

The implications of biofuel production on intensive livestock production in the United States

JW Comerford

Penn State University, University Park, PA, United States

Email: jxc16@psu.edu

The United States (US) produces 13.3 billion bushels of corn and 3.2 billion bushels of soybeans annually. Sixty percent of total corn is used in livestock production, with 31% used in beef production, 27% in poultry, 24% in pork, and 15% in dairy. Current US policy dictates that 25% of fossil fuel requirements will be replaced by biofuels by 2025. The entire US corn crop used for ethanol production would replace only 12.3% of the current US fossil fuel demand. Fundamentally, the use of US grain crops will not have a *significant* impact on total fuel use in the near future. Alternative energy sources—cellulosic fermentation products, cropland conversion to sugar cane, increased use of wind, geothermal, or other energy power, or a significant reduction in prices for crude oil will diminish the demand for alternative fuels.

Ethanol and biodiesel production predominate as alternative fuels, with 124 ethanol plants using about 20% of the corn crop in the US and producing 6.5 billion gallons of ethanol. Distillers grains represent a maximum of 40% of the replacement rate of corn in beef cattle, with poultry being only about 5%. Significant costs for shipment of distillers grains from production areas to feeding areas will increase diet costs. Biodiesel production triples annually. Enough virgin soy oil and recycled restaurant grease are available in the United States to provide feedstock for about 1.7 billion gallons of biodiesel per year, or 5% of on-road diesel use. Co-products of this process include glycerol and soybean meal. There will be restrictive future need for soybean meal. Glycerol is currently under study, and studies have shown effective use in dairy cattle, replacing 10% of the corn in beef steers, up to 10% of the diet in pigs, and up to 5% of the diet in chickens. Biodiesel represents the most significant source of alternative fuels in the US. The use of soybeans as the primary feedstock will be under scrutiny because of depleted value of soybean meal for livestock use from overproduction and placing glycerol in a competitive international marketplace.

For the future, use of corn to meet policy requirements for fossil fuel replacement implies 6.6 million additional bushels of corn will no longer be available. Short term implications are higher prices for feed grains as they are diverted to subsidized biofuel production. Higher costs for most livestock and dairy production, because of lower production and increased ownership costs, will make red meats, poultry, and milk less competitive to imports and substitutes. Longer term implications will be from determination of the most economical feedstock for biofuel production. This may include cellulosic fermentation coming on line, and 300 million acres of grasslands could be converted to biomass production. Concentrated dairy and beef feeding operations, including that for the breeding herd, will be similar to current production systems for pork and poultry. The implications to this result on consumer acceptability will be important in the marketplace. The substitution rate of corn with co-products for the dairy and beef industries will be mandate a higher proportion of forage-based diets. Lower milk and meat production could result with reduced energy in the total diet. Complete forage diets may emerge. Supply and demand forces will need to dictate if this result is profitable in the US market since grass-fed meat and milk in the “natural” or organic form resides only in niche markets.