

# *U.S. Pork in the International Marketplace*

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## **The Demands of the Global Pork Market**

The pork export market can vary significantly from the U.S. domestic market. The U.S. exported pork or pork variety meats to 85 different countries in 2000. Frequently the demands for various pork cuts or byproducts are unique to these countries. Just as frequently, unique requirements or standards exist in areas such as processing, carcass fabrication, food safety, sanitation and hygiene. Yet exports represented only 6.8 percent of domestic production, which means that the needs of the U.S. domestic market are still the primary driver of our industry. This paper will look at the export market for U.S. pork including the opportunities that exist and the benefits of exports to the U.S. producer. It will explore some of the differences between the domestic market and the export market, especially in the areas of cutting methods and product specifications. Finally, it will present recommendations to overcome some of the barriers that exist to exports.

## **The Global Pork Trade Situation**

U.S. pork exports have increased dramatically both in volume and value in the last decade. Figure 1 shows USDA data for pork and pork variety meat exports since 1990. Annual growth has averaged 14.8 percent by volume and 13.7 percent by value during this period.

Figure 2 shows imports, exports and net pork trade as a percent of domestic production. During the last decade, the U.S. went from being a net importer of pork to a net exporter. While exports have increased, a surge in imports occurred in 1999 and 2000, driven by increased domestic demand and a strong U.S. dollar. This caused net exports to decline from a high in 1998 of 2.8 percent to the current level of 1.7 percent. The U.S. exported 1.252 billion pounds of pork and pork variety meats worth \$1.313 billion. 2000 was the eleventh consecutive year of record exports and the fifth year in a row that the U.S. exported over one billion dollars worth of pork.

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There is an increasing demand for pork around the world. The United Nations projects that the world population will increase by more than 2.9 billion people over the next fifty years, and the global economy is expected to continue to grow. As countries develop and per capita incomes increase, populations increase their spending on meat products. Pork remains the world's meat of choice, representing 41% of all meat consumed. So the world will have many more people with more money to spend on meat, and who prefer pork to other meats. The International Food Policy Research Institute (IFPRI) projects that world pork consumption will grow from 74 million metric tons in 1993 to 122 million metric tons in 2020. This presents an enormous opportunity for the U.S. pork industry.

## **The Importance of Exports to the U.S. Producer**

Exports make a significant contribution to producer profitability by increasing the value of U.S. pork products, some of which have little or no value in the domestic market. Exports also create opportunities for producers to grow and expand their operations. In 1999, the University of Missouri estimated that the economic impact of our net exports has enhanced the overall income of the U.S. pork industry by more than \$3.22 billion since 1987, which means every one percent increase in net pork exports is worth approximately \$250 million to the U.S. producer. Other U.S. agricultural industries reap significant benefits as well. The U.S. Meat Export Federation (USMEF) reported that in 2000, pork exports accounted for 101.9 million bushels of corn worth \$183.3 million and 23.6 million bushels of soybeans worth \$115.8 million.

Pork exports help support producer prices by maintaining the demand for live hogs. Figure 3 shows the significant decline in U.S. pork demand experienced in the 1970's and 1980's. Pork checkoff-funded programs, particularly the "Pork - The Other White Meat" campaign, have halted this decline and started to grow pork demand. Figure 3 also shows the demand index for live hogs. Since the mid-1990's, increases in retail pork demand have been outpaced by increases in the demand for live hogs. Retail pork demand growth is strictly a domestic phenomenon — driven by relatively flat levels of pork consumption moving at ever-higher prices. Live hog demand, however, is impacted by both exports of pork and plant capacity utilization. Live hog demand is up 13 percent since 1995, the year that the NAFTA and the GATT agreements took

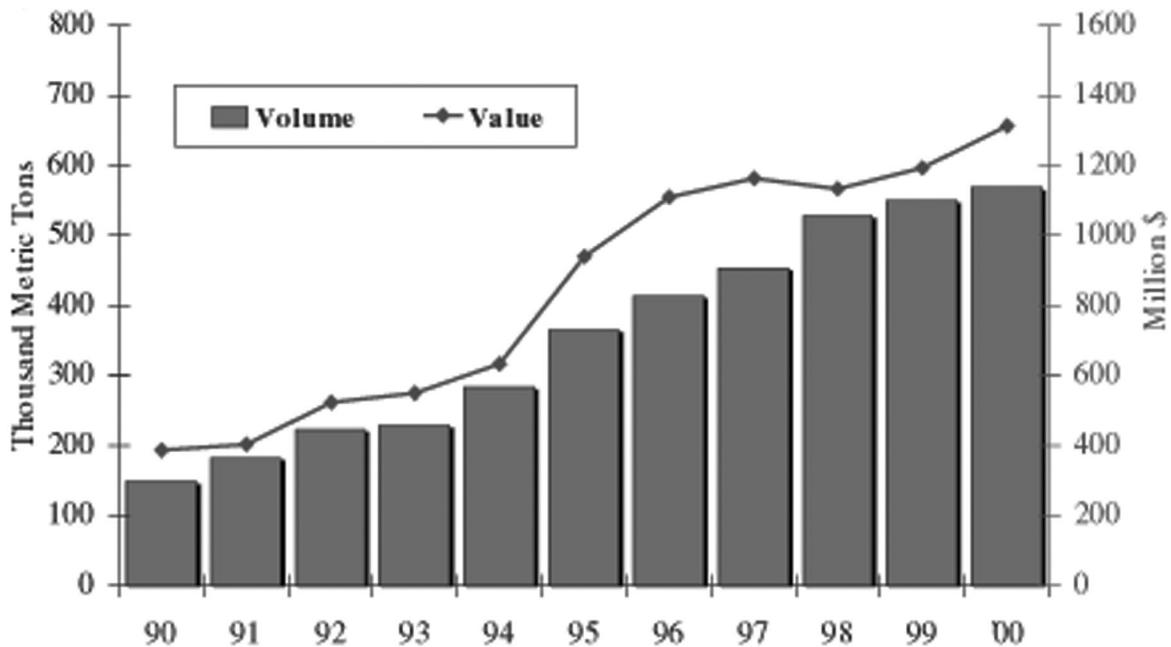


FIGURE 1. U. S. pork and pork variety meat exports (product weight).

effect, strong evidence that exports help support U.S. hog prices.

### Live Animal and Carcass Specifications

The ability to meet customer needs is critical to increasing exports. The U.S. industry has two options: 1) convince customers to accept product produced to U.S. specifications or 2) modify production processes to meet customer specifications.

One primary difference between the United States pork industry and others around the world is the weight at which our hogs are slaughtered. The economics of slaughter and fabrication have driven and continue to drive plants to increase their slaughter weights. Table 1 presents the average slaughter weights for some representative pork importing or exporting countries. The U.S. slaughters hogs at, on average, 12 to 20 kilograms more than pork industries in most other countries around the globe. This extra weight has a significant effect on average cut size.

Cut size is an important issue in many markets including Mexico, Japan, and Hong Kong. One reason Brazilian loins are preferred in Hong Kong is because of their similarity in size and weight to Chinese-produced pork loins. Smaller loins are also preferred in Japan, both because of similarities to Japanese-produced pork and because the large eye size of U.S. loins can impact portion size in the foodservice sector and package size/cost at retail. However, this is not just an export issue. U.S. retailers have also started raising the problem of product weight with suppliers. Some customers do prefer the larger size of U.S. loins. During a seminar at the Westminster Chef's School in the United Kingdom, students were visibly impressed with the large loin eye and expressed

a preference for U.S. Pork over pork produced in the United Kingdom.

### Carcass Fabrication for the Export Market

The fabrication method used to break the carcass is even more important to our export customers than is slaughter weight. Most of the United State's customers or competitors fabricate the hog differently than the U.S. Table 1 shows the carcass break for some of these countries. The primary difference is the separation of the shoulder from the loin. The U.S. standard is a 1<sup>st</sup>/2<sup>nd</sup>-rib split. Most other countries use a 4<sup>th</sup>/5<sup>th</sup>-rib split. Some countries such as Japan and Spain also leave the sirloin on the ham instead of on the loin like in the U.S.

TABLE 1: Average Live Weight and Carcass Fabrication Style for Several Representative Pork Importing and Exporting Countries (Source: NPPC)

Country	Preferred or Average Live Weight (Kg)	Carcass Fabrication at Shoulder
Mexico	90-110	4 <sup>th</sup> / 5 <sup>th</sup> rib
Brazil	95-100	4 <sup>th</sup> / 5 <sup>th</sup> rib (Some 7 <sup>th</sup> /8 <sup>th</sup> )
Canada	106-109	2 <sup>nd</sup> / 3 <sup>rd</sup> rib
Japan	100-110	4 <sup>th</sup> / 5 <sup>th</sup> rib
Denmark	105*	4 <sup>th</sup> / 5 <sup>th</sup> rib
Korea	100-110	4 <sup>th</sup> / 5 <sup>th</sup> rib
Argentina	100	4 <sup>th</sup> / 5 <sup>th</sup> rib
United States	118.8	1 <sup>st</sup> / 2 <sup>nd</sup> rib

\*Calculated from average carcass weight using dressing yield of 73.4%

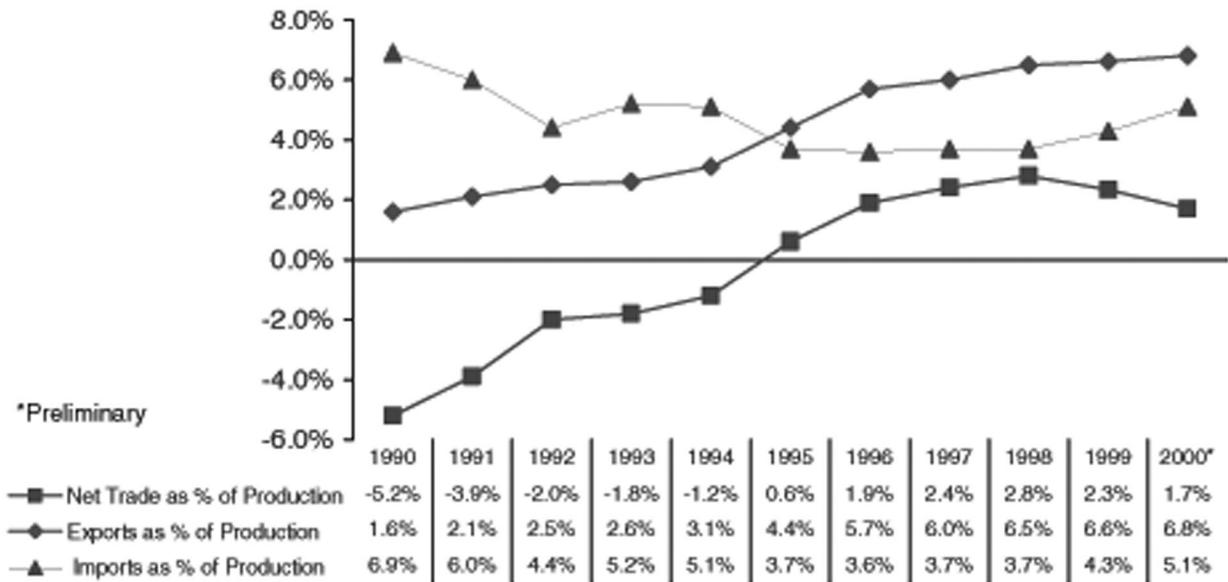


FIGURE 2. U. S. pork trade as a percent of domestic production.

and Canada. Figures 4, 5 and 6 show the U.S. carcass break, the Canadian carcass break and the Danish carcass break respectively. Of the three, the Danish break is closer to the international norm than is the Canadian or the U.S. While most

U.S. packers now have some international fabrication capabilities, there are several limiting factors precluding the expansion of U.S. production of the "International Break." These include the inability to dispose of underutilized "non-U.S.

TABLE 2. 1997 USMEF/University of Illinois Carcass Yield Test (Sixteen matched sides fabricated to American or Japanese specifications; all ham cuts made to U.S. specifications)

Carcass Data (n=8)	American Style		Japanese Style		
Length (in.)	31.10		31.10		
1st rib fat depth (in.)	1.54		1.54		
Last rib fat depth (in.)	1.10		1.10		
Last lumbar fat depth (in.)	1.01		1.01		
10th rib fat depth (in.)	1.04		1.04		
Loin eye area (sq. in.)	5.80		5.80		
% lean	0.50		0.50		
Carcass side weight (lb.)	85.27		85.84		
Selected Primal Cuts	Weight (lb)	% of side	Weight (lb)	% of side	% Change from U.S.
Ham	21.23	24.6	21.19	24.4	
Jowl	2.21	2.6	2.15	2.5	
Picnic	9.45	11.0	10.70	12.3	+1.3
Boston butt	9.20	10.7	11.12	12.8	+2.1
Belly	15.07	17.5	13.50	15.5	-2.0
fresh side	12.28	14.2	11.01	12.7	
spare ribs	2.69	3.1	2.53	2.9	
Loin	24.57	28.5	21.67	24.9	-3.6
loin, bone in, 1/4" trim	19.10	22.1	16.42	18.9	
boneless, 1/4" trim	7.77	9.0	6.92	8.0	
back ribs	1.37	1.6	1.27	1.5	
tenderloin	0.94	1.1	0.95	1.1	

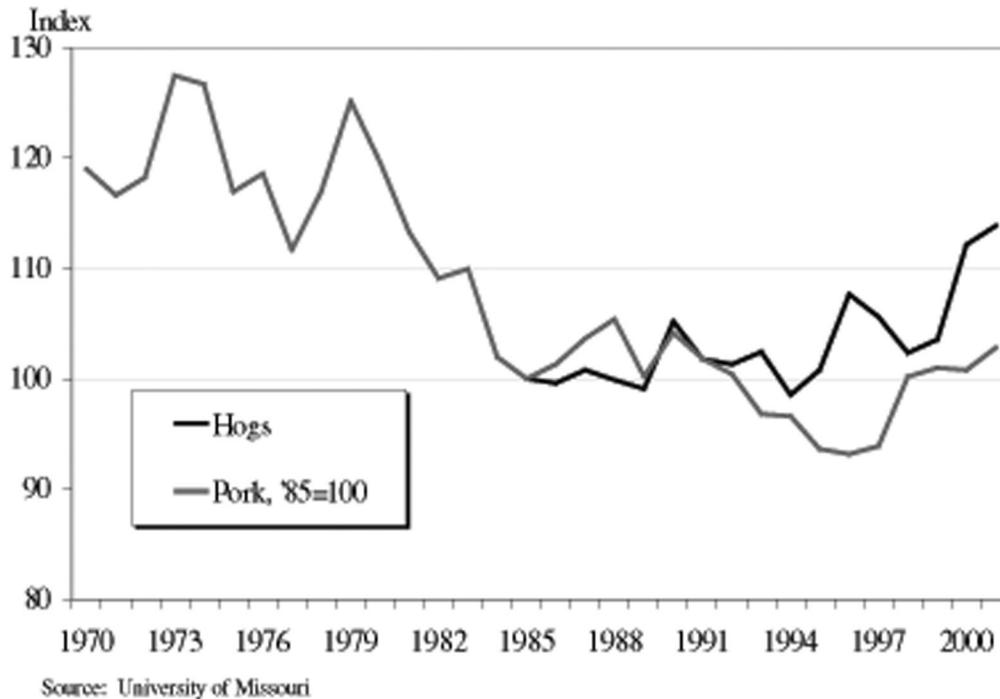


FIGURE 3. Live hog and retail pork demand indexes, 1985 = 100.

style" cuts and the cost impact on the carcass cutout due to a loss or reduction in yields. Table 2 shows the impact that the international (Japanese) fabrication method can have on yields. While only a small pilot test, the increases in the shoulder and picnic yield and the decreases in the belly and loin yield are clearly evident.

At this time, processors that are producing this fabrication style are generally requiring customers to take the "full set" of primal cuts. This negates one of the main competitive advantages of the U.S. industry, i.e. the ability to ship container loads of individual cuts. If the industry can find alternative uses for underutilized cuts in either the domestic market or the export market, processors might be able to increase their production of the international break.

### Primal Cut and Product Specifications for the Export Market

There are a number of cuts that are unique to the export market. Several of these dominate trade in pork products in some countries. Examples of these unique cuts include the single-ribbed belly, the single-ribbed loin, the collar butt, the lancone, the long-cut hock, and the sirloin-on ham. The United Nations Economic Commission for Europe - Standard For Porcine Carcasses And Cuts (1998) provides detailed international specifications.

#### Single-ribbed Belly

The single-ribbed (SR) belly (Figure 7) represents one of the major pork cuts traded around the world. For example, average SR-belly imports by Korea over the last five years equaled 49,000 MT per year - seventy percent of total Korean

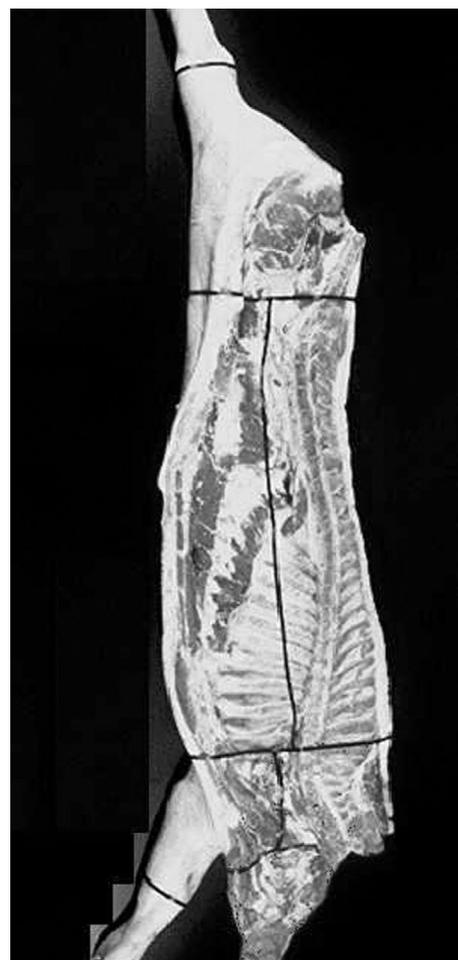
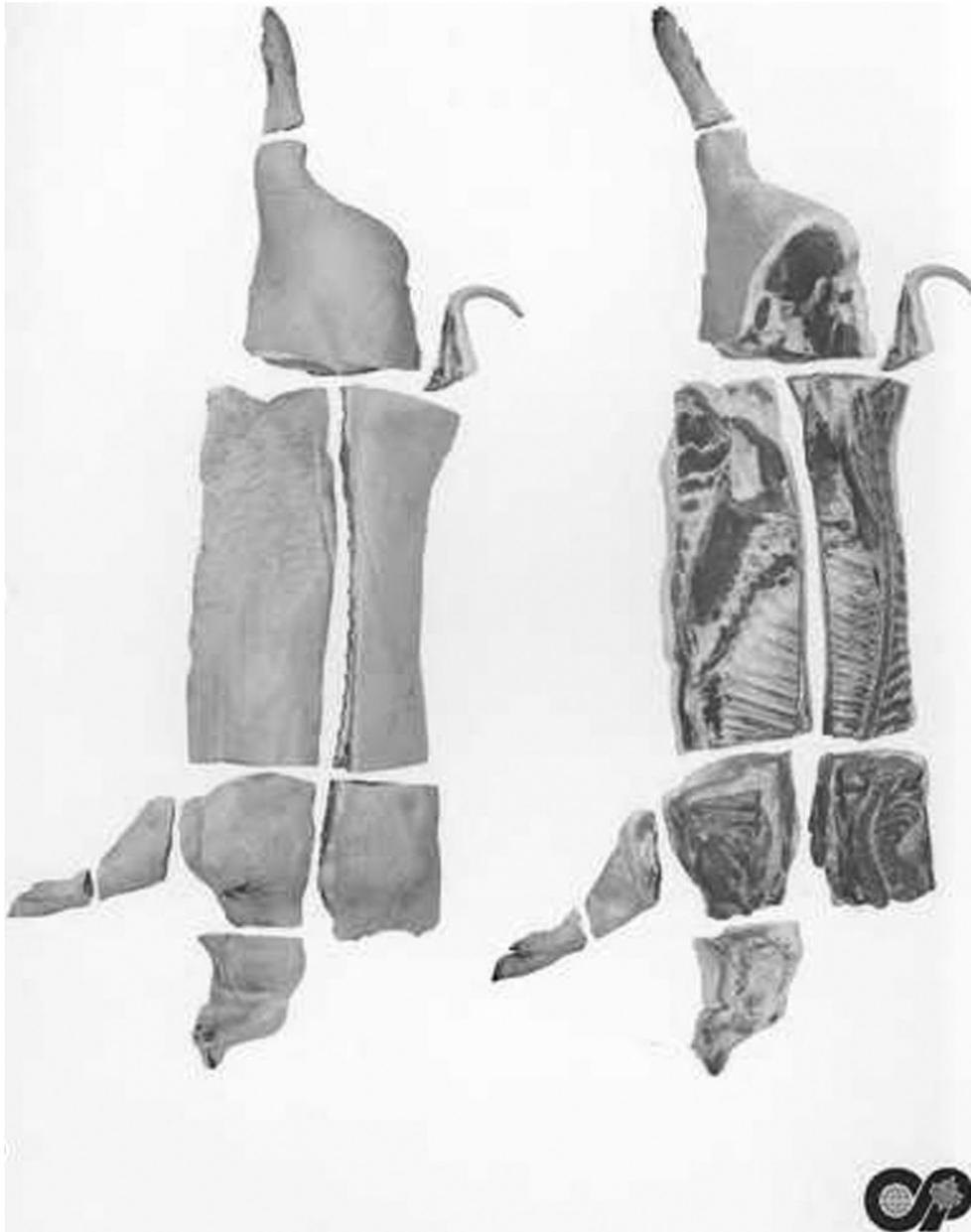


FIGURE 4. U. S. carcass break.



**FIGURE 5.** Canadian carcass break (courtesy of Canada Pork International).

imports. Japan's annual imports of SR-bellies average 50-80,000 metric tons - between nine and fourteen percent of total imports.

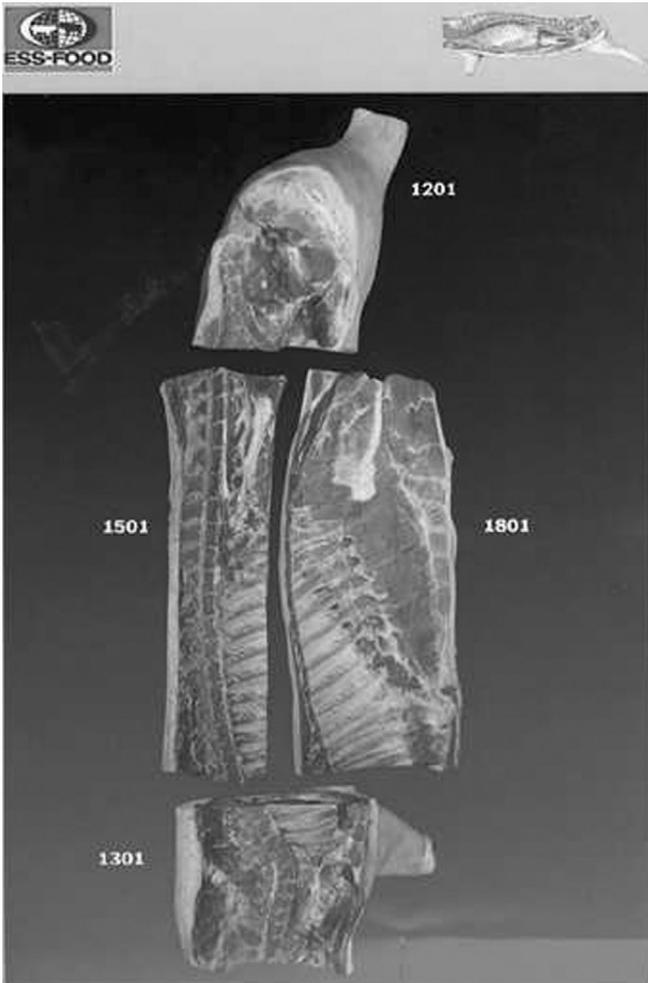
To fabricate the SR-belly, the ribs are removed individually. The diaphragm and intercostal meat remains intact and firmly attached to the belly. Usually, the costal cartilage remains in the belly. While the U.S. does produce SR-bellies, we are currently not price competitive with other countries. Both the strong domestic demand for bacon and the yield loss due to destruction of the sparerib impact U.S. prices. Danish SR-bellies as shown in Figure 7 are preferred in many Asian countries due to their leanness and smaller size.

#### *The Single-ribbed Loin*

The single-ribbed (SR) loin is produced in a similar fashion to the SR-belly with the backbone and ribs removed individually. In Japan, where chilled loins are in high demand for retail and foodservice uses, the U.S. has been able to successfully substitute chilled, vacuum-packed, sheet-ribbed boneless loins for SR-Loins.

#### *The Collar-butt*

The bone-in or boneless collar-butt (Figure 9) is very similar to a popular U.S. beef cut - the chuck roll. It is processed



**FIGURE 6.** Danish carcass break (courtesy of ESS-Food USA, Inc.).

from a shoulder produced with the international (4<sup>th</sup>/5<sup>th</sup>-rib) break. The lower portion of the shoulder is removed with a straight cut extending the scribe line through the shoulder, approximately perpendicular to the loin/shoulder separation. The outside shoulder is removed at the natural seams between the *serratus ventralis* and the *subscapularis*, and the *serratus ventralis* and the medial side of the scapula shoulder. Removing the vertebrae produces boneless collar-butts. This cut is extremely popular in Japan, Korea and other parts of Asia where they are thinly sliced or cut into small roasts and cooked in a multitude of ways.

#### Sirloin-on Ham

The traditional way to separate the ham from the loin in Japan is to leave the sirloin with the ham. This method is very common in Europe where all the major pork suppliers offer a sirloin-on ham as a standard item. When combined with the 4<sup>th</sup>/5<sup>th</sup>-rib shoulder separation, as is typical in many countries, the loins produced are equivalent to the U.S. center-cut loin. The net effect of this fabrication method is to transfer loin value and yield to the ham and shoulder.

#### The Lancone

Another popular product in Asia is the lancone (Figure 10). The lancone is a foot-on front leg produced by removing the front leg with a cut through the elbow joint approximately parallel to the frontal plane of the hog. It is usually cooked as a stew dish in Taiwan, Singapore, Malaysia and Thailand. In the Philippines, it is mainly served roasted as a whole leg. The USMEF office in Singapore estimates that the annual consumption in Singapore, Malaysia, Thailand, and the Philippines is 167,000 metric tons per year. Korean consumption is approximately 2,400-3,600 metric tons per year.

#### "Long-cut" Front Hock

There is significant demand for a "long cut" front hock in Asia (Figure 11). In fact, this is the standard specification in China. The long cut hock weighs approximately .9 kg and is approximately 6-7 inches long compared to the U.S. hock which is approximately .3 kg and 2.5 to 3.5 inches long. The price premium for this product over U.S. hocks is approximately \$.09-.10 per lb. Hocks are generally stewed in China, although there are many recipes. The standard recipe is the so-called "German Pigs Knuckle" which is quite well known throughout China.

#### Pork Trimmings Specifications

In many international markets, the chemical lean content for pork trimmings is congruent with the name of the product. Especially in Europe, the standard for 80 trim is 80% chemical lean, the standard for 60 trim is 60% chemical lean and so on. In the U.S. there are two primary types of pork trimmings, 80 trim and 50 trim. However, the chemical lean standard for 80 trim is 72% while the standard for 50 trim is 42%. This nomenclature can cause confusion with export customers, especially with less experienced traders or importers unfamiliar with U.S. specifications.

#### Pork Variety Meat Values and Specifications

One of the best examples of how pork exports permit more of the hog to be used can be seen by looking at variety meat exports. In 2000, the U.S. exported variety meats worth \$93.96 million, the equivalent of \$.96 per head. The USDA Agriculture Marketing Service reports a daily "drop" credit for pork

**TABLE 3:** Examples of Domestic and Export Prices for U.S. Pork Variety Meats (December 2000)

Item	Domestic Price/lb.	Export Price/lb.
Pork Bungs	0	\$1.05
Uteri	0	\$.55
Ears	\$.84	\$.90
Tails	\$.40	\$.45
Femur Bones	0	\$.21
Hearts	\$.21	\$.24
Kidneys	0	\$.16

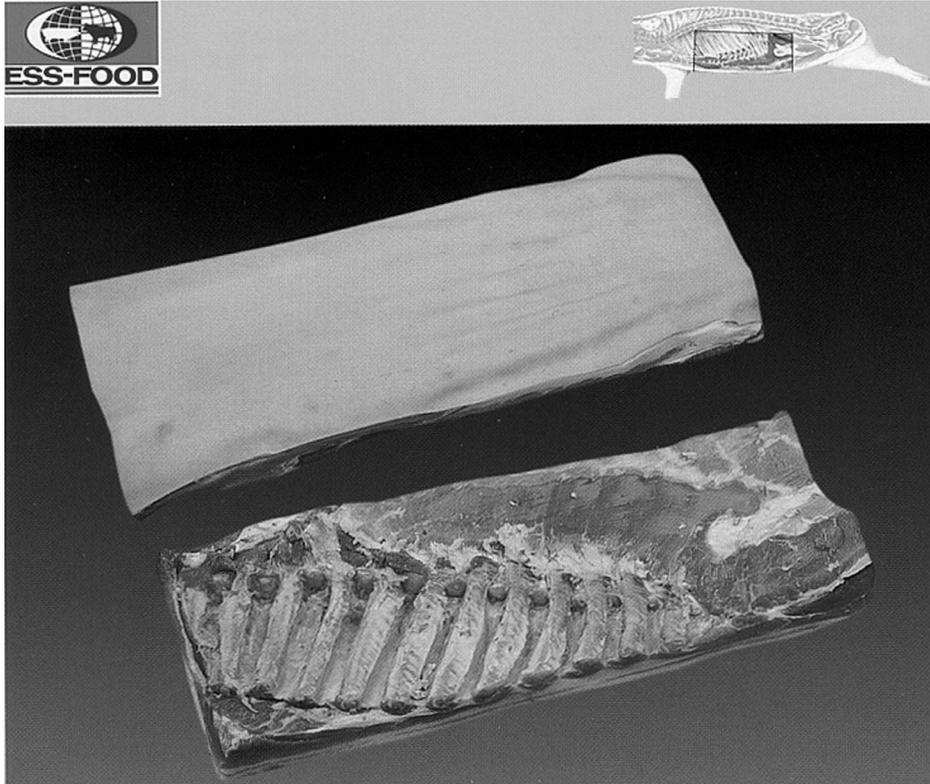


FIGURE 7. Single-ribbed belly (photo courtesy of ESS-Food USA, Inc.).

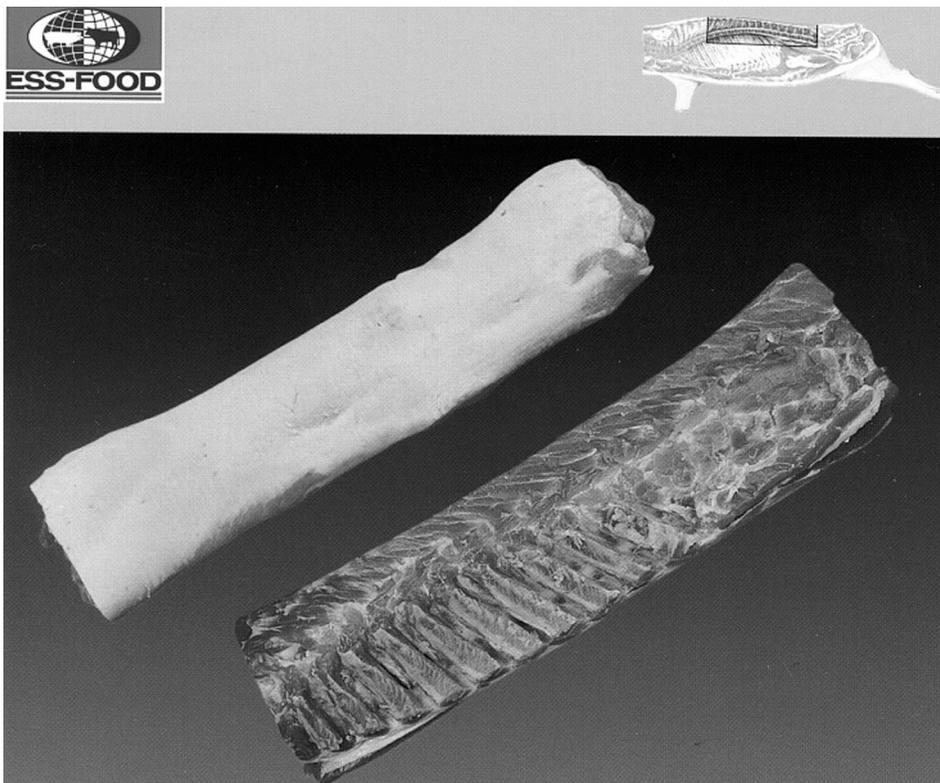
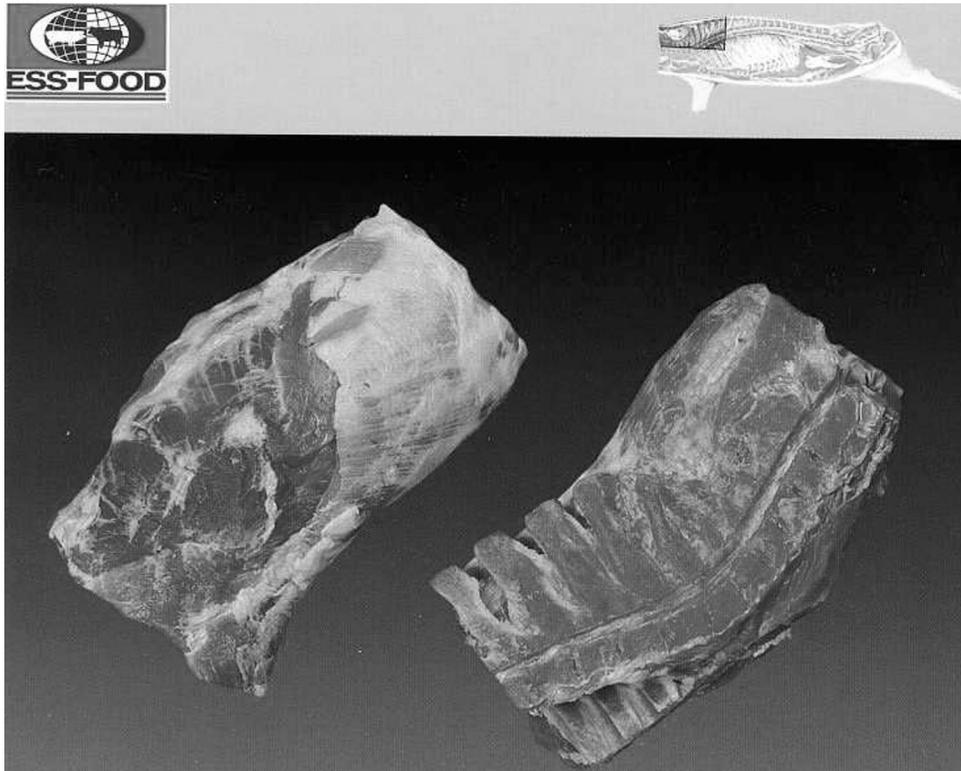


FIGURE 8. Single-ribbed loin (photo courtesy of ESS-Food USA, Inc.).



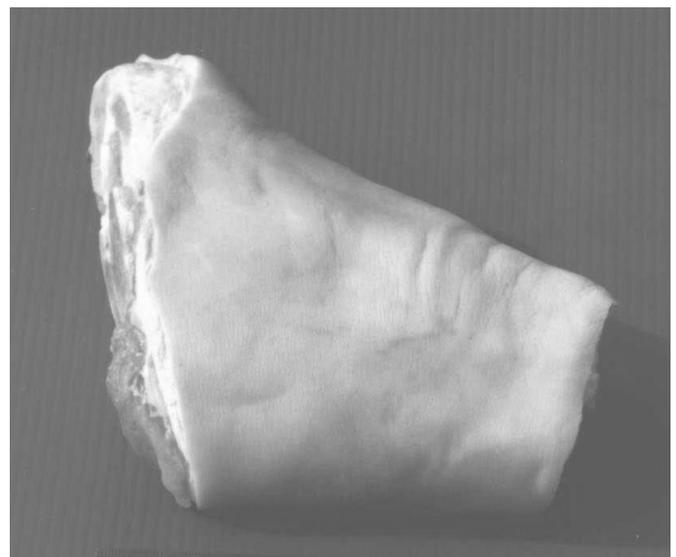
**FIGURE 9.** Collar butt (photo courtesy of ESS-Food USA, Inc.).

variety meats. For the week ending June 22, this value was \$3.77 per head on a carcass weight basis. Table 3 shows some representative prices for U.S. variety meats on the domestic or export market. Without the export market, some variety meats would end up in inedible rendering and the impact of the byproduct credit on the live hog price would be reduced.

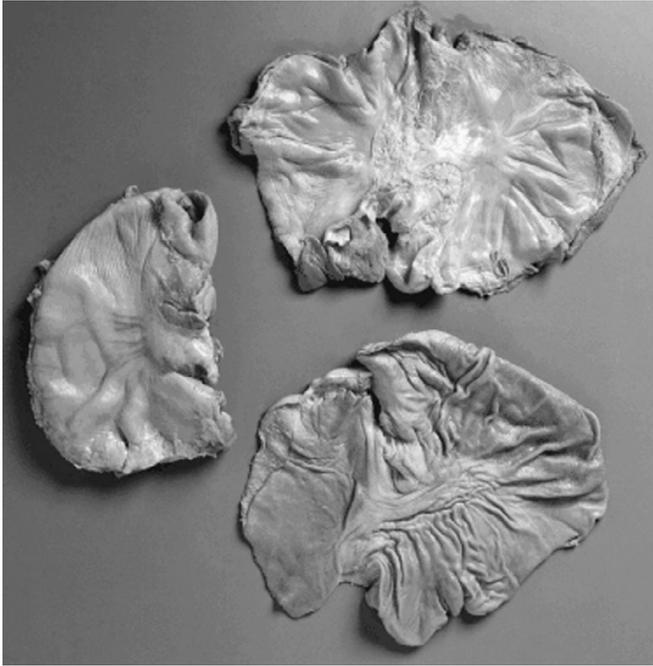
Variety meat specifications are not an issue that would seem to be at the forefront of the U.S. pork industry. However, specifications and harvesting methods can have a significant impact on the value of pork variety meats in the export market. To illustrate this, the following provides some examples of byproduct specifications from the China market



**FIGURE 10.** U.S. "Lancone" for the Korea market.



**Figure 11.** Long-cut (Chinese) hock.



**FIGURE 12.** Specifications for pork stomachs (photo courtesy of Hormel Foods International).

as well as price premiums as reported by Chinese importers in December 2000. One striking fact about China and certain other Asian countries' consumption habits is that the parts of the animal least favored by U.S. consumers are those that are most in demand by consumers in those countries. For example, in China, chicken feet sell for more than chicken breasts, in Taiwan, intestines sell for more than pork loins, and in Korea, raw bellies sell for more than tenderloin. According to Hayes (2000) the Chinese market, if fully opened to U.S. pork variety meats, would add about \$5 per head to each of the 100 million hogs the U.S. slaughters each year. In China, buyers do not usually specify a brand or company name when purchasing imported meats. It is much more common to use the USDA Establishment number on the box to determine quality.

**Stomachs.** Chinese customers prefer pouch-style stomachs more than opened stomachs (Figure 12). They also specify stomachs processed with a high temperature or dual scald and packed in 15 kg boxes. They are willing to pay a \$.05 per pound premium for this product.

**Kidneys.** There is a strong preference for unslashed kidneys over slashed product (Figure 13). Chinese buyers have stated a willingness to pay a 5-10% premium for this specification.

**Ears.** Chinese buyers want a square-cut ear with the canal removed. They must be cleaned of all hair and be packed in a 15 kg box.

**Tongues.** Tongues must be 100% tip-on, skinless and trimmed of all "root" (See Figure 15). The preference is for a 15 kg box. Again, there is a premium for certain USDA plants meeting this specification.



**FIGURE 13.** Specifications for pork kidneys (photo courtesy of Hormel Foods International).

**Hearts.** Asian buyers prefer hearts that are either whole or have been cut just slightly for washing. They should be neatly packed in a 6 kg box. There is a five percent premium for certain USDA plants meeting Chinese specifications.

**Tails.** The only specification for tails acceptable in China is the long tail. Since most U.S. producers dock their pigs' tails, it is difficult for the U.S. to supply this product.

U.S. specifications for primal cuts and variety meats are determined by a number of factors including traditional processing practices, domestic demand, USDA-FSIS inspection requirements or constraints, on-farm practices, and sometimes even a lack of knowledge about alternatives. U.S. processing methods are not the norms around the world as these examples illustrate. And there are many other product specifications that vary dramatically from the U.S. At the least, this fact has the potential to negatively impact the value we receive for our products. In the worst cases, it makes the U.S. industry less competitive or noncompetitive for some products in the global marketplace.

## Pork Quality

Quality has always been a major factor impacting the global trade in pork and pork products. In 1984, Morgan et al. measured preferences for various pork attributes among potential and current purchasers of U.S. pork in "high-growth"



**FIGURE 14.** Specifications for pork ears (photo courtesy of Hormel Foods International).

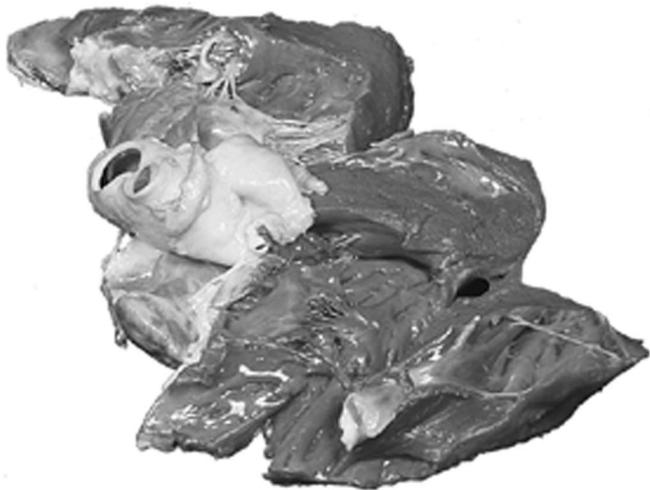
markets. The study concluded that 1) confidence in product safety, 2) competitive prices, 3) palatability (tenderness), 4) positive perception/image of the U.S., and 5) availability of individual pork cuts ranked highest as reasons that international customers would purchase U.S. pork. Conversely, the top five areas in which improvement by the U.S. pork industry was needed to increase exports of pork were 1) variation in lean quality (color, purge, overall appearance) was too great, 2) customer service was lacking, 3) abscesses, bruises and contamination with foreign material occurred too frequently, 4) size and size/weight consistency was lacking in U.S. pork, and 5) label placement and information were inadequate.

The Japanese market represents the “gold standard” for pork quality. Japanese buyers demand and are willing to pay for product that meets stringent product specifications. Sixteen countries imported more than one thousand metric tons of



**FIGURE 15.** Specifications for pork tongues.

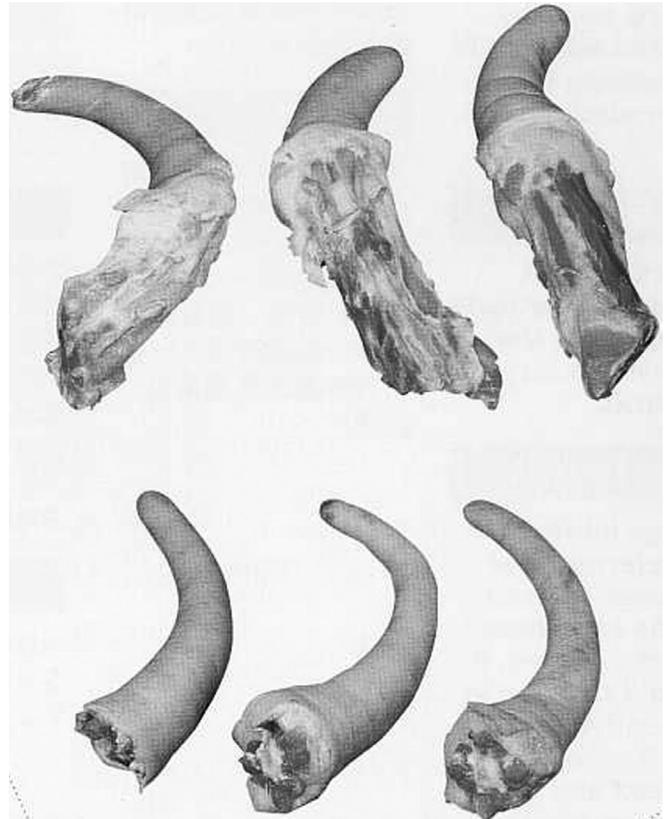
U.S. pork in 2000. Of these, only Italy had a higher average value (\$4,245/mt for 1340 metric tons) than Japan (\$3,740 Mt for 198,628 metric tons). Japanese retail requirements for pork that meets specific standards of color, firmness and fat quality have been a driving factor in the U.S. industry's efforts to improve lean meat and loin quality. Japanese retailers want moderately firm, fine-textured, well-marbled (NPPC marbling score 3.0-5.0) lean muscle with a shiny, red color (NPPC color score 3-5). The Japanese retail trade also prefers moderately firm, rather sticky, aromatic, white-colored fat.



**FIGURE 16.** Specifications for pork hearts.

These trade specifications have been confirmed by specific consumer tests. In 1999, Miller et al. conducted a series of consumer preference tests in Japan with U.S. loins. Results showed that Japanese consumers did not prefer dark-colored pork (Japanese color scores 5 and 6), but they did indicate a distinct dislike for light colored pork (Japanese color scores of 1 and 2). Importantly, Japanese consumers were able to detect color differences in blind tests as they indicated Japanese color scores of 1 were the lightest, 2 and 3 were slightly darker, and that 4, 5, and 6 were darker. However, they said they liked Japanese color scores 3, 4, 5, and 6 similarly. To meet this standard, most major suppliers to the Japanese market sort their loins by color. In addition, some are evaluating or have implemented additional quantitative measurements such as pH and instrumental color. In other markets, the issues of color and marbling are less important.

PSE is still an issue with U.S. product in Japan, particularly in the summer, but the frequency of complaints has decreased substantially. In many cases, what customers are concerned with is not PSE per se, but wide variations in lean color, particularly in boneless ham muscles in the Japanese and Mexican processing sectors.



**FIGURE 17.** Specifications for pork tails.

## Food Safety Issues

While this paper is not intended to address the multitude of food safety issues impacting the global trade in pork products, it should be covered briefly. Food safety is the defining issue in the pork export market today. Consumers around the world are uncertain about the safety of the foods they eat and are especially concerned with the safety of imported foods, driven by the large number of prominent food safety situations that have occurred over the last decade.

The United States is one of the world's leaders in food safety. As a result of the Federal Meat Inspection Act of 1905, the U.S. has had Federal inspection of meat and meat products for 96 years. Many countries still do not have mandatory meat inspection and have yet to address issues the U.S. addressed in 1905. With the exception of some European and Canadian plants, the U.S. industry is unsurpassed in producing safe, wholesome, high quality pork. While this paper will not go into the multitude of food safety initiatives undertaken by the pork industry over the last decade, producers continue to spend pork checkoff funds on pork safety programs. Government and industry also spend millions of dollars on food safety and pork safety systems. But foreign consumers do not know about these programs, and are not aware of the high quality and safety of U.S. Pork. That is why a primary objective for our export development program is to build trust in pork from America. And that is why we have introduced the U.S. Pork

Seal, to serve as an easily identified brand indicating the U.S. as the country of origin.

## Conclusions

Achieving sustained export growth at the level desired by U.S. Pork producers requires that the industry focus on achieving a number of key objectives. These objectives cover a range of issues from market access to product image and reputation.

1. Maintain a consistent supply by producing the world's safest pork in an environmentally sustainable manner, from farm to table.
2. Gain meaningful access to all key markets.
3. Supply pork that meets customer needs at a price they are willing to pay.
4. Customize products and services to meet the needs of customers worldwide.
5. Create significant acceptance for U.S. pork among the trade in key markets.
6. Establish a world-class image and reputation for the U.S. Pork industry in the minds of importers and consumers.

Achieving these objectives requires an escalation of efforts in many areas of the pork chain. There are increasing expectations by global consumers for accountability, certification and traceability in food safety systems. It is critical that pork producers throughout the country are aware of the evolving food safety and quality issues and are preparing themselves to address their role and responsibilities in providing safe, high quality pork to global customers. Producers and processors must raise the bar on quality. Improvements in color, cutting specifications, cut size, and customer service are required if the U.S. is going to achieve world-class quality. The industry must continue to push for fair and open access to the world's pork markets within the constraints of current trade agreements and the upcoming World Trade Organization's Agriculture negotiations. The industry must invest in the educational and marketing efforts that demonstrate the benefits of U.S. Pork to customers and continue to build its image around the world.

Within the meat science community, international initiatives are ongoing. The National Pork Board and the American Meat Science Association have implemented a number of new programs including an international module for the Pork 101 curriculum and this session focusing on international issues. The pork checkoff is also funding "problem solving teams" to provide the USMEF and our export customers with scientific and technical support. There are a number of other initiatives that should be considered:

- 1) Develop specific, quantifiable measurements of how the U.S. pork industry compares to its competitors technologically, economically, and politically. Its critical to understand and benchmark the competitive advantages

and disadvantages of the U.S. Pork industry vis-a-vis export competitors such as Canada, Denmark, and Brazil.

- 2) Significantly increase the international focus and content of undergraduate meat science curriculums. Ninety-six percent of the world's population lives outside of the United States, and the majority of them buy their meat in public or wet markets, at best. Most of the world cuts their hogs differently and consume much different pork products than the United States. Graduates should be prepared to address the constraints that these market conditions impose on the industry's ability to export.
- 3) Expand the export focus in pork research programs. Numerous scientific or technical barriers are holding down exports. The impact of alternative feed sources on fat or meat quality, the impact of enhancement technologies or bone-in product on export shelflife, the transmissibility of certain swine diseases in meat, or the presence or absence of residues or pathogens in pork supplies around the world are all areas worthy of increased study.
- 4) It is possible for the U.S. pork industry to duplicate almost any product specification from around the world, but at what final cost? It is important to develop production and processing systems that will allow the U.S. industry to customize products or improve quality and yields while maintaining cost competitiveness.
- 5) The U.S. pork industry continues to be impacted by policy decisions based on politics or questionable science. To grow exports, the industry must vigorously defend a rigid science-based approach to risk assessment and the application of new technologies to pork production and processing.

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