New Techniques to Modify Pork Fats Promote Better Health

Helen H. Jensen
Iowa State University, hhjensen@iastate.edu

Donald C. Beitz
Iowa State University, dcbeitz@iastate.edu

Follow this and additional works at: http://lib.dr.iastate.edu/iowaagreview

Part of the Agriculture Commons, Animal Sciences Commons, and the Human and Clinical Nutrition Commons

Recommended Citation
Available at: http://lib.dr.iastate.edu/iowaagreview/vol2/iss1/6

This Article is brought to you for free and open access by the Center for Agricultural and Rural Development at Iowa State University Digital Repository. It has been accepted for inclusion in Iowa Ag Review by an authorized editor of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.
Table 2: Change in the Gross Returns, minus Feed Costs for Pork (Farrow-to-Finish), Under a Given Drop in Demand for Corn used in Ethanol Production.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>9.53</td>
<td>12.43</td>
<td>14.57</td>
<td>15.69</td>
</tr>
<tr>
<td>10 Percent</td>
<td>9.66</td>
<td>12.62</td>
<td>14.52</td>
<td>15.71</td>
</tr>
<tr>
<td>Change</td>
<td>1.36%</td>
<td>1.53%</td>
<td>-0.34%</td>
<td>-0.08%</td>
</tr>
<tr>
<td>50 Percent</td>
<td>10.16</td>
<td>13.28</td>
<td>14.33</td>
<td>15.76</td>
</tr>
<tr>
<td>Change</td>
<td>6.61%</td>
<td>6.84%</td>
<td>-1.65%</td>
<td>0.45%</td>
</tr>
</tbody>
</table>

Gross returns, minus the feed costs, provide a basis to assess the impact of a decrease in ethanol demand on the livestock sector. The feed costs include all feed costs, so if feeders substitute lower-cost feed rations, it can be seen in this calculation. In the farrow-to-finish category, an initial increase in net returns can be seen. In the third year after the ethanol change is implemented, the reaction shows that people are making adjustments (in production) to take advantage of the lower crop prices. Thus, from the third year onward, the imports are slightly positive or negative but are mostly insignificant. The change at the end of the time period (seen in the 1999-2003 average) shows the equilibrium reached after all the production adjustments have taken place.

Ethanol policy can have negative aspects, and the implications go beyond the corn producing sector. The policy options impact other sectors of agriculture as well. Whether a policy change comes out of the legislative or executive branch of the national government, diverse agricultural and rural interests are affected in one way or another.

Special Articles

New Techniques to Modify Pork Fats Promote Better Health

(Helen H. Jensen, 515/294-6253)
(Donald Beitz, 515/294-5626)

Mounting scientific evidence establishing the link between adverse health consequences and the consumption of fat and fat rich in saturated fatty acids (saturated fat) has prompted leading health organizations to recommend decreasing the consumption of total and saturated fat. In the U.S. diet, approximately 37 percent of food energy consumed is derived from total fat, which contains 13 percent saturated fatty acids, 14 percent monounsaturated fatty acids, and 7 percent polyunsaturated fatty acids. And, approximately 56 percent of all dietary fat and 70 percent of saturated fat come from animal sources. The scientific evidence and increased public focus on dietary fat have motivated the meat industry to plan new marketing strategies and to invest in technological innovations to enhance the desired qualities in their products.

Changes in meat consumption (especially for pork products) are important to Iowa’s agriculture. Iowa leads the nation in production of hogs and pork products, with almost half of farm cash receipts in the state attributed directly to pork. Feed grains for the pork sector are also major income components from Iowa’s agricultural sector.

In recent years, hog producers have decreased the amount of carcass fat through breeding and feeding practices, and pork processors have removed more of the remaining excess fat from the carcass. The amount of excess fat removed from the carcass declined from a high of 20.60 percent of carcass weight in 1955 to the present amount of around 5.50 percent of carcass weight because of the leaner carcasses. There is a limit, however, to how much fat can be trimmed from the carcass today.

The pork industry has significant potential to alter pork products to meet the taste and health preferences of consumers. Innovative techniques may allow changes in the final product through feeding practices. One promising technology would modify fat deposition through diet intervention. This technology was used in a recent fat modification experiment on pork conducted at Iowa State University (ISU) by Don Beitz and others in the Department of Animal Science. The experiment was funded by ISU’s Center for Designing Foods to Improve Human Nutrition.

The fat modification experiment was designed to produce pork products with more desirable fatty acid composition. Supplemental feeding of fat in the form of soy oil and choice white grease was expected to depress the deposition of less desirable fatty acids. Experimental results indicated that feeding of supplemental choice white grease at concentrations of 30 percent of total feed calories increased the proportion of unsaturated fatty acids in the loin, ham, and shoulder muscles compared with the control diet and USDA data. The effects on palmitic acid relative to stearic acid were mixed. This ratio is important since palmitic acid raises undesirable blood cholesterol and
stearic acid has no effect on blood cholesterol. The soybean oil-supplemented diet did result in the desired decrease of palmitic acid relative to stearic acid in all muscles when compared with both the control diet and with USDA data.

In a related human study directed by Murray Kaplan of ISU's Department of Food Science and Human Nutrition, pork and lard from pigs fed a fat-supplemented diet with 40 percent of calories as soy oil caused significantly lower plasma cholesterol in college students than did typical pork and lard. This evidence supports the possibility of modifying the fat in pork products to achieve desirable health effects in humans.

The fat-supplemented diets associated with the new technology did have higher feed costs compared with the baseline industry standards diet because they used higher proportions of relatively more expensive feed ingredients such as soybean meal and soy oil. Moreover, the fat-supplemented rations had lower feed efficiency (on a weight-to-weight basis) compared with the model baseline ration. For individual hog producers and the pork industry as a whole to benefit from the new technology, consumers would need to be willing to pay a premium of at least 37 percent of the current price. By using reasonable assumptions on adoption rates and with the 37 percent premium, the pork industry would experience increasing supply, consumption, and market share of meats after about five years.

The feasibility of generating a remunerative premium depends in large part on whether the new pork products can be differentiated clearly and whether consumers can be adequately informed and convinced (e.g., through advertising) about the health merits of the fat-modified pork product. Mandatory nutrition labeling, which specifies total and saturated fat percentages, has recently been introduced for fresh and processed meats. The fat modification feeding program is likely to be most successful if consumers are won over by significant improvements in attributes linked to the healthfulness of the product, and if taste and other qualities are not affected. Some recent results from experiments evaluating consumers' willingness to pay for leaner pork products conducted at Iowa State University indicate a willingness to pay a premium of over 50 percent for leaner pork products. This response suggests that the experimental product may be economically feasible. Such experimental work holds the promise of redesigning traditional animal products into foods with improved health related characteristics.

**How Technology Impacts Agriculture — The Focus for the 1996 National Forum for Agriculture**

New and evolving technology has a significant effect on how agricultural producers, processors, manufacturers, and retailers do business. It also impacts rural American communities and institutions.

Is all this technology good or bad? Who owns the fruits of research and development efforts? Why has the impetus for technology development shifted from public academic institutions to private corporations, and how does that sea change alter the face of agriculture?

These are some of the questions and issues facing presenters and participants at the 1996 National Forum for Agriculture to be held March 4 and 5, 1996, at the Marriott Hotel in Des Moines, Iowa. Concurrent sessions will examine the links between technology and capital, social change, politics, and global environment. Other sessions look at cutting edge technologies such as gene splicing, irradiation, and global positioning. Speakers will explore how all these miraculous changes will shape the industry of agriculture and transform consumption patterns and trends.

The 1996 National Forum for Agriculture, now in its seventh year, is organized cooperatively by the Center for Agricultural and Rural Development (CARD) and the Food and Agriculture Committee of the Greater Des Moines Chamber of Commerce Federation. The 1996 Agricultural Vision Award will be presented at the Forum's March 5 luncheon.

For more information about the program and registration for the 1996 National Forum for Agriculture, contact Judith Pim at CARD, 515/294-6257.