

Changes in Nutrient Levels for Three Fresh Pork Loin Cuts between 1992-2010

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Abstract: Since pork composition has changed between 1992 and 2010, a collaborative study was conducted by scientists at USDA, Texas Tech University and the National Pork Board to determine current nutrient values. To compare analytical nutrient data from 1992 to that of 2010 in three raw highly consumed pork products in the USDA National Nutrient Database for Standard Reference (SR), baby back ribs bone-in (BKR), blade chops, bone-in (BCB), and sirloin roast, boneless (SRB) were purchased from 12 retail outlets using a nationwide sampling plan developed for USDA's National Food and Nutrient Analysis Program (Pehrsson, P. et al. J. Food Comp. Anal 13:379, 2003). Nutrient values for proximates, cholesterol and minerals were determined by commercial laboratories using validated methodology and quality assurance. The 1992 data were derived from analyses of fresh, raw retail cuts from a nation-wide market basket survey of pork from supermarkets in 15 cities across the US. Nutrient values from 1992 and 2010 for equivalent cuts were compared statistically using a paired two-tailed T-test (Critical value $p < 0.05$). Moisture increased significantly ($p < 0.001$) while total fat, and cholesterol decreased ($p < 0.001$) in BCB and BKR except for SRB (lean and fat). Sodium values from 2010 were higher in all three cuts by 9-24% but still less than 90 mg/100g. Calcium, potassium and phosphorus were higher ($p < 0.05$) whereas iron and zinc were lower ($p < 0.001$). This research updates the values in SR and provides current and accurate data for use in nutrition monitoring and policy.

Introduction

Improving pork quality through nutritional interventions has been of interest to the pork industry in recent years. Changes in breeding practices and swine nutrition has been undertaken to improve attributes such as muscle color, water holding capacity and pork palatability¹. Nutrient composition on fresh pork loins in the National Nutrient Database for Standard Reference (SR) was last updated in 1992. A collaborative study was conducted by scientists at ARS/USDA, Texas Tech University, and the National Pork Board in order to determine current nutrient content in three highly consumed fresh pork products and to evaluate those levels to those reported in 1992.

Objectives

- To update the raw nutrient profiles of three popular fresh, pork loin cuts (lean and fat) in the USDA National Nutrient Database for Standard Reference (SR): baby back ribs, bone-in (BKR), sirloin Roast, boneless (SRB), and blade chops, bone-in (BCB).
- To compare nutrient values from 1992 to those determined in 2010.

Methodology

Sampling: Three fresh pork cuts were recently purchased from 12 retail outlets using the nationwide sampling plan developed for the USDA National Food and Nutrient Analysis Program². The 1992 data were derived from analyses of 11 fresh retail cuts; cut selection was based on a nation-wide market basket survey of retail meat cases in supermarkets across the US³.

Sample preparation: Separable fat, bone and connective tissues were removed from each cut; separable fat from all samples was combined and composited prior to nutrient analysis. Lean portions were composited by cut for nutrient analysis.

Analyses: Nutrient values for proximates (ash, moisture, protein and total fat), minerals and cholesterol were determined by a commercial laboratory using standard AOAC methodology⁴; minerals were analyzed by ICP methodology⁴.

Quality Control: Quality assurance was monitored through the use of commercial reference materials, in-house control materials and random duplicate sampling.

Statistics: Data were evaluated using a paired two-tailed independent samples Student's two-tailed t-test of the mean values. The critical value was set at $p < 0.05$.

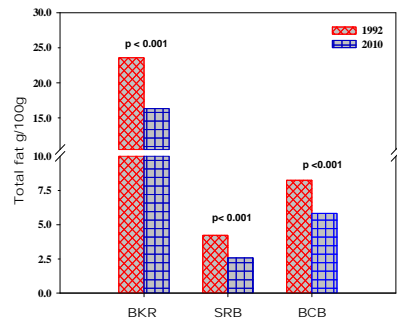


Fig 1. Comparison of total fat for fresh pork loin cuts. Statistical significance between 1992 and 2010 were determined by Student's two-tailed t test; critical value = $p < 0.05$

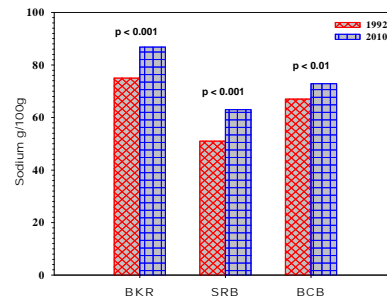


Fig 3. Comparison of sodium for fresh pork loin cuts. Statistical significance between 1992 and 2010 were determined by Student's two-tailed t test; critical value = $p < 0.05$

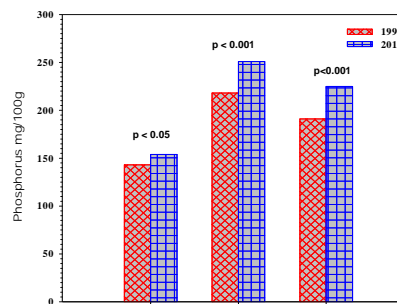


Fig 5. Comparison of phosphorus for fresh pork loin cuts. Statistical significance between 1992 and 2010 were determined by Student's two-tailed t test; critical value = $p < 0.05$

Table 1. Nutrient Content in Fresh Pork Loin Cuts 1992 vs 2010

Cuts	Nutrients	2010	se	n	1992	se	n
Back ribs (BKR)	Water (g/100g)	63.4	0.18	12	59.3	0.88	12
	Total Fat (g/100g)	16.3	0.28	12	23.5	0.95	5
	Cholesterol (mg/100g)	68.0	0.83	12	81.0	0.91	5
	Protein (mg/100g)	19.0	0.10	12	16.1		1 [†]
	Sodium (mg/100g)	86	1.46	12	75	2.02	5
	Potassium (mg/100g)	247	7.16	12	233	2.29	5
	Phosphorus (mg/100g)	154	4.55	12	143	8.51	5
Sirloin Roast (SRB)	Water (g/100g)	30.8	1.04	12	32	0.36	5
	Iron (mg/100g)	0.7	0.32	12	0.9	0.05	5
	Zinc (mg/100g)	2.5	0.05	12	2.3	0.09	5
	Water (g/100g)	74.3	0.29	12	73.5	0.24	14
	Total Fat (g/100g)	2.5	0.17	12	4.2	0.20	14
	Cholesterol (mg/100g)	62	1.43	12	63	62.51	11
	Protein (mg/100g)	22.8	0.24	12	21.0	0.35	11
Blade-chops, bone-in (BCB)	Sodium (mg/100g)	63	0.66	12	51	1.31	36
	Potassium (mg/100g)	356	4.85	12	370	5.05	36
	Phosphorus (mg/100g)	251	4.95	12	218	2.01	13
	Calcium (mg/100g)	9.2	0.18	12	13	2.30	5
	Iron (mg/100g)	.56	0.01	12	.87	0.04	16
	Zinc (mg/100g)	1.7	0.03	12	1.8	0.05	16
	Water (g/100g)	72.8	0.29	12	71.	0.33	15
Blade-chops, bone-in (BCB)	Total Fat (g/100g)	5.8	0.44	12	8.2	0.46	15
	Cholesterol (mg/100g)	59	0.78	12	64	0.28	11
	Protein (mg/100g)	21.2	0.24	12	19.	0.34	17
	Sodium (mg/100g)	72	1.55	12	67		1 [†]
	Potassium (mg/100g)	313	10.22	12	340	0.60	5
	Phosphorus (mg/100g)	226	6.41	12	191	3.36	16
	Calcium (mg/100g)	30.4	3.14	12	23	0.92	5
Blade-chops, bone-in (BCB)	Iron (mg/100g)	0.7	0.05	12	1.0	0.04	17
	Zinc (mg/100g)	2.7	0.12	12	2.9	0.07	16

[†]When SEM for 1992 data was unavailable, equal variances and a minimum number of observations (n=1) were assumed for statistical purposes and are denoted in italics.

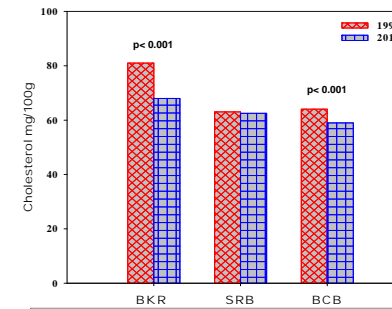


Fig 2. Comparison of cholesterol for fresh pork loin cuts. Statistical significance between 1992 and 2010 were determined by Student's two-tailed t test; critical value = $p < 0.05$

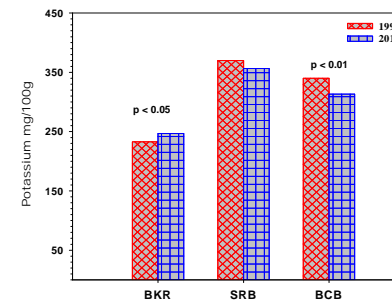


Fig 4. Comparison of potassium for fresh pork loin cuts. Statistical significance between 1992 and 2010 were determined by Student's two-tailed t test; critical value = $p < 0.05$

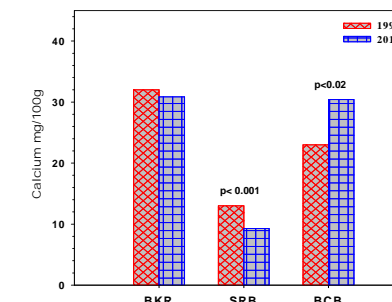


Fig 6. Comparison of calcium for fresh pork loin cuts. Statistical significance between 1992 and 2010 were determined by Student's two-tailed t test; critical value = $p < 0.05$

Results

- Results expressed relative to data from the 1992 cuts:
- Moisture concentration increased ($p < 0.05$) while total fat levels decreased ($p < 0.001$) in all three cuts (Fig 1).
 - Cholesterol significantly decreased ($p < 0.001$) in BKR and BCB while cholesterol values in SRB were unchanged (Fig 2).
 - Sodium values were significantly higher ($p < 0.001$) in all three cuts (Fig 3).
 - Potassium was elevated ($p < 0.05$) in BKR but significantly decreased ($p < 0.001$) in BCB (Fig 4)
 - Phosphorus was significantly higher ($p < 0.05$) in all 3 cuts (Fig 5)
 - Calcium was significantly elevated in ($p < 0.01$) in BCB but significantly lower ($p < 0.001$) in SRB (Fig 6).
 - Iron and Zinc levels varied in all cuts, compared to 1992 data except for zinc in BKR (Table 1).

Conclusion

- New data developed in 2010 indicate that all three pork loin cuts are significantly leaner than in 1992.
- Comparison of sodium data indicate that sodium levels increased 9-24% in all three cuts since 1992.
- Changes in cholesterol, phosphorus, calcium and potassium varied among the cuts.
- With the release of these data in the USDA National Nutrient Database for Standard Reference 25 (<http://ndb.nal.usda.gov>), consumers, restaurant associations, researchers and dietitians will have the necessary information to identify and select leaner pork cuts.

References

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