BACON BITS

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Quick Amino Acid Determination for Wheat

Now there's a more accurate way (than looking in feed tables) to get nutrient values for wheat. *Alberta Pork* sponsored a major feed analysis project for Alberta grown wheat which was just completed at our Soils and Animal Nutrition Lab. The end result was the calibration of the NIR (near infrared spectroscopy) Systems 6500 to measure protein, moisture and 18 amino acids in wheat. We also developed regression equations for calculating these amino acids from protein content. So, if NIRS is not available these equations can be used. All you need is the protein analysis and moisture for the wheat in question.

Wheat Analysis Project

Two years ago we obtained over seven hundred samples of wheat from the Soils and Nutrition Lab sample storage. These samples were identified by NIRS to be spectrally (and chemically) different from one another. Out of these, the NIRS computer program selected 100 representative samples which were analyzed for moisture, protein and 18 amino acids which included all the essential ones. The data provided up-to-date information on protein and amino acid contents of wheat presently grown in Alberta.

We found that wheat protein varied between eight and 22 per cent with similar variations in amino acids. When the amino acids were expressed as a per centage of protein, coefficient of variation (SD/mean x 100) ranged from 6.3 to 13.6 per cent. Lysine had the highest coefficient of variation at 13.6 which tells us that the precision with which lysine can be predicted is lower than the other amino acids. This fact was also demonstrated by lysine having the lowest R^2 (regression coefficient) of all amino acids in the regression equations. Unfortunately, this level of accuracy in predicting lysine content of wheat is only about as good as previous work by other researchers.

The amino acid analysis data were used in the calibration of the NIR System 6500 to analyze wheat for amino acids. In less time than it takes to drink a cup of coffee this machine can analyze whole wheat for moisture, protein and the following amino acids: alanine, arginine, aspartic acid, cystine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tyrosine and valine. Unfortunately, private labs in Alberta don't offer amino acid analysis yet. We hope that will happen soon.

Practical Amino Acid Determination

Until private labs can offer NIR analysis we still need to determine amino acid values for ration formulation purposes. These can be calculated using linear regression equations if you have the dry matter protein content of the wheat. (In the lab, protein was calculated as N x 5.7). Here is a table with the equations. The R^2 values indicate the extent to which protein accounts for the amino acid in question.

Linear regression equations for calculating amino acids in wheat.

Amino acid	Intercept	Slope	R^2
Alanine	0.1006	0.0276	0.79
Arginine	0.0658	0.0405	0.86
Aspartic acid	0.0771	0.0441	0.76
Cystine	0.1241	0.0183	0.63
Glutamic acid	-0.1766	0.3046	0.92
Glycine	0.1247	0.0333	0.85
Histidine	0.0533	0.0198	0.86
Isoleucine	0.0555	0.0319	0.90
Leucine	0.1489	0.0561	0.90
Lysine	0.0991	0.0203	0.64
Methionine	0.038	0.0129	0.80
Phenylalanine	0.0123	0.0464	0.92
Proline	-0.0082	0.1034	0.89
Serine	0.0886	0.0409	0.87
Threonine	0.0842	0.0238	0.78
Tryptophan	0.1012	0.0097	0.85
Tyrosine	-0.068	0.024	0.89
Valine	0.1237	0.035	0.86

Example Calculation for Lysine

Here is an example how to use the equations in the table for a wheat sample that was analyzed and found to contain 10 per cent moisture and 13.6 per cent protein

- determine dry matter content of the sample:
  100 - 10 = 90 %.
- convert the protein to dry matter basis as follows:
  100/90 x 13.6 = 15.11 %.
- apply the equation for lysine:
  0.0991 + 0.0203 x 15.11 = 0.406 %
- convert lysine back to sample basis:
  90/100 x .406 = 0.365 %.

To be able to calculate lysine, methionine, threonine and tryptophan accurately for wheat can improve diet formulation and save you money.

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Alberta
AGRICULTURE, FOOD AND RURAL DEVELOPMENT

Going Organic

This article looks at the implications of producing and marketing 'organic' pork. Some of the questions that require answers are as follows:

- Where and how can it be marketed?
- What can I hope to be paid for this product?
- What are the production criteria that must be met to label the product as 'organic'?
- What investments are needed that differ from a standard pork production?
- What are the added production and marketing costs, and what will be the net return?

Markets

Demand for organic food products is rising and much of that industry consists of produce and plant products right now. However, some European countries and Asian countries are increasingly looking for organic meat products. For a producer to pursue an export market, linkages with exporters and other organizations will be necessary. Local certification is a necessity for long term organic marketing. Spot sales in local farmers markets may not be enough to support an 'organic' pork operation. An insight into the organic marketplace may be obtained from the *Northwest Processor* which featured organic marketing in its fall, 1999 issue (http://www.agic.gov.ab.ca/food/process/nwp/nwp18.html). This reference provides links to information sources and Alberta Agriculture specialists (http://www.agric.gov.ab.ca/food/process/nwp/nwp18.html#specialists) that can help to develop a marketing plan.

Price of Product

What you can hope to be paid for organic pork is not well established at this time. In some export markets large price markups are available and the opportunities tend to vary widely. Today it will likely be more costly to produce certified 'organic' pork. The necessary premium will be high as long as the quantities produced and marketed are low. Demand is likely to increase. That will mean that some market development will be necessary for anyone hoping to realize premiums for 'organic' pork.

Certifying Organic Pork

There are non-government certifying bodies in Alberta. A list of these is available our web site (http://www.agric.gov.ab.ca/food/process/nwp/nwp18.html#certification). In addition, national standards to call products 'organic' have been developed. Canadian National Organic Standards are summarized at a Government of Canada web site (http://www.pwgsc.gc.ca/cgsb/text/what's new e.html) The requirements for livestock include appropriate rearing conditions and stocking rates, as well as high-quality organically-produced feed. Also ethical animal husbandry that produces low stress is required. These requirements, in turn, promote good health and prevents disease.

The food and processed products from these 'organic' pigs need to follow principles of organic systems. You are prohibited from using GMO or GME (genetically modified or engineered organisms) in production or processing. In addition to national standards, the certifying body may impose its own restrictions. International Guidelines for developing Standards (ftp://ftp.fao.org/codes/standard/organic/gl99 32e.pdf) have been drafted by the Codex Alimentarius Commission of the FAO (Food and Agricultural Organization of the United Nations) which is at this website: http://www.fao.org/waicent/faoinfo/economic/esn/CODEX/Default.html.

Capital Cost

The cost for facilities for raising pigs to produce organic pork need not be any greater than that for any other system. However, standards requiring more space per pig, and potentially slower growth rates, may mean that capital cost per unit pork produced will be greater. Additional costs may also include access to the marketing system (membership in appropriate organizations), participation in a marketing group and even ownership of a retail outlet or intermediary distribution facility as well as market development costs.

Operational and Marketing Costs

The operational and marketing costs are likely to exceed those of other pork production and marketing systems. A premium may have to be paid for organic feed ingredients. The amount of this premium will vary, depending on your ability to find these. Growth performance enhancement will not be allowed through the use of growth promoting feed additives. This may lead to lower rates of gain, and more feed per kilo of liveweight gain. Estimates are from five to 15 per cent slower gains, and two to eight per cent more feed. Additionally, fees for organic certification, inspection, labeling and other related costs will likely be required. This will depend on the organization you are affiliated with. Additional operating costs for organic production could be from 20 to 50 per cent above other types of production systems. When you can generate greater production volumes, costs are likely to be lower. Labour needs will likely also to be greater, due to the needs for recording, labeling, and certification.

Summary

- Markets for 'organic' pork are not well established at this time.
- The organic market is likely to be a growing sector.
- Prices will be at a premium to other types of pork. However, since a regular market is not present, it may be a few years before the amount of premium that customers are willing to pay can be determined.
- Certifying bodies are active, and standards vary. National and international standardization has begun, and is evolving.
- Capital costs will be similar to alternative production, but operational costs are likely to be 20 to 50 per cent higher.

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Manure Management 2000 (MM 2000) June 27 and 28 in Calgary

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Registration Cost: before May 15 – one day $80, two days $125, after May 15 – two days $150

Registration deadlines: June 9 to be included on the tour, June 19 to participate in the conference

Hotel Rooms: $110/night at Coast Plaza Hotel, 1316 - 33 Street NE, Calgary, Telephone: 1-800-663-114

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