Etherton, 1986; and Etherton, 1988). Our findings of a decrease in total SFA (including 16:0 and 18:0), a decrease in MUFA (including 18:1[n-9]c), and no change in PUFA (including 18:2[n-6]), support this conclusion. One would expect a decrease in fat synthesis to lead to a decrease in the production of SFA and MUFA with little change in the amount of PUFA, since the majority of the PUFA in pig tissues are the dietary fatty acids, 18:2(n-6) and 18:3(n-3), and are not synthesized.

With storage there were minimal changes in some of the fatty acids in all of the tissues, but they were independent of treatment. Changes in fatty acids with storage appeared to be greater for the tissues with higher fat content. Those fatty acids that changed with storage were also present in small quantities to begin with. In the fat tissues there were consistent increases (wet weight basis) in 18:1(n-9)t, 20:1(n-9), 20:2(n-6), and a decrease in

18:1(n-7). In the muscle tissues fewer changes with storage were observed. In raw muscle there was a slight increase (wet weight basis) in 20:0 with storage and in cooked loin there were slight decreases (wet weight basis) in 20:3(n-6) and 20:4(n-6) with storage.

In muscle tissues small increases in some fatty acids after storage might be explained by the fact that after storage the association between triglycerides and proteins is weaker and greater extraction of lipids may occur (Davidkova and Khan, 1967). However, if this were the case total lipid content after storage would also increase, which was not seen in our study. There were decreases in some fatty acids in cooked loin. These decreases could be attributed to lipid oxidation since the decreases were in the more unsaturated fatty acids which are more vulnerable to oxidation (Pearson et al., 1983). However, similar results were not seen in all of the tissues. Igene et al. (1981) also found conflicting results in the fatty acid composition in white and dark chicken meat after storage. They found that the unsaturated fatty acid content of triglycerides in white meat decreased after freezer storage, whereas the unsaturated fatty acid content of dark meat increased after freezer storage. They concluded that the small changes seen with storage were probably not significant. Likewise, changes seen in the tissues with storage in our study are probably not significant.

There are some discrepancies in our study in the reported fatty acid composition of the tissues. Identified fatty acid methyl esters were quantitated by comparison to the internal standard (17:0) peak area and are reported as grams of fatty acid methyl ester per 100 grams of tissue. Another way to report fatty acid composition is as relative weight percents. If an internal standard is not used, the relative weight percent of the fatty acid methyl ester can be converted to the amount of fatty acid per 100 g of tissue if the total lipid content of the tissue and the fatty acid content of the total lipids is known. In other words, in addition to determining the total lipid content of the tissue, the proportion of triglycerides, phospholipids, and cholesterol in the total lipids must be known in order to determine what weight percent of the total lipids is due to fatty acids. Conversion factors representing the fatty acid content of total lipids (grams of fatty acid per gram of total lipid) have been derived for various tissues. For pork skeletal muscle the conversion factor is 0.910 g fatty acid per gram of lipid and for pork adipose tissue it is 0.953 g fatty acid per gram of lipid (Anderson, 1976; Weihrauch et al., 1975). Thus, the sum of the fatty acids (g/100 g wet tissue) in pork muscle and adipose tissue should theoretically equal 91.0% and 95.3% of the total lipid content of these tissues, respectively.

Summation of the identified fatty acids in SC fat and IM fat in this study accounted for 94% and 91% of the total lipids in these tissues, respectively. Taking into account that this did not include unidentified fatty acids, roughly 0.6% of the total fatty acids in these samples, this is fairly close to the theoretical expectation of 95.3%. In raw muscle and cooked loin, summation of the fatty acids accounted for 97% and 95% of the total lipids, respectively. Possible reasons that the fatty acid content of the total lipids in muscle is much higher than the expected result of 91.0% are that either the fatty acid content (determined with an internal standard) was overestimated or the total lipid content (determined gravimetrically) was underestimated.

It seems most likely that the gravimetric determination of total lipids in raw muscle and cooked loin was underestimated. In these tissues approximately 1.5 to 2.0 g of sample were used for lipid extraction. After extraction the tissue formed a barrier between the upper methanol-water layer and the lower chloroform layer containing the lipid. It is possible that some lipid adhered to the tissue barrier and was lost. Thus, total lipid content was underestimated. The lipid loss, however, was corrected for in the fatty acid determination since the internal standard was added prior to extraction. This would explain why the sum of the individual fatty acids is higher than the 91.0% of the total lipids in raw muscle and cooked loin samples.

In adipose tissue the sample size used for lipid extraction was much smaller (approximately 0.2 g). After extraction the tissue formed only a thin film between the methanol-water layer and the chloroform layer, and thus, recovery of the chloroform layer containing the lipid was more effective. This would explain why the sum of the individual fatty acids is close to 95.3% of total lipids in SC fat and IM fat.

In further support of this hypothesis, we found that the internal standard recovery was higher in the fat tissues than in the muscle tissues. For example, the peak area for the same amount of internal standard was consistently higher in fat samples than in muscle samples. If the internal standard was lost along with muscle lipid in the tissue barrier, as suggested, this would be the expected result.

To test this hypothesis, the ratio of the internal standard recovered in the fat tissues to that recovered in muscle tissues was used to predict the lipid lost in the muscle tissue plugs. The data suggest that about 10% was not extracted. The ratio was then used to adjust the total lipid content in raw muscle and cooked loin samples. The sum of fatty acids in raw muscle and cooked loin is 88% and 89% of adjusted total lipid contents, respectively. This is much closer to the expected result of 91.0% of total lipids, especially when the unidentified fatty acid content of these tissues (about 3%) is taken into consideration.

Previous data from our laboratory indicated that one extraction was sufficient to obtain a good recovery of total lipids. From my results, however, it appears that certain matrices may require more than one extraction. Perhaps a second extraction would have yielded total lipid contents that coincided better with the sum of the fatty acids as determined with the internal standard.

Our findings that pST treatment (3 mg per day) had no influence on the cholesterol content of raw longissimus muscle and cooked loin roasts was also reported by Prusa (1989) with doses of 4 and 8 mg pST per day. In a similar study Prusa et al. (1989a) found that 4 mg pST per day had no influence on the cholesterol content in broiled rib chops, but 8 mg pST per day increased cholesterol content slightly. It seems that the dose we used (3 mg per day) was not strong enough to influence cholesterol content. Our values of about 54.5 mg cholesterol per 100 g raw longissimus muscle chop and 78.2 mg cholesterol per 100 g cooked loin roast are close to USDA Handbook 8-10 values. Handbook 8-10 lists cholesterol content of raw loin, center rib, separable lean only at 55 mg per 100 g and the same cut roasted is listed at 79 mg per 100 g (USDA, 1983).

With storage cholesterol content of the muscle samples decreased. A loss of cholesterol with freezer storage has been reported elsewhere (Kregel et al., 1986). There is little known about the breakdown of cholesterol in muscle foods, although it has been suggested that cholesterol oxidation may occur in cooked and stored muscle foods (Kregel et al., 1986; Pearson et al., 1983).

Our findings of the effect of pST treatment on pork products may be of particular interest to health-conscious consumers. The findings that pST treatment decreased total fat, SFA and MUFA, and did not change PUFA and cholesterol content of raw muscle and cooked loin roasts are mostly in accordance with current dietary recommendations to limit total fat, SFA, and cholesterol intake (AHA, 1986; USDA, 1990). In general SFA in the diet raise blood cholesterol levels compared to MUFA and PUFA (Mattson and Grundy, 1985). Additionally, recent reports indicate that certain individual fatty acids may be more atherosclerotic than others (Grundy and Denke, 1990). In particular, among the SFA there is some evidence that suggests that 18:0 has no effect on blood cholesterol levels, whereas 16:0 may increase blood cholesterol levels (Bonanome and Grundy, 1988; Grundy and Denke, 1990). The main saturated fatty acid in pork is 16:0, whereas in beef, chicken, and turkey the main saturated fatty acid is 18:0. Since 16:0 may be more atherosclerotic compared to 18:0, the decrease seen in this fatty acid with pST treatment in pork is important from a health standpoint, as is the decrease in total fat and total saturated fat. Of the nearly 2.0 g total fatty acid loss in a serving size (100 g) of cooked loin roast from pST treated pigs, about 0.9 g was a decrease in saturated fatty acids and more than 0.5 g of this was from a decrease in 16:0. MUFA made up the remainder of the total fatty acid change. A loss of 1.1 g was found, 0.9 g of which was due to a decrease in 18:1(n-9c). Traditionally, MUFA were believed to be neutral in their effect on serum cholesterol. More recently, however, it seems that MUFA, in particular 18:1(n-9)c (the main MUFA measured in our samples), and PUFA, in particular 18:2(n-6) (the main PUFA measured in our samples), may reduce serum LDL-cholesterol levels (the fraction that is associated with heart disease) to the same extent (Grundy and Denke, 1990). In addition Grundy and Denke (1990) report that 18:1(n-9)c does not lower serum HDL-cholesterol levels (the fraction that is associated with the removal of cholesterol from arterial walls and thus is thought to be heart healthy), whereas 18:2(n-6) does. Therefore, the decrease in 18:1(n-9)c and the fact that no change was seen in 18:2(n-6) in pST-treated pigs in our study is not an optimal result in terms of a heart healthy diet. However, taking into account that total fat, saturated fat, and 16:0 all decreased with pST treatment, pork products from pST-treated pigs compared to control pigs are probably healthier.

Additional studies are needed to determine if our observations hold true for other tissues. Further investigations should look at manipulating the pig's diet in conjunction with pST supplementation in an attempt to create pork products with fatty acid compositions that are even closer to current dietary recommendations. The type and amount of fat in the pig's diet affects the composition of the fat in their tissues. Canola oil (Rhee et al., 1988; Busboom et al., 1991) and fish oil (Hertzman et al., 1988) incorporated into the pig's diet increases the unsaturated fat content in their tissues. The source of dietary fat in our study was beef tallow, which is relatively high in saturated fat. Perhaps a more unsaturated fat in the pig's diet along with pST treatment would have even more desirable effects on the fatty acid compostion of pork products than pST treatment alone.

SUMMARY AND CONCLUSIONS

The purpose of our study was to determine if pST administration to pigs influenced the total fat content, fatty acid profile, cholesterol content and storage stability of selected tissues. Of particular interest, was the comparison of pST's effect on these measurements to current dietary recommendations to limit fat and cholesterol intake. It has already been established in the literature that pST enhances growth, improves feed efficiency, increases muscle deposition and decreases fat accretion (see Table 1), but its effect on cholesterol content and fatty acid profile is unclear.

Our study found that total lipids decreased in all tissues studied (SC fat, IM fat, raw longissimus muscle, and cooked loin roast). Among the fatty acids, 16:0, 18:0 and 18:1(n-9)c decreased, and 18:2(n-6) was unchanged in all tissues. Cholesterol was not effected by treatment. There was no interaction between the effect of pST treatment and storage. The effect of freezer storage on the fatty acid profile was small and not consistent among the tissues. Cholesterol decreased with freezer storage.

The fact that total fat content and saturated fat content decreased in our study indicates that pork products from pST-treated pigs coincide well with current dietary recommendations.

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APPENDICES

Appendix a. Growth performance data

Pig #	Pen #	Trt	Initial Weight (lbs)	Final Weight (lbs)	Gain (lbs)	Days on Study	ADG (lbs)	Feed Intake (lbs)	Feed: Gain
276	1	Ctrl	116	232	116	56	2.071	359.3	3.097
277	1	Ctrl	130	242	112	49	2.286	359.3	3.208
281	1	Ctrl	115	218	103	56	1.839	359.3	3.488
292	1	Ctrl	132	247	115	49	2.347	359.3	3.124
285	3	Ctrl	113	225	112	56	2.000	316.0	2.821
286*	3	Ctrl	127	240	113	49	2.306	316.0	2.796
287	3	Ctrl	123	240	117	49	2.388	316.0	2.701
288*	3	Ctrl	105	213	108	56	1.929	316.0	2.926
280*	2	pST	129	247	118	49	2.408	358.3	3.036
282	2	pST	110	247	137	56	2.446	358.3	2.615
283	2	pST	111	236	125	49	2.551	358.3	2.866
289	2	pST	118	247	129	56	2.304	358.3	2.778
278*	4	pST	124	236	112	49	2.286	360.8	3.221
279	4	pST	121	243	122	49	2.490	360.8	2.957
284	4	pST	121	212	91	56	1.625	360.8	3.965
290	4	pST	116	218	102	56	1.821	360.8	3.537

*At slaughter, it was discovered that these pigs had one testicle. Therefore, they have been excluded from the statistical analyses.

Appendix b. Food intake data (lbs of feed added to each pen)

DATE	Pen 1 Ctrl	Pen 2 pST	Pen 3 Ctrl	Pen 4 pST
12-11	33	33	33	33
12-12	33	33	33	33
12-13	33	33	33	33
12-14	17	17	18	19
12-15	23	25	24	26
12-16	22	26	24	27
12-17	36	21	22	23
12-18	0	0	0	8
12-19	45	30	29	3
12-20	17	19	18	44
12-21	21	16	16	19
12-22	24	19	22	3
12-23	20	22	21	44
12-24	30	25	18	15
12-25	29	31	29	25
12-26	23	23	23	7
12-27	22	22	22	44
12-28	25	12	22	20
12-29	26	21	12	22
12-30	20	20	21	24
12-31	34	25	21	33
1-1	57	22	22	30
1-2	0	23	10	17
1-3	25	30	24	29
1-4	24	23	25	26
1-5	25	38	37	37
1-6	35	38	35	38
1-7	15	16	0	15

DATE	Pen 1 Ctrl	Pen 2 pST	Pen 3 Ctrl	Pen 4 pST
1-8	52	52	52	53
1-9	27	27	26	26
1-10	32	32	33	31
1-11	31	30	30	19
1-12	26	26	26	27
1-13	33	32	25	25
1-14	31	32	33	26
1-15	30	29	20	23
1-16	23	25	28	28
1-17	49	47	30	65
1-18	25	29	25	25
1-19	22	25	22	28
1-20	15	21	13	34
1-21	41	57	55	35
1-22	32	32	20	20
1-23	48	49	40	43
1-24	23	28	10	34
1-25	32	32	33	52
1-26	32	32	31	24
1-27	28	31	30	48
1-28	45	42	30	50
1-29	20	22	21	23
1-30	0	0	0	0
1-31	10	18	17	-1
2-1	20	21	22	21
2-2	15	20	18	16
2-3	0	0	0	0
2-4	11	10	12	13
2-5	-30	-31	-52	-42
TOTALS	1437	1433	1264	1443

Appendix c. Carcass parameter data

Pig #	Trt	Live Wt (lbs)	Hot Wt (lbs)	Cold Wt (lbs)	Dressing (%)	LEA (in2)	length (in)	Backfat (in)	Muscle (%)	Color Score	Marbling Score
276	Ctrl	232	177	172	76.29	5.07	29.50	1.1	52.401	3	1
277	Ctrl	242	177	172	73.14	3.30	30.00	1.8	44.508	3	2
281	Ctrl	218	169	164	77.52	3.97	31.50	1.1	51.213	3	2
292	Ctrl	247	188	183	76.11	4.98	30.25	1.4	49.787	3	1
285	Ctrl	225	175	170	77.78	3.38	31.25	1.3	48.794	3	1
286	Ctrl	240	177	172	73.75	4.96	31.25	1.0	53.119	2	1
287	Ctrl	240	180	174	75.00	5.43	30.25	1.4	50.278	3	1
288	Ctrl	213	161	156	75.59	5.46	30.00	0.7	56.826	3	1
280	pST	247	183	178	74.09	4.06	32.00	1.4	48.776	3	2
282	pST	247	177	172	71.66	5.08	31.50	0.8	54.938	3	1
283	pST	236	170	165	72.03	4.96	30.50	0.9	54.124	3	1
289	pST	247	181	176	73.28	4.70	30.75	0.8	54.409	3	1
278	pST	236	170	168	72.03	5.23	30.75	0.8	55.318	2	1
279	pST	243	183	178	75.31	5.45	29.75	1.0	53.552	3	1
284	pST	212	153	148	72.17	4.17	30.00	0.9	53.549	3	1
290	pST	218	163	158	74.77	5.12	30.00	0.7	56.325	3	1

Appendix d. Moisture data expressed as g/100 g

Pig #	Trt	Stor	SC Fat	Raw Muscle	Cooked Loin
276	Ctrl	0	11.029	75.166	64.454
277	Ctrl	0	9.973	73.924	63.767
281	Ctrl	0	9.550	73.062	62.538
292	Ctrl	0	10.464	73.507	62.305
285	Ctrl	0	9.566	72.622	58.379
286	Ctrl	0	11.916	74.149	64.686
287	Ctrl	0	8.519	71.823	63.700
288	Ctrl	0	13.161	74.596	63.562
280	pST	0	10.417	73.516	62.678
282	pST	0	11.582	73.805	64.442
283	pST	0	13.874	72.716	64.856
289	pST	0	11.993	73.215	62.428
278	pST	0	13.491	74.188	65.756
279	pST	0	11.819	73.494	65.162
284	pST	0	10.823	73.664	62.024
290	pST	0	13.914	74.432	63.844
276	Ctrl	4	11.706	75.059	67.286
277	Ctrl	4	9.528	73.687	67.118
281	Ctrl	4	10.007	72.969	64.393
292	Ctrl	4	9.423	74.099	67.557
285	Ctrl	4	9.500	73.454	63.897
286	Ctrl	4	13.348	74.884	65.497
287	Ctrl	4	9.588	72.890	64.843
288	Ctrl	4	16.424	74.680	66.443
280	pST	4	10.135	74.038	66.737
282	pST	4	11.908	72.823	66.307
283	pST	4	15.705	73.087	63.339
289	pST	4	13.555	73.207	65.203
278	pST	4	15.345	74.217	65.767
279	pST	4	12.394	74.517	66.687
284	pST	4	11.916	73.904	65.546
290	pST	4	14.525	74.070	62.080

Appendix e. Total lipid data expressed as g/100 g wet weight

Pig #	Trt	Stor	SC Fat	SC Fat	IM Fat	IM Fat	Raw Muscle	Raw Muscle	Cooked Loin	Cooked Loin
276	Ctrl	0	76.601	80.363	75.928	76.983	1.669	1.592	3.830	3.417
277	Ctrl	0	83.613	84.104	74.198	73.122	3.000	2.617	6.299	5.312
281	Ctrl	0	83.619	82.699	78.807	78.864	3.701	3.841	6.666	6.869
292	Ctrl	0	79.723	85.390	78.419	75.428	2.047	1.768	4.072	4.894
285	Ctrl	0	79.123	83.262	79.263	81.653	2.989	3.337	7.031	8.060
286	Ctrl	0	74.695	74.353	79.779	71.127	1.268	1.428	2.714	2.625
287	Ctrl	0	81.922	81.475	75.376	82.151	2.495	.	6.608	5.631
288	Ctrl	0	79.558	81.288	65.268	57.412	1.451	1.408	2.890	3.032
280	pST	0	79.770	75.688	81.836	79.124	3.548	4.414	5.378	5.709
282	pST	0	79.250	79.165	76.941	75.569	1.996	1.828	4.006	4.110
283	pST	0	75.636	71.560	65.224	77.508	2.571	2.944	4.060	3.858
289	pST	0	72.322	79.545	69.564	72.001	2.412	2.633	4.149	3.800
278	pST	0	76.812	73.550	70.277	79.363	1.130	1.419	2.154	1.975
279	pST	0	78.712	77.031	83.691	86.937	2.345	2.378	3.620	3.534
284	pST	0	75.997	72.586	77.764	77.061	2.116	2.471	3.360	3.766
290	pST	0	74.994	71.885	70.717	74.710	1.993	1.625	2.892	3.388
276	Ctrl	4	83.238	81.322	79.477	74.560	2.183	2.496	4.558	3.495
277	Ctrl	4	71.207	75.961	82.305	83.128	3.307	3.195	5.503	5.317
281	Ctrl	4	83.087	81.568	82.431	83.080	4.146	4.013	6.742	6.624
292	Ctrl	4	86.137	82.930	82.045	82.534	1.879	1.898	2.838	3.239
285	Ctrl	4	81.105	84.572	81.446	78.887	4.363	5.308	6.775	7.096
286	Ctrl	4	80.711	81.971	79.220	79.062	1.613	1.238	2.995	3.079
287	Ctrl	4	85.730	81.045	81.463	81.680	2.636	2.616	5.885	6.345
288	Ctrl	4	74.877	78.339	58.589	57.837	1.301	1.337	2.749	2.568
280	pST	4	83.675	82.319	77.289	74.528	3.174	3.002	5.361	4.837
282	pST	4	80.308	79.304	78.666	78.677	2.187	2.654	3.446	3.518
283	pST	4	75.915	76.416	73.742	73.116	2.690	2.727	5.229	5.235
289	pST	4	78.029	74.920	77.210	76.043	1.814	2.618	4.104	4.060
278	pST	4	76.002	77.307	65.597	77.369	1.282	1.177	2.399	2.334
279	pST	4	82.324	79.647	80.996	84.228	2.473	2.448	4.163	3.665
284	pST	4	81.779	79.385	79.472	74.454	1.943	1.923	3.407	3.778
290	pST	4	77.571	75.727	63.518	71.054	1.668	1.577	1.996	1.912

Appendix f. Total lipid data expressed as g/100 g dry weight

Pig #	Trt	Stor	SC Fat	Raw Muscle	Cooked Loin
276	Ctrl	0	88.210	6.566	10.194
277	Ctrl	0	93.148	10.770	16.023
281	Ctrl	0	91.939	13.999	18.065
292	Ctrl	0	92.206	7.200	11.892
285	Ctrl	0	89.781	11.552	18.129
286	Ctrl	0	84.605	5.215	7.559
287	Ctrl	0	89.307	8.856	16.859
288	Ctrl	0	92.611	5.627	8.126
280	pST	0	86.768	15.032	14.852
282	pST	0	89.583	7.299	11.412
283	pST	0	85.454	10.107	11.266
289	pST	0	86.282	9.417	10.578
278	pST	0	86.905	4.937	6.029
279	pST	0	88.309	8.909	10.268
284	pST	0	83.308	8.707	9.382
290	pST	0	85.310	7.075	8.685
276	Ctrl	4	93.188	9.380	12.309
277	Ctrl	4	81.334	12.354	16.454
281	Ctrl	4	91.482	15.093	18.769
292	Ctrl	4	93.328	7.291	9.366
285	Ctrl	4	91.534	18.217	19.211
286	Ctrl	4	93.871	5.674	8.802
287	Ctrl	4	92.230	9.686	17.392
288	Ctrl	4	91.662	5.209	7.922
280	pST	4	92.357	11.893	15.330
282	pST	4	90.594	8.907	10.335
283	pST	4	90.356	10.063	14.271
289	pST	4	88.466	8.270	11.731
278	pST	4	90.550	4.767	6.913
279	pST	4	92.443	9.655	11.750
284	pST	4	91.483	7.407	10.427
290	pST	4	89.674	6.258	5.152

Appendix g. Fatty acid profile data for subcutaneous fat expressed as relative weight percent

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0	C18:3	C20:1	C20:2	C20:4	SFA	MUFA	PUFA
276	Ctrl	0	1.123	23.793	2.297	10.852	0.410	39.249	4.169	15.749	.	0.621	0.670	0.500	.	35.768	46.796	16.869
277	Ctrl	0	1.090	24.751	1.737	13.135	0.509	39.763	4.324	12.885	.	0.521	0.794	0.491	.	38.976	47.126	13.898
281	Ctrl	0	0.955	22.609	1.736	11.578	0.452	40.711	5.187	14.345	.	0.687	0.917	0.560	.	35.142	49.003	15.592
292	Ctrl	0	0.986	24.297	1.769	13.799	0.366	39.298	3.336	13.417	.	0.667	0.907	0.668	.	39.083	45.676	14.752
285	Ctrl	0	1.141	23.698	1.912	11.514	0.492	40.300	4.021	14.121	.	0.630	0.825	0.569	0.235	36.353	47.551	15.555
286	Ctrl	0	0.929	21.150	1.982	11.165	0.583	41.175	3.621	15.599	0.140	0.758	0.908	0.680	0.338	33.385	48.269	17.375
287	Ctrl	0	1.251	25.155	2.111	12.783	0.545	37.945	3.401	13.730	0.218	0.652	0.856	0.602	0.279	39.407	44.857	15.262
288	Ctrl	0	1.195	22.296	2.743	8.792	0.504	40.037	4.552	16.261	.	0.830	0.782	0.648	0.292	32.283	48.619	18.031
280	pST	0	0.996	22.651	2.138	10.589	0.474	41.424	3.926	14.812	.	0.723	0.745	0.494	0.255	34.236	48.707	16.284
282	pST	0	1.201	24.084	2.313	11.534	0.491	38.705	4.626	14.858	.	0.620	0.746	0.497	.	36.819	46.881	15.975
283	pST	0	1.178	22.745	2.466	11.157	0.539	37.695	3.847	16.476	0.141	0.847	0.775	0.615	0.296	35.221	45.322	18.234
289	pST	0	1.224	23.355	1.801	12.519	0.383	38.141	4.083	15.191	0.154	0.571	0.859	0.681	0.222	37.251	45.266	16.666
278	pST	0	0.884	20.441	2.114	9.821	0.620	42.158	5.032	15.881	.	0.715	0.743	0.527	0.261	31.145	50.667	17.384
279	pST	0	1.151	23.980	2.564	10.264	0.511	39.500	3.984	15.385	.	0.649	0.672	0.516	0.247	35.395	47.232	16.797
284	pST	0	1.249	22.894	2.664	10.561	0.513	39.188	4.452	15.321	.	0.630	0.857	0.692	0.255	34.704	47.674	16.898
290	pST	0	1.181	22.473	2.449	11.525	0.474	39.321	4.210	15.004	.	0.763	0.936	0.643	0.304	35.178	47.391	16.714
276	Ctrl	4	1.065	22.162	2.312	10.952	0.710	39.410	3.575	15.752	0.314	0.769	0.958	0.739	0.407	34.492	46.965	17.667
277	Ctrl	4	1.174	23.630	1.886	13.223	0.764	39.472	3.458	12.994	0.203	0.670	1.054	0.655	0.328	38.231	46.634	14.646
281	Ctrl	4	1.103	21.645	2.106	10.567	0.692	41.769	3.545	14.784	0.187	0.684	1.166	0.818	0.343	33.502	49.277	16.630
292	Ctrl	4	1.128	23.514	1.906	13.769	0.706	39.271	3.262	13.273	0.250	0.653	1.077	0.639	.	38.661	46.221	14.565
285	Ctrl	4	1.079	22.448	1.822	11.853	0.711	40.834	3.491	14.196	0.188	0.764	1.079	0.708	0.170	35.568	47.937	15.837
286	Ctrl	4	1.045	20.713	1.958	11.691	0.745	40.978	3.576	14.978	0.283	0.765	1.039	0.810	0.393	33.732	48.296	16.946
287	Ctrl	4	1.292	23.935	2.174	12.596	1.090	37.634	3.379	13.863	0.150	0.712	0.978	0.609	0.144	37.972	45.255	15.327
288	Ctrl	4	1.142	21.044	2.493	9.665	0.780	39.303	3.914	16.890	0.198	0.899	1.027	0.808	0.412	32.049	47.518	19.009
280	pST	4	1.064	21.855	1.943	11.760	0.743	40.058	3.464	15.219	0.202	0.787	0.989	0.618	0.323	34.881	47.198	16.948
282	pST	4	1.217	22.960	2.302	12.166	0.666	38.438	3.675	14.968	0.144	0.681	0.964	0.744	0.419	36.487	46.046	16.813
283	pST	4	1.152	22.072	2.466	11.030	0.771	38.969	3.509	16.342	0.242	0.828	0.813	0.690	0.271	34.497	46.528	18.131
289	pST	4	1.232	22.728	1.768	12.981	0.572	38.704	3.506	14.724	0.196	0.701	1.071	0.783	0.296	37.136	45.620	16.504
278	pST	4	0.980	19.798	2.198	10.251	0.717	42.229	3.970	15.422	0.185	0.720	1.058	0.700	0.434	31.213	50.172	17.276
279	pST	4	1.262	22.780	2.634	10.464	0.790	39.344	3.832	15.330	0.207	0.817	0.931	0.588	0.247	34.712	47.531	16.983
284	pST	4	1.161	21.914	2.405	11.528	0.685	39.427	3.800	15.157	0.182	0.771	1.034	0.770	0.417	34.785	47.352	17.114
290	pST	4	1.099	21.538	2.400	11.625	0.622	40.342	3.855	14.632	0.235	0.714	1.165	0.748	0.258	34.497	48.384	16.352

Appendix h. Fatty acid profile data for subcutaneous fat expressed as mg\100 g wet weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	860.986	18239.824	1761.250	8319.668	314.493	30089.083	3195.738	12073.345	.
277	Ctrl	0	834.146	18938.784	1328.723	10050.279	389.428	30424.817	3308.581	9859.404	.
281	Ctrl	0	790.594	18706.890	1436.359	9579.506	373.869	33684.955	4291.904	11869.702	.
292	Ctrl	0	753.979	18579.855	1353.078	10552.163	279.697	30050.288	2551.167	10260.046	.
285	Ctrl	0	830.566	17251.201	1391.782	8381.866	358.403	29337.084	2927.294	10279.601	.
286	Ctrl	0	670.007	15246.941	1428.924	8048.842	420.113	29682.513	2610.025	11245.155	100.781
287	Ctrl	0	1022.949	20565.042	1725.563	10450.603	445.602	31021.319	2780.088	11224.798	178.499
288	Ctrl	0	816.351	15235.675	1874.710	6007.915	344.403	27358.668	3110.471	11111.703	.
280	pST	0	654.605	14891.372	1405.689	6961.613	311.727	27232.831	2581.026	9737.691	.
282	pST	0	890.217	17844.492	1713.790	8545.583	363.874	28677.010	3427.757	11008.882	.
283	pST	0	806.077	15569.104	1687.730	7636.871	369.002	25802.401	2632.925	11278.071	96.288
289	pST	0	834.744	15933.360	1228.993	8540.339	261.056	26020.409	2785.284	10363.879	104.926
278	pST	0	629.769	14565.414	1506.534	6997.978	441.722	30040.652	3585.664	11316.315	.
279	pST	0	866.520	18053.071	1930.228	7727.179	385.079	29737.493	2999.314	11582.436	.
284	pST	0	849.753	15570.493	1811.521	7182.620	348.813	26652.016	3028.071	10420.112	.
290	pST	0	798.888	15207.835	1657.520	7799.430	320.444	26609.736	2849.221	10153.745	.
276	Ctrl	4	784.312	16325.652	1703.309	8067.758	523.063	29031.952	2633.441	11603.700	231.121
277	Ctrl	4	851.686	17135.879	1367.692	9588.590	553.709	28623.763	2507.809	9422.723	147.446
281	Ctrl	4	818.912	16065.537	1563.003	7843.390	513.576	31002.268	2631.016	10973.411	138.613
292	Ctrl	4	869.387	18125.700	1469.078	10613.461	543.917	30271.167	2514.299	10231.411	192.378
285	Ctrl	4	810.072	16854.736	1367.767	8899.780	533.871	30659.373	2621.481	10658.773	141.449
286	Ctrl	4	739.891	14662.240	1386.348	8275.552	527.152	29007.018	2531.096	10602.179	200.027
287	Ctrl	4	831.243	15403.168	1399.149	8106.083	701.397	24219.022	2174.493	8921.484	96.245
288	Ctrl	4	742.504	13677.378	1620.618	6281.793	507.224	25545.049	2543.833	10977.497	128.411
280	pST	4	763.088	15674.099	1393.442	8434.192	533.199	28729.093	2484.554	10915.042	144.860
282	pST	4	858.715	16194.672	1623.689	8581.329	470.075	27112.465	2592.229	10557.749	101.419
283	pST	4	781.980	14977.919	1673.564	7484.875	523.250	26443.761	2380.926	11089.164	164.062
289	pST	4	826.619	15251.732	1186.155	8710.791	383.773	25972.656	2353.029	9880.450	131.605
278	pST	4	643.737	13005.575	1443.972	6734.055	470.948	27741.413	2607.679	10131.074	121.393
279	pST	4	920.283	16617.758	1921.121	7633.161	576.425	28700.993	2795.726	11183.157	151.144
284	pST	4	841.790	15882.090	1743.156	8354.597	496.773	28575.074	2753.822	10984.786	132.090
290	pST	4	728.123	14268.027	1589.954	7701.444	412.110	26725.328	2553.984	9692.991	155.791

Appendix h. cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	475.861	513.973	383.256	.	27420.479	35874.538	12932.462	76227.479
277	Ctrl	0	398.603	607.213	375.911	.	29823.209	36058.762	10633.919	76515.890
281	Ctrl	0	568.561	759.093	463.255	.	29076.990	40546.180	12901.518	82524.688
292	Ctrl	0	509.810	693.296	511.169	.	29885.996	34927.526	11281.025	76094.547
285	Ctrl	0	458.783	600.749	413.882	171.068	26463.634	34615.313	11323.334	72402.280
286	Ctrl	0	546.343	654.800	490.196	243.460	24066.570	34796.375	12525.153	71388.098
287	Ctrl	0	532.783	699.736	491.757	227.690	32217.093	36672.308	12477.028	81366.429
288	Ctrl	0	567.423	534.333	442.608	199.532	22059.941	33222.584	12321.266	67603.791
280	pST	0	475.539	489.501	324.680	167.427	22507.589	32020.774	10705.337	65233.700
282	pST	0	459.390	552.581	368.018	.	27280.291	34735.011	11836.290	73851.592
283	pST	0	579.508	530.653	421.209	202.553	24108.340	31022.711	12481.341	67612.392
289	pST	0	389.698	585.747	464.464	151.537	25413.368	30881.490	11369.577	67664.436
278	pST	0	509.717	529.292	375.578	185.742	22193.161	36103.863	12387.352	70684.377
279	pST	0	488.913	506.166	388.625	185.870	26646.771	35558.280	12645.844	74850.895
284	pST	0	428.786	583.018	470.370	173.404	23602.866	32423.439	11492.672	67518.977
290	pST	0	516.385	633.662	435.091	205.749	23806.154	32070.584	11310.969	67187.706
276	Ctrl	4	566.585	705.513	544.396	299.975	25408.843	34597.279	13014.657	73020.778
277	Ctrl	4	485.795	764.296	474.812	237.701	27723.601	33817.270	10621.032	72161.903
281	Ctrl	4	507.697	865.257	607.487	254.546	24866.453	36575.120	12343.141	73784.714
292	Ctrl	4	503.553	830.294	492.563	.	29800.926	35628.754	11227.528	76657.208
285	Ctrl	4	573.428	810.072	531.381	127.680	26706.038	35992.566	11891.262	74589.865
286	Ctrl	4	541.820	735.348	573.469	277.938	23877.710	34186.962	11995.405	70060.077
287	Ctrl	4	458.213	629.505	391.702	92.376	24436.739	29123.567	9863.775	63424.080
288	Ctrl	4	584.138	667.432	525.352	267.601	20830.086	30884.155	12354.589	64068.830
280	pST	4	564.769	709.446	443.565	231.854	25016.238	33849.734	12155.229	71021.202
282	pST	4	480.524	680.027	524.687	295.839	25736.134	32478.486	11858.799	70073.419
283	pST	4	561.631	551.678	468.390	183.966	23408.836	31573.178	12303.151	67285.166
289	pST	4	470.218	718.466	525.676	198.635	24920.747	30614.080	11074.979	66609.806
278	pST	4	473.156	694.849	459.788	284.808	20504.760	32958.861	11348.825	64812.446
279	pST	4	596.037	678.906	429.251	180.176	25322.347	34673.172	12388.621	72384.139
284	pST	4	558.438	749.657	557.859	302.329	25210.567	34318.483	12403.411	71932.461
290	pST	4	472.949	771.774	495.580	171.096	22853.386	32053.150	10832.616	65739.152

Appendix i. Fatty acid profile data for subcutaneous fat expressed as mg/100 g dry weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	967.716	20500.865	1979.577	9350.989	353.478	33818.978	3591.887	13569.978	.
277	Ctrl	0	926.551	21036.782	1475.916	11163.628	432.568	33795.214	3675.099	10951.608	.
281	Ctrl	0	874.067	20682.023	1588.014	10590.941	413.343	37241.520	4745.057	13122.943	.
292	Ctrl	0	842.096	20751.268	1511.211	11785.385	312.385	33562.241	2849.320	11459.129	.
285	Ctrl	0	918.422	19076.013	1539.003	9268.490	396.314	32440.326	3236.940	11366.965	.
286	Ctrl	0	760.645	17309.546	1622.228	9137.689	476.946	33697.962	2963.110	12766.399	114.414
287	Ctrl	0	1118.209	22480.124	1886.253	11423.796	487.098	33910.122	3038.978	12270.087	195.122
288	Ctrl	0	940.074	17544.737	2158.834	6918.452	396.599	31505.047	3581.882	12795.752	.
280	pST	0	730.724	16622.989	1569.147	7771.132	347.975	30399.553	2881.156	10870.021	.
282	pST	0	1006.827	20181.967	1938.282	9664.981	411.538	32433.452	3876.764	12450.951	.
283	pST	0	935.928	18077.124	1959.606	8867.092	428.444	29958.899	3057.062	13094.850	111.799
289	pST	0	948.497	18104.651	1396.472	9704.158	296.631	29566.295	3164.843	11776.198	119.224
278	pST	0	727.981	16836.877	1741.477	8089.306	510.608	34725.464	4144.845	13081.084	.
279	pST	0	982.661	20472.745	2188.938	8762.862	436.692	33723.243	3401.316	13134.843	.
284	pST	0	952.884	17460.212	2031.377	8054.341	391.147	29886.648	3395.574	11684.753	.
290	pST	0	928.012	17665.864	1925.424	9060.045	372.237	30910.643	3309.738	11794.886	.
276	Ctrl	4	888.296	18490.103	1929.133	9137.380	592.411	32881.003	2982.582	13142.117	261.763
277	Ctrl	4	941.381	18940.533	1511.729	10598.406	612.023	31638.256	2771.918	10415.071	162.974
281	Ctrl	4	909.973	17851.986	1736.805	8715.556	570.685	34449.644	2923.578	12193.627	154.027
292	Ctrl	4	959.832	20011.372	1621.911	11717.612	600.502	33420.368	2775.869	11295.816	212.392
285	Ctrl	4	895.107	18624.017	1511.345	9834.012	589.913	33877.761	2896.664	11777.650	156.298
286	Ctrl	4	853.864	16920.833	1599.903	9550.330	608.356	33475.301	2920.989	12235.354	230.839
287	Ctrl	4	919.395	17036.641	1547.526	8965.716	775.779	26787.398	2405.093	9867.588	106.451
288	Ctrl	4	888.418	16365.199	1939.095	7516.264	606.902	30565.053	3043.736	13134.748	153.645
280	pST	4	849.149	17441.828	1550.595	9385.403	593.333	31969.168	2764.763	12146.043	161.198
282	pST	4	974.793	18383.817	1843.175	9741.326	533.619	30777.443	2942.639	11984.912	115.128
283	pST	4	927.671	17768.455	1985.365	8879.382	620.736	31370.498	2824.516	13155.186	194.628
289	pST	4	956.237	17643.278	1372.150	10076.686	443.951	30045.296	2721.995	11429.753	152.241
278	pST	4	760.424	15363.032	1705.714	7954.704	556.315	32769.964	3080.360	11967.485	143.397
279	pST	4	1050.480	18968.744	2192.910	8713.058	657.975	32761.447	3191.250	12765.287	172.527
284	pST	4	955.667	18030.618	1978.970	9484.807	563.977	32440.709	3126.359	12470.807	149.959
290	pST	4	851.855	16692.632	1860.139	9010.172	482.141	31266.836	2987.989	11340.148	182.265

Appendix i. Cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	534.849	577.686	430.765	.	30819.569	40321.608	14535.593	85676.770
277	Ctrl	0	442.760	674.478	417.554	.	33126.960	40053.275	11811.922	84992.158
281	Ctrl	0	628.592	839.241	512.167	.	32147.031	44827.175	14263.702	91237.908
292	Ctrl	0	569.391	774.321	570.909	.	33378.749	39009.478	12599.429	84987.655
285	Ctrl	0	507.313	664.296	457.662	189.163	29262.925	38276.879	12521.102	80060.906
286	Ctrl	0	620.252	743.382	556.509	276.396	27322.295	39503.627	14219.556	81045.477
287	Ctrl	0	582.397	764.898	537.551	248.893	35217.251	40087.349	13638.928	88943.528
288	Ctrl	0	653.419	615.315	509.688	229.772	25403.264	38257.677	14188.632	77849.574
280	pST	0	530.836	546.421	362.435	186.896	25124.844	35744.252	11950.188	72819.285
282	pST	0	519.566	624.964	416.226	.	30853.775	39285.000	13386.743	83525.518
283	pST	0	672.861	616.135	489.062	235.183	27991.942	36020.146	14491.955	78504.043
289	pST	0	442.803	665.569	527.757	172.188	28876.530	35089.811	12918.947	76885.288
278	pST	0	589.206	611.834	434.149	214.708	25654.165	41734.228	14319.148	81707.541
279	pST	0	554.443	574.008	440.713	210.782	30218.268	40324.197	14340.781	84883.246
284	pST	0	480.825	653.776	527.456	194.449	26467.437	36358.522	12887.484	75713.443
290	pST	0	599.847	736.080	505.414	239.004	27653.920	37254.122	13139.150	78047.192
276	Ctrl	4	641.703	799.050	616.572	339.746	28777.542	39184.179	14740.137	82701.858
277	Ctrl	4	536.956	844.788	524.817	262.734	30643.294	37378.714	11739.579	79761.587
281	Ctrl	4	564.152	961.472	675.038	282.851	27631.541	40642.184	13715.668	81989.393
292	Ctrl	4	555.939	916.672	543.806	.	32901.207	39335.321	12395.561	84632.089
285	Ctrl	4	633.622	895.107	587.161	141.083	29509.434	39770.791	13139.516	82419.740
286	Ctrl	4	625.282	848.622	661.807	320.752	27555.867	39453.171	13843.195	80852.233
287	Ctrl	4	506.805	696.263	433.241	102.173	27028.203	32212.059	10909.807	70150.069
288	Ctrl	4	698.930	798.593	628.593	320.189	24923.526	36953.378	14782.460	76659.364
280	pST	4	628.464	789.458	493.590	258.002	27837.577	37667.316	13526.099	79030.993
282	pST	4	545.480	771.951	595.613	335.830	29215.064	36868.825	13461.834	79545.724
283	pST	4	666.269	654.462	555.655	218.240	27770.136	37455.577	14595.350	79821.064
289	pST	4	543.950	831.126	608.104	229.782	28828.443	35414.518	12811.590	77054.551
278	pST	4	558.922	820.800	543.131	336.434	24221.558	38933.153	13405.971	76560.683
279	pST	4	680.361	774.954	489.979	205.667	28904.809	39578.536	14141.293	82624.637
284	pST	4	633.983	851.071	633.326	343.228	28621.051	38961.086	14081.344	81663.481
290	pST	4	553.318	902.923	579.796	200.171	26736.924	37500.029	12673.432	76910.386

Appendix j. Fatty acid profile data for intermuscular fat expressed as relative weight percent

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0	C18:3	C20:1	C20:2	C20:4	SFA	MUFA	PUFA
276	Ctrl	0	1.081	24.783	2.312	11.213	0.378	39.126	5.585	13.698	.	0.466	0.551	0.416	.	37.077	47.952	14.580
277	Ctrl	0	1.282	26.081	1.962	14.438	0.446	39.307	3.305	10.600	0.229	0.627	0.835	0.513	.	42.030	45.855	11.741
281	Ctrl	0	0.942	23.979	1.731	12.790	0.391	39.027	5.937	13.180	.	0.482	0.782	0.515	.	37.710	47.870	14.178
292	Ctrl	0	1.220	26.234	1.789	15.077	0.476	37.907	3.057	11.464	0.242	0.690	0.908	0.575	.	42.774	44.136	12.728
285	Ctrl	0	1.063	25.141	1.946	12.628	0.427	38.917	5.584	12.233	.	0.557	0.682	0.408	.	38.832	47.557	13.199
286	Ctrl	0	1.104	22.964	1.963	12.972	0.504	39.918	3.364	13.798	0.159	0.691	0.902	0.631	0.320	37.200	46.652	15.440
287	Ctrl	0	1.368	26.787	2.003	14.525	0.483	35.910	2.987	12.952	0.241	0.711	0.795	0.509	0.186	42.921	42.178	14.359
288	Ctrl	0	1.018	22.717	2.222	10.294	0.509	38.383	5.810	16.741	.	0.684	0.688	0.588	.	34.029	47.612	18.014
280	pST	0	1.150	23.485	1.829	12.899	0.462	39.369	3.249	14.258	0.183	0.679	0.834	0.544	0.247	37.716	45.742	15.728
282	pST	0	1.177	25.215	2.172	13.121	0.294	37.910	4.503	13.553	.	0.501	0.681	0.450	.	39.513	45.561	14.504
283	pST	0	1.196	24.243	2.179	12.903	0.530	37.834	3.391	14.670	0.213	0.714	0.686	0.518	0.246	38.555	44.620	16.148
289	pST	0	1.108	24.397	1.641	13.727	0.362	37.441	5.575	13.679	.	0.438	0.793	0.501	.	39.231	45.812	14.618
278	pST	0	1.032	21.051	1.991	11.580	0.604	40.087	3.562	16.383	0.125	0.800	0.805	0.660	0.361	33.788	47.048	18.204
279	pST	0	1.268	24.948	2.494	11.782	0.493	39.133	3.617	13.523	0.167	0.650	0.738	0.559	.	38.165	46.475	14.733
284	pST	0	1.027	24.132	2.214	12.652	.	39.131	5.461	13.302	.	0.514	0.735	0.478	.	37.812	47.541	14.294
290	pST	0	1.068	22.920	2.009	12.569	0.544	38.090	5.343	14.807	.	0.636	0.820	0.563	.	36.557	46.808	16.006
276	Ctrl	4	1.197	23.616	2.309	11.616	0.676	38.681	3.421	15.137	0.183	0.746	0.893	0.658	0.340	36.612	45.979	16.881
277	Ctrl	4	1.336	25.880	1.947	14.894	0.520	38.667	2.514	11.146	0.241	0.632	0.911	0.553	0.283	42.351	44.558	12.615
281	Ctrl	4	1.056	22.999	1.802	13.183	0.658	39.979	3.147	13.610	0.289	0.630	1.118	0.721	0.286	37.527	46.703	15.246
292	Ctrl	4	1.232	25.321	1.833	14.952	0.535	38.964	2.454	11.570	0.233	0.600	1.007	0.598	0.247	41.738	44.794	13.016
285	Ctrl	4	1.165	24.053	1.945	12.850	0.676	40.263	3.205	12.552	0.186	0.692	1.019	0.651	0.234	38.254	47.108	14.130
286	Ctrl	4	1.084	22.409	1.903	13.165	0.701	40.387	3.141	13.445	0.221	0.753	0.978	0.661	0.392	36.879	47.110	15.251
287	Ctrl	4	1.326	26.367	2.079	14.507	0.558	36.723	2.362	12.872	0.258	0.707	0.928	0.634	0.185	42.458	42.651	14.397
288	Ctrl	4	1.183	21.923	2.430	10.347	0.748	39.958	3.686	16.253	.	0.782	0.907	0.743	0.444	33.454	47.729	18.222
280	pST	4	1.143	23.073	1.795	13.194	0.662	39.813	3.128	13.708	0.189	0.705	0.925	0.659	0.298	37.600	46.323	15.370
282	pST	4	1.222	24.206	2.050	13.738	0.663	37.357	3.299	14.211	0.199	0.657	0.909	0.649	0.321	39.365	44.277	15.839
283	pST	4	1.167	23.264	2.200	12.522	0.691	38.310	3.221	15.276	0.227	0.740	0.751	0.597	0.392	37.181	45.172	17.005
289	pST	4	1.240	23.670	1.769	14.135	0.629	37.787	3.009	13.934	0.288	0.641	1.075	0.789	0.218	39.333	44.268	15.582
278	pST	4	0.994	20.640	1.982	11.731	0.648	41.813	2.926	15.662	.	0.780	0.944	0.705	0.422	33.366	48.313	17.568
279	pST	4	1.305	24.347	2.339	12.197	0.628	38.654	2.666	14.298	0.219	0.827	0.841	0.579	0.283	38.068	45.130	15.988
284	pST	4	1.231	23.362	2.335	12.682	0.612	39.066	3.423	13.879	0.186	0.684	0.904	0.641	0.314	37.461	46.340	15.518
290	pST	4	1.083	22.094	2.074	12.709	0.591	39.586	2.793	15.050	0.197	0.833	1.069	0.715	0.439	36.083	46.113	17.038

Appendix k. Fatty acid profile data for intermuscular fat expressed as mg/ 100g wet weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	801.877	18375.596	1714.312	8313.861	280.262	29010.543	4141.406	10156.359	.
277	Ctrl	0	936.862	19060.850	1433.878	10551.469	325.948	28726.425	2415.222	7747.061	167.561
281	Ctrl	0	751.132	19117.131	1380.426	10196.496	311.991	31114.713	4733.398	10508.186	.
292	Ctrl	0	939.568	20197.808	1377.364	11608.060	366.207	29184.413	2353.545	8825.792	186.549
285	Ctrl	0	812.567	19217.505	1487.516	9652.920	326.738	29748.031	4268.745	9351.223	.
286	Ctrl	0	832.570	17318.227	1480.633	9783.096	380.028	30103.821	2537.160	10405.888	120.268
287	Ctrl	0	1060.231	20763.085	1552.915	11258.788	374.406	27834.407	2314.903	10039.487	186.475
288	Ctrl	0	663.604	14809.232	1448.839	6711.034	331.574	25022.325	3787.812	10913.870	.
280	pST	0	876.169	17898.449	1393.923	9830.760	351.846	30004.427	2476.296	10866.669	139.526
282	pST	0	865.300	18545.588	1597.825	9650.502	216.274	27882.146	3311.737	9967.835	.
283	pST	0	760.202	15407.456	1385.146	8200.761	336.774	24045.080	2155.369	9323.583	135.196
289	pST	0	792.746	17456.849	1174.395	9821.806	259.027	26790.056	3989.096	9787.942	.
278	pST	0	671.489	13693.004	1294.815	7532.458	392.902	26075.857	2316.889	10656.958	81.372
279	pST	0	964.793	18989.210	1898.628	8967.605	375.486	29785.383	2752.686	10292.906	127.080
284	pST	0	761.036	17878.168	1640.160	9372.935	.	28989.656	4046.014	9854.535	.
290	pST	0	706.209	15153.152	1328.508	8309.414	359.975	25182.503	3532.386	9789.216	.
276	Ctrl	4	877.477	17305.586	1691.727	8512.351	495.311	28345.208	2507.178	11091.972	134.067
277	Ctrl	4	1003.057	19430.940	1461.467	11182.039	390.217	29030.999	1887.217	8368.648	180.852
281	Ctrl	4	820.358	17866.902	1399.644	10241.420	511.491	31057.386	2444.395	10573.029	224.258
292	Ctrl	4	956.971	19669.823	1424.041	11615.405	415.750	30268.511	1906.432	8988.277	181.103
285	Ctrl	4	833.891	17215.430	1392.430	9196.911	484.004	28816.742	2293.548	8984.009	133.024
286	Ctrl	4	751.595	15537.036	1319.497	9127.526	485.941	28001.196	2177.984	9321.801	153.403
287	Ctrl	4	964.338	19181.910	1512.590	10553.334	405.592	26715.765	1718.377	9364.209	187.880
288	Ctrl	4	661.369	12252.146	1357.964	5782.941	417.883	22331.715	2060.279	9083.535	.
280	pST	4	802.060	16186.774	1258.956	9256.540	464.267	27931.176	2194.152	9616.703	132.919
282	pST	4	909.654	18023.548	1526.240	10229.147	493.505	27815.480	2456.009	10581.032	148.239
283	pST	4	836.525	16669.556	1576.615	8972.492	494.814	27450.229	2307.787	10945.493	162.754
289	pST	4	846.359	16155.675	1207.158	9647.814	429.326	25790.683	2053.705	9510.565	196.568
278	pST	4	585.298	12147.942	1166.472	6904.313	381.472	24609.189	1722.097	9217.855	.
279	pST	4	945.881	17650.520	1695.984	8842.591	455.505	28022.936	1933.027	10365.813	158.748
284	pST	4	927.099	17595.994	1758.389	9551.526	460.775	29423.931	2578.009	10453.643	139.997
290	pST	4	614.991	12547.507	1177.726	7217.876	335.673	22481.684	1586.447	8547.461	111.681

Appendix k. Cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	345.290	408.466	308.635	.	27491.333	35554.989	10810.284	73856.607
277	Ctrl	0	458.185	610.605	375.107	.	30716.742	33512.079	8580.353	72809.173
281	Ctrl	0	384.576	623.675	410.843	.	30064.760	38164.203	11303.605	79532.568
292	Ctrl	0	531.000	698.741	442.495	.	32931.986	33980.269	9799.287	76711.542
285	Ctrl	0	425.943	521.339	312.144	.	29682.991	36352.369	10089.310	76124.670
286	Ctrl	0	521.331	680.365	475.617	241.002	28054.160	35182.006	11643.838	74880.005
287	Ctrl	0	551.139	616.316	394.879	144.240	33268.580	32692.948	11129.746	77091.273
288	Ctrl	0	446.083	448.398	383.434	.	22183.871	31038.948	11743.387	64966.205
280	pST	0	517.697	635.529	414.321	188.127	28744.903	34862.020	11986.815	75593.739
282	pST	0	368.682	501.130	331.047	.	29061.390	33509.113	10667.564	73238.066
283	pST	0	453.902	435.885	329.354	156.166	24503.614	28358.253	10263.005	63124.873
289	pST	0	313.185	567.299	358.285	.	28071.401	32779.872	10459.413	71310.686
278	pST	0	520.628	523.508	429.288	234.711	21978.323	30603.970	11841.585	64423.878
279	pST	0	495.075	561.487	425.540	.	29048.687	35373.670	11213.522	75635.879
284	pST	0	381.010	544.593	354.254	.	28012.139	35220.423	10589.799	73822.362
290	pST	0	420.699	542.432	371.894	.	24168.775	30945.804	10581.810	65696.388
276	Ctrl	4	546.940	654.031	481.902	249.322	26829.481	33693.456	12370.137	72893.074
277	Ctrl	4	474.807	684.231	415.030	212.628	31796.889	33454.131	9471.113	74722.133
281	Ctrl	4	489.131	868.429	559.737	222.039	29152.938	36281.344	11843.937	77278.219
292	Ctrl	4	465.893	782.317	464.869	192.204	32423.301	34797.052	10111.243	77331.596
285	Ctrl	4	495.537	729.168	465.968	167.355	27379.257	33715.892	10112.869	71208.018
286	Ctrl	4	522.189	677.902	458.022	271.754	25569.560	32662.519	10573.766	68805.846
287	Ctrl	4	514.158	675.350	461.270	134.241	30887.463	31027.674	10473.879	72389.015
288	Ctrl	4	436.954	506.771	415.293	247.946	18696.457	26674.612	10183.728	55554.797
280	pST	4	494.711	649.175	462.160	209.238	26378.293	32497.727	10782.813	69658.833
282	pST	4	489.302	676.523	483.380	239.304	29310.588	32967.758	11793.018	74071.364
283	pST	4	530.593	538.062	427.938	280.708	26641.328	32367.507	12184.732	71193.566
289	pST	4	437.242	733.504	538.798	148.969	26846.416	30214.376	10635.574	67696.366
278	pST	4	458.848	555.479	414.812	248.155	19637.552	28434.709	10339.669	58411.930
279	pST	4	599.868	609.866	419.788	205.226	27597.741	32717.318	11590.694	71905.753
284	pST	4	515.032	681.194	483.003	236.541	28214.616	34902.299	11688.219	74805.134
290	pST	4	473.285	607.033	406.124	249.133	20492.056	26188.563	9676.004	56356.623

Appendix 1. Fatty acid profile data for raw longissimus muscle expressed as relative weight percent

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0	C18:3	C20:1	C20:2	20:3	C20:4	SFA	MUFA	PUFA
276	Ctrl	0	0.887	23.613	3.027	9.277	0.131	37.073	5.606	12.658	.	0.301	0.537	0.300	0.154	1.941	33.778	46.374	15.354
277	Ctrl	0	1.320	25.212	3.463	11.126	0.300	40.391	4.722	7.924	0.166	0.306	0.667	0.257	0.173	1.135	37.824	49.543	9.796
281	Ctrl	0	1.107	24.985	2.505	11.469	0.179	42.112	5.112	7.586	0.113	0.272	0.849	0.324	0.087	0.872	37.674	50.757	9.141
292	Ctrl	0	1.016	24.087	2.729	11.269	.	39.647	4.179	9.880	0.149	0.298	0.833	0.323	0.227	1.695	36.522	47.387	12.424
285	Ctrl	0	1.151	25.347	2.775	11.744	0.214	40.825	5.073	7.663	0.151	0.239	0.675	0.282	0.092	1.035	38.393	49.562	9.311
286	Ctrl	0	0.837	21.578	2.250	10.508	.	37.450	3.810	13.698	.	0.408	0.725	0.440	0.330	2.904	32.924	44.236	17.779
287	Ctrl	0	1.297	25.901	2.911	13.184	0.158	39.785	3.855	7.751	0.185	0.267	0.706	0.286	0.185	1.015	40.566	47.415	9.504
288	Ctrl	0	0.933	22.457	2.594	9.640	0.271	32.864	4.617	15.845	.	0.391	0.559	0.462	0.324	2.804	33.030	40.904	19.826
280	pST	0	1.168	24.618	2.212	12.514	0.278	40.162	3.819	9.354	0.179	0.318	0.859	0.367	0.193	1.238	38.479	47.330	11.469
282	pST	0	0.922	23.985	2.783	10.622	0.160	36.963	5.216	11.660	0.134	0.237	0.595	0.348	0.153	1.780	35.663	45.718	14.179
283	pST	0	1.175	23.781	2.913	10.986	0.329	40.483	4.175	10.290	.	0.402	0.741	0.382	0.212	1.484	35.943	48.641	12.769
289	pST	0	1.167	24.777	2.307	11.991	0.182	37.652	4.862	10.289	0.129	0.270	0.781	0.387	0.186	1.368	38.064	45.785	12.499
278	pST	0	0.800	21.237	2.026	9.738	0.374	34.844	3.809	15.438	.	0.358	0.713	0.452	0.375	3.373	31.774	41.765	19.995
279	pST	0	1.239	24.583	3.745	9.926	0.351	39.590	4.862	9.097	0.148	0.297	0.755	0.335	0.207	1.436	35.896	49.303	11.372
284	pST	0	1.057	23.514	3.350	10.544	0.208	38.861	5.411	10.076	0.168	0.295	0.766	0.391	0.187	1.495	35.282	48.595	12.444
290	pST	0	0.856	23.094	2.550	10.536	.	35.663	5.018	13.312	.	0.273	0.699	0.393	0.246	2.271	34.487	43.929	16.495
276	Ctrl	4	1.084	23.403	3.302	9.748	0.269	40.545	5.265	10.132	0.198	0.307	0.800	0.393	0.116	1.410	34.433	50.181	12.358
277	Ctrl	4	1.241	24.688	3.360	11.246	0.285	40.125	5.339	7.815	0.202	0.288	0.707	0.327	0.216	1.066	37.378	49.817	9.712
281	Ctrl	4	1.156	23.958	2.569	11.438	0.282	42.020	4.867	7.905	0.201	0.314	0.976	0.366	0.103	0.937	36.753	50.713	9.625
292	Ctrl	4	0.971	23.743	2.748	11.351	0.244	38.756	4.551	10.155	0.241	0.244	0.751	0.285	0.130	1.685	36.305	47.049	12.497
285	Ctrl	4	1.282	25.158	2.800	12.031	0.276	42.107	4.803	6.529	0.203	0.278	0.886	0.305	0.051	0.808	38.674	50.873	7.971
286	Ctrl	4	0.742	20.622	1.993	11.019	0.332	32.283	4.042	15.814	.	0.382	0.611	0.455	0.331	3.915	32.383	39.261	20.896
287	Ctrl	4	1.180	24.891	2.788	12.854	0.289	38.619	4.617	8.402	0.278	0.261	0.664	0.318	0.294	1.193	39.204	46.977	10.468
288	Ctrl	4	0.926	22.024	2.605	9.725	0.254	33.387	4.438	15.530	.	0.353	0.713	0.462	0.264	3.033	32.675	41.397	19.642
280	pST	4	1.127	24.355	2.159	12.517	0.213	39.103	4.268	9.603	0.196	0.306	0.919	0.389	0.147	1.249	38.195	46.662	11.695
282	pST	4	1.058	23.229	2.789	10.854	0.308	38.286	5.086	10.836	0.185	0.324	0.758	0.427	0.116	1.604	35.326	47.227	13.307
283	pST	4	1.116	23.501	2.888	10.842	0.351	39.973	5.028	9.932	0.226	0.380	0.725	0.345	0.162	1.300	35.684	48.965	12.119
289	pST	4	1.235	24.135	2.291	12.396	0.222	37.465	4.333	10.341	0.248	0.376	0.961	0.436	0.375	1.573	38.014	45.271	13.101
278	pST	4	0.707	20.336	1.806	10.117	0.330	31.468	4.118	16.548	0.173	0.361	0.669	0.487	0.254	4.041	31.333	38.390	21.691
279	pST	4	1.248	24.564	3.666	9.945	0.331	39.398	5.552	9.069	.	0.328	0.734	0.311	0.133	1.340	35.757	49.681	11.181
284	pST	4	0.958	22.383	3.196	10.414	0.224	36.915	5.120	11.341	.	0.283	0.800	0.420	0.364	2.135	33.755	46.256	14.543
290	pST	4	0.925	22.654	2.417	10.596	0.293	35.232	4.489	14.184	.	0.498	0.767	0.396	0.216	2.474	34.175	43.198	17.769

Appendix m. Patty acid profile data for raw longissimus muscle expressed as mg\100 g wet weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	13.597	361.770	46.370	142.126	2.015	567.989	85.881	193.931	.
277	Ctrl	0	42.251	806.763	110.828	356.012	9.588	1292.500	151.086	253.570	5.323
281	Ctrl	0	43.946	992.257	99.488	455.495	7.116	1672.456	203.009	301.269	4.505
292	Ctrl	0	18.853	447.187	50.656	209.219	.	736.060	77.580	183.431	2.775
285	Ctrl	0	40.169	884.641	96.845	409.865	7.470	1424.806	177.061	267.443	5.267
286	Ctrl	0	11.930	307.623	32.081	149.808	.	533.896	54.320	195.278	.
287	Ctrl	0	39.441	787.907	88.546	401.056	4.807	1210.270	117.273	235.779	5.622
288	Ctrl	0	11.353	273.145	31.547	117.255	3.295	399.725	56.159	192.731	.
280	pST	0	42.280	890.959	80.062	452.898	10.065	1453.536	138.205	338.527	6.487
282	pST	0	16.351	425.452	49.370	188.417	2.844	655.655	92.529	206.833	2.376
283	pST	0	33.016	668.132	81.833	308.651	9.242	1137.353	117.304	289.080	.
289	pST	0	28.554	606.264	56.462	293.407	4.461	921.317	118.973	251.762	3.162
278	pST	0	9.952	264.345	25.225	121.210	4.657	433.716	47.408	192.159	.
279	pST	0	32.011	635.026	96.740	256.405	9.079	1022.694	125.602	234.985	3.833
284	pST	0	24.585	547.111	77.936	245.322	4.833	904.175	125.906	234.439	3.902
290	pST	0	11.531	311.095	34.346	141.930	.	480.405	67.590	179.320	.
276	Ctrl	4	26.880	580.091	81.844	241.625	6.658	1005.016	130.513	251.140	4.920
277	Ctrl	4	40.618	807.828	109.951	367.994	9.334	1312.950	174.704	255.707	6.625
281	Ctrl	4	48.486	1004.642	107.723	479.651	11.807	1762.061	204.084	331.482	8.431
292	Ctrl	4	17.924	438.379	50.729	209.574	4.509	715.578	84.032	187.490	4.441
285	Ctrl	4	74.161	1455.789	162.005	696.201	15.982	2436.575	277.945	377.815	11.742
286	Ctrl	4	8.398	233.391	22.560	124.700	3.756	365.353	45.746	178.969	.
287	Ctrl	4	30.603	645.456	72.296	333.307	7.499	1001.428	119.711	217.879	7.215
288	Ctrl	4	10.947	260.277	30.789	114.932	3.005	394.564	52.447	183.530	.
280	pST	4	34.769	751.459	66.620	386.206	6.581	1206.522	131.681	296.307	6.063
282	pST	4	24.527	538.539	64.658	251.627	7.152	887.603	117.918	251.228	4.287
283	pST	4	31.649	666.497	81.893	307.484	9.964	1133.673	142.599	281.687	6.410
289	pST	4	30.585	597.659	56.744	306.976	5.492	927.757	107.291	256.068	6.137
278	pST	4	7.598	218.564	19.412	108.738	3.543	338.206	44.258	177.855	1.859
279	pST	4	31.655	623.189	92.993	252.299	8.406	999.514	140.860	230.083	.
284	pST	4	16.606	387.967	55.399	180.497	3.888	639.841	88.739	196.580	.
290	pST	4	13.102	320.995	34.245	150.131	4.157	499.209	63.606	200.983	.

Appendix m. cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	20:3	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	4.606	8.221	4.597	2.356	29.744	517.493	710.475	235.235	1463.203
277	Ctrl	0	9.787	21.342	8.235	5.527	36.334	1210.349	1585.344	313.453	3109.146
281	Ctrl	0	10.818	33.699	12.867	3.442	34.640	1496.203	2015.769	363.036	3875.008
292	Ctrl	0	5.533	15.465	6.005	4.211	31.476	678.034	879.762	230.656	1788.451
285	Ctrl	0	8.346	23.543	9.856	3.195	36.125	1339.941	1729.724	324.964	3394.629
286	Ctrl	0	5.811	10.337	6.270	4.698	41.402	469.361	630.633	253.460	1353.455
287	Ctrl	0	8.123	21.473	8.706	5.625	30.866	1234.026	1442.369	289.099	2965.494
288	Ctrl	0	4.756	6.802	5.616	3.946	34.101	401.753	497.527	241.150	1140.431
280	pST	0	11.499	31.093	13.296	6.985	44.788	1392.625	1712.960	415.095	3520.681
282	pST	0	4.210	10.554	6.173	2.721	31.579	632.596	810.952	251.516	1695.064
283	pST	0	11.287	20.827	10.725	5.959	41.688	1009.798	1366.557	358.738	2735.094
289	pST	0	6.595	19.106	9.461	4.552	33.479	931.387	1120.320	305.849	2357.556
278	pST	0	4.461	8.870	5.623	4.662	41.983	395.507	519.875	248.889	1164.271
279	pST	0	7.676	19.494	8.650	5.338	37.104	927.275	1273.608	293.753	2494.636
284	pST	0	6.871	17.815	9.098	4.346	34.785	820.920	1130.664	289.538	2241.122
290	pST	0	3.675	9.410	5.300	3.311	30.594	464.556	591.751	222.200	1278.508
276	Ctrl	4	7.607	19.833	9.751	2.864	34.959	853.517	1243.864	306.322	2403.702
277	Ctrl	4	9.428	23.133	10.702	7.060	34.878	1223.064	1630.072	317.774	3170.911
281	Ctrl	4	13.173	40.919	15.363	4.313	39.281	1541.210	2126.595	403.611	4071.416
292	Ctrl	4	4.497	13.857	5.255	2.392	31.112	670.318	868.706	230.747	1769.771
285	Ctrl	4	16.094	51.291	17.644	2.947	46.761	2237.893	2943.797	461.260	5642.951
286	Ctrl	4	4.320	6.917	5.146	3.742	44.308	366.489	444.331	236.486	1047.307
287	Ctrl	4	6.776	17.208	8.241	7.635	30.925	1016.580	1218.142	271.456	2506.178
288	Ctrl	4	4.175	8.429	5.461	3.119	35.839	386.155	489.234	232.124	1107.513
280	pST	4	9.457	28.343	12.014	4.547	38.529	1178.497	1439.746	360.853	2979.096
282	pST	4	7.500	17.566	9.891	2.696	37.189	818.980	1094.897	308.504	2222.381
283	pST	4	10.779	20.556	9.781	4.581	36.873	1012.040	1388.685	343.701	2744.426
289	pST	4	9.312	23.791	10.808	9.283	38.951	941.358	1121.075	324.421	2386.854
278	pST	4	3.876	7.191	5.232	2.731	43.432	336.758	412.610	233.126	982.493
279	pST	4	8.311	18.620	7.896	3.386	33.991	907.143	1260.393	283.667	2451.202
284	pST	4	4.908	13.875	7.284	6.301	37.003	585.069	801.741	252.075	1640.757
290	pST	4	7.059	10.861	5.607	3.061	35.056	484.228	612.078	251.767	1348.073

Appendix n. Fatty acid profile data for raw longissimus muscle expressed as mg\100 g dry weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	54.750	1456.734	186.716	572.296	8.112	2287.111	345.815	780.897	.
277	Ctrl	0	162.031	3093.912	425.023	1365.296	36.770	4956.696	579.410	972.432	20.413
281	Ctrl	0	163.139	3683.521	369.327	1690.917	26.418	6208.599	753.622	1118.389	16.723
292	Ctrl	0	71.164	1687.961	191.208	789.721	.	2778.349	292.836	692.383	10.476
285	Ctrl	0	146.719	3231.222	353.735	1497.065	27.283	5204.219	646.728	976.856	19.237
286	Ctrl	0	46.150	1189.993	124.099	579.511	.	2065.297	210.128	755.405	.
287	Ctrl	0	139.974	2796.254	314.248	1423.333	17.059	4295.206	416.199	836.770	19.951
288	Ctrl	0	44.692	1075.222	124.182	461.571	12.972	1573.501	221.066	758.677	.
280	pST	0	159.646	3364.160	302.305	1710.093	38.004	5488.385	521.846	1278.238	24.496
282	pST	0	62.420	1624.182	188.473	719.292	10.856	2502.992	353.234	789.592	9.071
283	pST	0	121.008	2448.804	299.930	1131.253	33.872	4168.570	429.936	1059.520	.
289	pST	0	106.605	2263.409	210.792	1095.398	16.656	3439.622	444.171	939.922	11.804
278	pST	0	38.556	1024.102	97.723	469.583	18.042	1680.265	183.664	744.446	.
279	pST	0	120.767	2395.783	364.974	967.346	34.251	3858.348	473.862	886.533	14.462
284	pST	0	93.352	2077.438	295.930	931.514	18.353	3433.250	478.077	890.190	14.817
290	pST	0	45.099	1216.731	134.333	555.107	.	1878.923	264.352	701.343	.
276	Ctrl	4	107.774	2325.834	328.149	968.780	26.693	4029.541	523.283	1006.928	19.727
277	Ctrl	4	154.362	3070.021	417.851	1398.503	35.472	4989.658	663.936	971.776	25.178
281	Ctrl	4	179.372	3716.638	398.519	1774.455	43.679	6518.688	755.003	1226.307	31.189
292	Ctrl	4	69.201	1692.523	195.859	809.137	17.410	2762.749	324.436	723.876	17.147
285	Ctrl	4	279.373	5484.122	610.290	2622.669	60.205	9178.856	1047.049	1423.271	44.235
286	Ctrl	4	33.437	929.251	89.822	496.497	14.956	1454.662	182.138	712.571	.
287	Ctrl	4	112.887	2380.903	266.680	1229.474	27.660	3693.986	441.579	803.695	26.614
288	Ctrl	4	43.233	1027.957	121.602	453.921	11.868	1558.324	207.138	724.848	.
280	pST	4	133.921	2894.438	256.602	1487.572	25.349	4647.229	507.203	1141.304	23.353
282	pST	4	90.250	1981.622	237.915	925.893	26.315	3266.047	433.895	924.426	15.776
283	pST	4	117.599	2476.510	304.290	1142.523	37.022	4212.402	529.858	1046.669	23.817
289	pST	4	114.156	2230.679	211.787	1145.746	20.500	3462.721	400.447	955.737	22.906
278	pST	4	29.469	847.711	75.291	421.745	13.741	1311.750	171.657	689.819	7.209
279	pST	4	124.220	2445.497	364.921	990.062	32.987	3922.258	552.758	902.884	.
284	pST	4	63.632	1486.690	212.288	691.663	14.900	2451.869	340.046	753.293	.
290	pST	4	50.529	1237.927	132.067	578.986	16.031	1925.217	245.298	775.099	.

Appendix n. Cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	20:3	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	18.549	33.102	18.511	9.488	119.771	2083.780	2860.856	947.216	5891.851
277	Ctrl	0	37.534	81.847	31.581	21.195	139.340	4641.651	6079.746	1202.081	11923.478
281	Ctrl	0	40.161	125.101	47.766	12.777	128.592	5554.299	7483.066	1347.685	14385.050
292	Ctrl	0	20.883	58.375	22.667	15.894	118.810	2559.322	3320.768	870.638	6750.728
285	Ctrl	0	30.485	85.994	35.999	11.668	131.949	4894.243	6317.959	1186.956	12399.158
286	Ctrl	0	22.480	39.988	24.256	18.173	160.159	1815.654	2439.512	980.474	5235.640
287	Ctrl	0	28.829	76.207	30.897	19.963	109.543	4379.513	5118.918	1026.002	10524.432
288	Ctrl	0	18.723	26.775	22.106	15.535	134.237	1581.485	1958.495	949.278	4489.258
280	pST	0	43.420	117.403	50.204	26.375	169.114	5258.395	6467.943	1567.351	13293.689
282	pST	0	16.073	40.289	23.564	10.387	120.555	2414.965	3095.845	960.173	6470.983
283	pST	0	41.367	76.332	39.309	21.842	152.792	3701.064	5008.640	1314.830	10024.534
289	pST	0	24.623	71.331	35.322	16.994	124.988	3477.216	4182.572	1141.849	8801.637
278	pST	0	17.283	34.363	21.784	18.062	162.648	1532.241	2014.056	964.224	4510.521
279	pST	0	28.960	73.546	32.635	20.138	139.984	3498.358	4804.981	1108.250	9411.589
284	pST	0	26.089	67.644	34.544	16.501	132.082	3117.121	4293.254	1099.406	8509.780
290	pST	0	14.374	36.805	20.729	12.948	119.657	1816.938	2314.413	869.051	5000.403
276	Ctrl	4	30.500	79.517	39.098	11.484	140.167	3422.115	4987.184	1228.177	9637.476
277	Ctrl	4	35.829	87.914	40.670	26.829	132.547	4648.063	6194.830	1207.651	12050.545
281	Ctrl	4	48.733	151.378	56.834	15.954	145.318	5701.654	7867.268	1493.146	15062.069
292	Ctrl	4	17.362	53.502	20.290	9.235	120.120	2588.009	3353.956	890.883	6832.849
285	Ctrl	4	60.628	193.219	66.468	11.102	176.152	8430.400	11089.619	1737.621	21257.641
286	Ctrl	4	17.202	27.538	20.489	14.901	176.414	1459.185	1769.116	941.577	4169.878
287	Ctrl	4	24.993	63.476	30.400	28.163	114.074	3749.877	4493.381	1001.325	9244.583
288	Ctrl	4	16.487	33.289	21.569	12.320	141.544	1525.111	1932.221	916.768	4374.100
280	pST	4	36.425	109.170	46.273	17.513	148.404	4539.284	5545.553	1389.919	11474.756
282	pST	4	27.597	64.638	36.394	9.920	136.842	3013.541	4028.811	1135.179	8177.531
283	pST	4	40.052	76.381	36.342	17.023	137.009	3760.449	5159.952	1277.094	10197.495
289	pST	4	34.756	88.797	40.339	34.647	145.379	3513.487	4184.252	1210.857	8908.596
278	pST	4	15.033	27.892	20.292	10.591	168.455	1306.134	1600.330	904.190	3810.653
279	pST	4	32.612	73.069	30.984	13.287	133.388	3559.779	4945.993	1113.155	9618.926
284	pST	4	18.808	53.168	27.910	24.145	141.795	2241.985	3072.271	965.952	6287.378
290	pST	4	27.222	41.887	21.625	11.805	135.196	1867.442	2360.501	970.948	5198.890

Appendix o. Fatty acid profile data for cooked loin roast expressed as relative weight percent

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0	C18:3	C20:1	C20:2	20:3	C20:4	SFA	MUFA	PUFA
276	Ctrl	0	1.152	24.319	2.985	10.301	0.230	38.778	5.401	10.726	0.154	0.317	0.725	0.358	0.154	1.398	35.927	48.118	12.953
277	Ctrl	0	1.371	25.745	3.448	11.635	0.224	40.205	6.083	6.465	0.163	0.244	0.604	0.232	0.094	0.752	38.915	50.564	7.786
281	Ctrl	0	1.197	25.245	2.463	12.036	0.228	40.757	5.021	8.155	0.206	0.314	0.913	0.347	0.109	0.862	38.684	49.381	9.787
292	Ctrl	0	1.140	25.155	2.682	12.287	0.205	38.917	4.884	9.199	0.151	0.301	0.776	0.310	0.161	1.177	38.733	47.465	11.148
285	Ctrl	0	1.247	25.465	2.642	12.129	0.239	40.274	4.942	8.029	0.160	0.307	0.803	0.338	0.108	0.878	39.001	48.899	9.660
286	Ctrl	0	0.909	22.060	2.227	11.262	0.258	35.901	5.328	13.240	.	0.282	0.693	0.423	0.241	2.514	34.231	44.406	16.700
287	Ctrl	0	1.348	27.086	2.879	14.153	0.187	39.677	4.867	6.511	0.183	0.224	0.611	0.228	0.081	0.538	42.769	48.221	7.583
288	Ctrl	0	1.036	23.180	2.673	10.006	0.213	30.877	4.585	16.964	.	0.421	0.570	0.366	0.308	2.955	34.222	38.916	21.014
280	pST	0	1.138	25.040	2.141	13.033	0.202	37.962	4.627	9.809	0.172	0.277	0.728	0.341	0.182	1.297	39.383	45.660	11.905
282	pST	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
283	pST	0	1.222	24.595	2.874	11.404	0.228	38.823	4.999	10.164	0.132	0.356	0.653	0.317	0.171	1.243	37.353	47.577	12.251
289	pST	0	1.297	24.896	2.250	13.064	0.212	36.499	4.639	10.501	0.245	0.273	0.881	0.420	0.222	1.391	39.501	44.481	12.808
278	pST	0	0.805	21.651	2.004	10.295	0.292	33.928	5.647	14.996	.	0.333	0.587	0.395	0.246	2.711	32.751	42.459	18.680
279	pST	0	1.209	25.443	3.605	10.325	0.199	38.091	5.585	9.744	0.126	0.296	0.622	0.333	0.157	1.280	37.105	48.101	11.810
284	pST	0	1.072	23.911	3.169	10.596	0.169	36.641	6.507	10.801	0.183	0.221	0.675	0.305	0.227	1.655	35.762	47.161	13.209
290	pST	0	0.999	23.590	2.522	11.069	0.194	36.253	5.058	12.943	0.117	0.364	0.737	0.389	0.195	1.735	35.775	44.764	15.626
276	Ctrl	4	1.104	23.559	3.092	10.291	0.259	39.888	4.928	10.541	0.310	0.404	0.808	0.436	0.124	1.495	35.263	48.975	13.000
277	Ctrl	4	1.322	25.535	3.395	11.844	0.270	41.957	5.247	5.997	0.212	0.261	0.718	0.260	0.069	0.627	38.912	51.587	7.214
281	Ctrl	4	1.202	24.640	2.483	12.307	0.313	42.561	4.600	7.142	0.217	0.304	1.034	0.353	0.073	0.696	38.367	50.991	8.567
292	Ctrl	4	1.104	24.570	2.806	12.196	0.239	40.527	4.491	8.727	0.285	0.272	0.850	0.355	0.113	0.989	38.155	48.913	10.456
285	Ctrl	4	1.222	24.746	2.532	12.409	0.329	42.170	4.557	7.118	0.207	0.282	0.911	0.340	0.082	0.794	38.584	50.499	8.615
286	Ctrl	4	0.951	22.013	2.169	11.808	0.410	38.585	4.069	12.056	0.256	0.404	0.785	0.433	0.183	1.868	35.028	46.018	14.943
287	Ctrl	4	1.306	25.841	2.828	14.352	0.280	40.641	4.244	6.474	0.213	0.258	0.741	0.304	0.086	0.629	41.713	48.734	7.751
288	Ctrl	4	0.965	22.625	2.797	10.366	0.408	36.628	4.547	13.353	0.332	0.409	0.797	0.406	0.239	2.143	34.287	45.176	16.550
280	pST	4	1.125	24.779	2.275	13.052	0.324	40.014	4.131	8.862	0.207	0.326	0.886	0.358	0.113	0.955	39.163	47.629	10.614
282	pST	4	1.098	24.120	2.817	11.569	0.335	38.810	4.635	10.481	0.188	0.315	0.834	0.392	0.119	1.390	36.975	47.431	12.697
283	pST	4	1.230	24.017	3.019	11.503	0.373	40.599	4.682	9.413	0.237	0.358	0.741	0.339	0.114	1.014	36.987	49.415	11.237
289	pST	4	1.311	24.416	2.288	13.059	0.357	38.128	4.322	9.902	0.262	0.322	1.022	0.416	0.147	1.158	39.049	46.117	11.946
278	pST	4	0.829	21.479	2.071	10.685	0.383	36.907	4.228	14.490	.	0.415	0.844	0.475	0.193	2.492	32.993	44.433	18.066
279	pST	4	1.224	25.169	3.629	10.800	0.356	40.052	5.145	9.029	0.200	0.322	0.762	0.338	0.129	0.969	37.393	49.944	10.786
284	pST	4	1.197	23.678	3.347	11.129	0.281	40.483	5.000	9.374	0.195	0.324	0.919	0.395	0.145	1.100	36.199	50.030	11.338
290	pST	4	0.906	23.037	2.394	10.954	0.249	34.421	4.473	14.599	.	0.304	0.811	0.447	0.214	2.686	34.898	42.348	18.250

Appendix p. Fatty acid profile data for cooked loin roast expressed as mg\100 g wet weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	45.530	960.868	117.941	407.004	9.073	1532.138	213.391	423.809	6.104
277	Ctrl	0	86.906	1631.598	218.529	737.400	14.200	2548.016	385.526	409.697	10.356
281	Ctrl	0	78.906	1663.760	162.308	793.227	14.996	2686.082	330.900	537.440	13.585
292	Ctrl	0	46.970	1036.241	110.488	506.166	8.460	1603.163	201.212	378.948	6.201
285	Ctrl	0	89.025	1817.517	188.534	865.700	17.044	2874.487	352.701	573.083	11.418
286	Ctrl	0	21.471	521.158	52.614	266.056	6.084	848.123	125.872	312.784	.
287	Ctrl	0	86.096	1730.091	183.869	904.003	11.960	2534.372	310.846	415.902	11.673
288	Ctrl	0	21.012	470.039	54.199	202.908	4.310	626.117	92.966	343.988	.
280	pST	0	56.764	1249.402	106.824	650.293	10.088	1894.149	230.871	489.410	8.604
282	pST	0	.	.	.	.	.	.	.	.	.
283	pST	0	49.363	993.543	116.113	460.684	9.209	1568.312	201.925	410.573	5.346
289	pST	0	53.906	1035.018	93.526	543.102	8.820	1517.404	192.876	436.587	10.184
278	pST	0	16.541	445.035	41.201	211.611	6.008	697.386	116.063	308.240	.
279	pST	0	43.122	907.160	128.519	368.145	7.091	1358.086	199.132	347.422	4.500
284	pST	0	34.541	770.523	102.135	341.449	5.434	1180.770	209.702	348.060	5.906
290	pST	0	27.823	657.067	70.250	308.325	5.407	1009.788	140.887	360.498	3.268
276	Ctrl	4	35.931	766.840	100.649	334.964	8.421	1298.347	160.395	343.115	10.077
277	Ctrl	4	69.645	1345.532	178.908	624.080	14.203	2210.856	276.493	316.026	11.173
281	Ctrl	4	82.663	1694.016	170.711	846.120	21.542	2926.088	316.229	491.052	14.950
292	Ctrl	4	32.427	721.557	82.398	358.162	7.018	1190.190	131.891	256.300	8.373
285	Ctrl	4	85.022	1722.286	176.248	863.646	22.914	2934.911	317.145	495.367	14.394
286	Ctrl	4	28.193	652.418	64.275	349.973	12.140	1143.611	120.603	357.321	7.578
287	Ctrl	4	82.265	1627.859	178.171	904.123	17.644	2560.129	267.357	407.815	13.408
288	Ctrl	4	20.777	487.245	60.236	223.228	8.778	788.786	97.914	287.564	7.139
280	pST	4	49.350	1087.250	99.809	572.707	14.231	1755.715	181.245	388.834	9.073
282	pST	4	35.721	784.853	91.664	376.447	10.901	1262.829	150.824	341.031	6.123
283	pST	4	63.178	1233.948	155.100	591.026	19.176	2085.938	240.569	483.639	12.177
289	pST	4	50.908	948.092	88.828	507.101	13.873	1480.521	167.838	384.516	10.192
278	pST	4	16.779	434.655	41.902	216.217	7.761	746.856	85.558	293.234	.
279	pST	4	42.027	864.288	124.602	370.870	12.230	1375.366	176.692	310.051	6.869
284	pST	4	42.572	842.348	119.060	395.894	9.989	1440.162	177.889	333.494	6.942
290	pST	4	14.834	377.123	39.195	179.322	4.077	563.476	73.221	238.983	.

Appendix p. Cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	20:3	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	12.527	28.640	14.158	6.069	55.238	1419.506	1901.181	511.801	3832.488
277	Ctrl	0	15.459	38.276	14.690	5.965	47.642	2466.260	3204.548	493.452	6164.260
281	Ctrl	0	20.704	60.166	22.874	7.211	56.788	2549.478	3254.452	645.017	6448.947
292	Ctrl	0	12.382	31.977	12.786	6.636	48.467	1595.578	1955.299	459.220	4010.097
285	Ctrl	0	21.880	57.328	24.106	7.725	62.669	2783.660	3490.094	689.464	6963.218
286	Ctrl	0	6.666	16.366	9.985	5.693	59.399	808.684	1049.059	394.527	2252.269
287	Ctrl	0	14.337	39.020	14.591	5.195	34.335	2731.864	3080.067	484.360	6296.291
288	Ctrl	0	8.528	11.552	7.430	6.253	59.918	693.960	789.145	426.117	1909.222
280	pST	0	13.816	36.320	17.036	9.063	64.709	1965.064	2278.252	594.034	4837.350
282	pST	0	.	.	.	.	.	.	.	.	.
283	pST	0	14.390	26.379	12.788	6.919	50.226	1508.935	1921.939	494.895	3925.769
289	pST	0	11.346	36.611	17.457	9.235	57.843	1642.210	1849.237	532.469	4023.917
278	pST	0	6.837	12.074	8.119	5.054	55.722	673.187	872.733	383.972	1929.891
279	pST	0	10.562	22.170	11.878	5.588	45.637	1322.927	1714.998	421.087	3459.012
284	pST	0	7.126	21.737	9.833	7.322	53.330	1152.419	1519.779	425.670	3097.869
290	pST	0	10.131	20.524	10.848	5.436	48.332	996.482	1246.856	435.246	2678.584
276	Ctrl	4	13.148	26.308	14.181	4.050	48.648	1147.811	1594.120	423.141	3165.073
277	Ctrl	4	13.734	37.824	13.692	3.648	33.024	2050.431	2718.284	380.123	5148.838
281	Ctrl	4	20.885	71.065	24.251	4.990	47.827	2637.749	3505.634	589.004	6732.387
292	Ctrl	4	7.984	24.970	10.423	3.330	29.045	1120.519	1436.467	307.081	2864.067
285	Ctrl	4	19.594	63.390	23.687	5.673	55.289	2685.348	3514.609	599.611	6799.567
286	Ctrl	4	11.971	23.272	12.826	5.415	55.366	1038.163	1363.901	442.900	2844.964
287	Ctrl	4	16.255	46.664	19.156	5.414	39.598	2627.655	3069.965	488.238	6185.858
288	Ctrl	4	8.805	17.154	8.750	5.136	46.160	738.390	972.867	356.414	2067.671
280	pST	4	14.301	38.855	15.698	4.967	41.900	1718.380	2089.855	465.699	4273.934
282	pST	4	10.265	27.127	12.760	3.871	45.213	1203.144	1543.345	413.139	3159.629
283	pST	4	18.389	38.066	17.396	5.836	52.085	1900.329	2538.849	577.346	5016.523
289	pST	4	12.500	39.691	16.162	5.726	44.977	1516.292	1790.752	463.881	3770.925
278	pST	4	8.405	17.081	9.612	3.909	50.436	667.651	899.159	365.596	1932.405
279	pST	4	11.048	26.172	11.594	4.434	33.270	1284.053	1715.061	370.397	3369.511
284	pST	4	11.535	32.701	14.050	5.155	39.115	1287.756	1779.802	403.349	3470.907
290	pST	4	4.983	13.273	7.320	3.505	43.964	571.279	693.241	298.755	1563.275

Appendix q. Fatty acid profile data for cooked loin roast expressed as mg\100 g dry weight

Pig #	Trt	Stor	C14:0	C16:0	C16:1	C18:0	C18:1 (n-9)t	C18:1 (n-9)c	C18:1 (n-7)c	C18:2	C20:0
276	Ctrl	0	128.089	2703.167	331.798	1145.006	25.523	4310.296	600.323	1192.284	17.173
277	Ctrl	0	239.852	4503.073	603.123	2035.162	39.192	7032.308	1064.018	1130.729	28.581
281	Ctrl	0	210.631	4441.194	433.261	2117.418	40.029	7170.152	883.294	1434.627	36.263
292	Ctrl	0	124.606	2749.015	293.110	1342.794	22.443	4252.985	533.789	1005.301	16.450
285	Ctrl	0	213.894	4366.827	452.977	2079.960	40.950	6906.339	847.411	1376.909	27.433
286	Ctrl	0	60.800	1475.782	148.989	753.400	17.229	2401.663	356.435	885.721	.
287	Ctrl	0	237.179	4766.092	506.525	2490.368	32.949	6981.740	856.325	1145.736	32.156
288	Ctrl	0	57.666	1289.970	148.744	556.859	11.829	1718.307	255.136	944.037	.
280	pST	0	152.093	3347.630	286.223	1742.386	27.030	5075.154	618.591	1311.318	23.053
282	pST	0	.	.	.	.	.	.	.	.	.
283	pST	0	140.458	2827.062	330.391	1310.846	26.205	4462.531	574.565	1168.260	15.211
289	pST	0	143.473	2754.760	248.925	1445.497	23.476	4038.657	513.350	1162.000	27.106
278	pST	0	48.304	1299.599	120.317	617.950	17.544	2036.521	338.931	900.128	.
279	pST	0	123.778	2603.939	368.905	1056.733	20.355	3898.290	571.594	997.251	12.916
284	pST	0	90.956	2028.974	268.947	899.118	14.310	3109.252	552.197	916.527	15.551
290	pST	0	76.953	1817.310	194.297	852.762	14.956	2792.863	389.663	997.063	9.037
276	Ctrl	4	109.834	2344.072	307.662	1023.916	25.742	3968.780	490.295	1048.833	30.803
277	Ctrl	4	211.804	4092.002	544.091	1897.937	43.192	6723.605	840.864	961.090	33.980
281	Ctrl	4	232.154	4757.536	479.430	2376.276	60.499	8217.732	888.109	1379.088	41.986
292	Ctrl	4	99.951	2224.075	253.979	1103.972	21.633	3668.556	406.532	790.000	25.809
285	Ctrl	4	235.498	4770.478	488.180	2392.174	63.470	8129.273	878.444	1372.095	39.868
286	Ctrl	4	81.713	1890.903	186.288	1014.326	35.185	3314.527	349.544	1035.624	21.965
287	Ctrl	4	233.993	4630.257	506.787	2571.673	50.186	7281.989	760.467	1159.983	38.137
288	Ctrl	4	61.916	1451.992	179.502	665.221	26.159	2350.585	291.783	856.941	21.275
280	pST	4	148.363	3268.646	300.060	1721.754	42.783	5278.283	544.885	1168.968	27.277
282	pST	4	106.020	2329.424	272.056	1117.287	32.355	3748.047	447.642	1012.172	18.172
283	pST	4	172.332	3365.833	423.064	1612.137	52.307	5689.801	656.198	1319.220	33.215
289	pST	4	146.299	2724.636	255.275	1457.312	39.868	4254.739	482.336	1105.027	29.289
278	pST	4	49.014	1269.697	122.404	631.603	22.670	2181.685	249.929	856.583	.
279	pST	4	126.157	2594.446	374.034	1113.289	36.712	4128.615	530.399	930.722	20.619
284	pST	4	123.561	2444.848	345.562	1149.051	28.993	4179.956	516.310	967.941	20.149
290	pST	4	39.119	994.522	103.361	472.896	10.751	1485.960	193.094	630.230	.

Appendix q. Cont'd.

Pig #	Trt	Stor	C18:3	C20:1	C20:2	20:3	C20:4	SFA	MUFA	PUFA	Total FA
276	Ctrl	0	35.243	80.570	39.829	17.073	155.398	3993.434	5348.510	1439.827	10781.771
277	Ctrl	0	42.665	105.639	40.542	16.463	131.487	6806.668	8844.280	1361.886	17012.834
281	Ctrl	0	55.268	160.605	61.058	19.249	151.588	6805.504	8687.341	1721.790	17214.636
292	Ctrl	0	32.848	84.832	33.920	17.606	128.576	4232.864	5187.158	1218.251	10638.274
285	Ctrl	0	52.570	137.739	57.918	18.561	150.572	6688.113	8385.417	1656.529	16730.059
286	Ctrl	0	18.875	46.343	28.276	16.121	168.203	2289.982	2970.659	1117.196	6377.837
287	Ctrl	0	39.496	107.494	40.196	14.311	94.586	7525.795	8485.034	1334.325	17345.153
288	Ctrl	0	23.405	31.703	20.391	17.162	164.437	1904.494	2165.719	1169.431	5239.645
280	pST	0	37.018	97.316	45.646	24.283	173.380	5265.163	6104.314	1591.645	12961.122
282	pST	0	.	.	.	.	.	.	.	.	.
283	pST	0	40.946	75.061	36.387	19.686	142.914	4293.577	5468.753	1408.193	11170.523
289	pST	0	30.199	97.441	46.463	24.580	153.953	4370.835	4921.849	1417.196	10709.881
278	pST	0	19.965	35.259	23.708	14.759	162.722	1965.854	2548.571	1121.281	5635.706
279	pST	0	30.317	63.637	34.094	16.039	130.999	3797.367	4922.780	1208.700	9928.847
284	pST	0	18.764	57.240	25.892	19.280	140.431	3034.599	4001.947	1120.893	8157.439
290	pST	0	28.021	56.766	30.003	15.036	133.676	2756.062	3448.546	1203.799	7408.407
276	Ctrl	4	40.191	80.419	43.348	12.379	148.706	3508.624	4872.899	1293.457	9674.980
277	Ctrl	4	41.768	115.031	41.639	11.093	100.431	6235.724	8266.783	1156.022	15658.530
281	Ctrl	4	58.654	199.582	68.107	14.013	134.318	7407.951	9845.352	1654.179	18907.483
292	Ctrl	4	24.609	76.964	32.127	10.264	89.526	3453.807	4427.664	946.525	8827.997
285	Ctrl	4	54.272	175.582	65.609	15.714	153.144	7438.018	9734.949	1660.834	18833.800
286	Ctrl	4	34.697	67.449	37.173	15.695	160.467	3008.906	3952.993	1283.656	8245.555
287	Ctrl	4	46.236	132.731	54.486	15.400	112.631	7474.060	8732.159	1388.735	17594.955
288	Ctrl	4	26.239	51.118	26.075	15.306	137.556	2200.404	2899.147	1062.117	6161.668
280	pST	4	42.993	116.810	47.192	14.933	125.965	5166.039	6282.822	1400.051	12848.912
282	pST	4	30.465	80.511	37.870	11.489	134.191	3570.903	4580.611	1226.188	9377.701
283	pST	4	50.160	103.832	47.450	15.920	142.073	5183.516	6925.203	1574.822	13683.541
289	pST	4	35.922	114.065	46.446	16.456	129.254	4357.536	5146.283	1333.106	10836.926
278	pST	4	24.552	49.896	28.077	11.419	147.333	1950.314	2626.584	1067.963	5644.861
279	pST	4	33.164	78.564	34.802	13.311	99.869	3854.511	5148.324	1111.869	10114.704
284	pST	4	33.480	94.913	40.778	14.963	113.527	3737.609	5165.734	1170.688	10074.032
290	pST	4	13.140	35.001	19.304	9.243	115.939	1506.536	1828.168	787.856	4122.560

Appendix r. Cholesterol data expressed as mg/100 g

Pig #	Trt	Stor	Raw Muscle Wet Weight	Raw Muscle Dry Weight	Cooked Loin Wet Weight	Cooked Loin Dry Weight
276	Ctrl	0	53.57	215.71	75.06	211.16
277	Ctrl	0	53.41	204.83	75.62	208.70
281	Ctrl	0	55.69	206.74	75.56	201.70
292	Ctrl	0	47.16	178.01	77.70	206.13
285	Ctrl	0	55.23	201.73	92.27	221.69
286	Ctrl	0	52.97	204.91	80.66	228.41
287	Ctrl	0	55.60	197.32	74.59	205.48
288	Ctrl	0	53.11	209.07	85.15	233.68
280	pST	0	57.94	218.77	92.55	247.98
282	pST	0	62.82	239.82	65.81	185.08
283	pST	0	50.45	184.91	68.45	194.77
289	pST	0	60.31	225.16	90.48	240.82
278	pST	0	61.44	238.03	81.39	237.68
279	pST	0	56.14	211.80	73.18	210.06
284	pST	0	.	.	86.71	228.33
290	pST	0	47.90	187.34	82.71	228.76
276	Ctrl	4	49.53	198.59	66.03	201.84
277	Ctrl	4	44.82	170.33	64.13	195.03
281	Ctrl	4	51.23	189.52	75.37	211.67
292	Ctrl	4	38.58	148.95	57.74	177.97
285	Ctrl	4	54.20	204.18	67.43	186.77
286	Ctrl	4	44.94	178.93	73.43	212.82
287	Ctrl	4	48.13	177.54	41.91	119.21
288	Ctrl	4	39.35	155.41	58.91	175.55
280	pST	4	49.86	192.05	77.01	231.52
282	pST	4	52.15	191.89	66.61	197.70
283	pST	4	48.52	180.29	68.97	188.13
289	pST	4	57.01	212.78	63.54	182.60
278	pST	4	55.43	214.99	78.52	229.37
279	pST	4	45.85	179.92	52.11	156.43
284	pST	4	45.96	176.12	66.96	194.35
290	pST	4	39.04	150.56	68.73	181.25