

The Feed Pea Focus

Canada's Feed Pea Newsletter

Record Production Levels of Canadian Peas

Field pea (aka dry pea) producers have established peas as a stable proportion of their crop rotation. The Pulse and Special Crops Outlook published by Agriculture and Agrifood Canada predicts that 3.0 MMT of peas will be grown for '05-'06, down slightly from the record 3.3 MMT produced in '04-'05. Including carryout, approximately 3.5 MMT of peas will be available for sale in '05-'06, with price and harvest conditions determining the amount of feed and food-grade peas entering the live-stock market. In years with normal environmental conditions, over 80% of total pea production will meet the grade standards for sale as edible peas. However, 30 to 50% of peas are sold to the domestic and export feed markets annually, indicating the high quality of peas that are being used for livestock feed. There is room to further expand dry pea production, considering that annual feed barley production exceeds 9MMT.

1. http://www.agr.gc.ca/mad-dam/e/sd2e/2005e/aug2005sc_e.htm

Trypsin Inhibitor Levels in Peas Less than for Soybean Meal

Trypsin inhibitors are proteins that reduce protein digestibility by binding with the digestive enzymes trypsin and chymotrypsin. The trypsin inhibitor levels in four commonly-grown pea varieties studied by the Canadian Grain Commission averaged 2.0 mg g⁻¹ DM (range of 1.5 to 2.7) - lower than the 5.46 +/- 0.41mg/g contained in solvent extracted soybean meal.

In order to determine the effects of field pea trypsin inhibitors, pea lines that differed only in trypsin inhibitor content (trypsin inhibitor units mg⁻¹ DM = TIU) were developed and fed to broiler chicks. The mean apparent ileal digestibility of amino acids was significantly higher for diets containing peas with low (1.7 TIU) versus high (8.0 TIU) trypsin inhibitor contents. Low- and high-trypsin pea genotypes had apparent ileal digestibilities of 93 versus 89 % for methionine, 94 versus 91% for lysine and 87 versus 83% for threonine.

2. Wiseman, J., Al-Mazooki, W., Welham, T and Domoney, C. 2003. The apparent ileal digestibility, determined with young broilers, of amino acids in near-isogenic lines of peas (*Pisum sativum* L.) differing in trypsin inhibitor activity. *J. Sci. Food Agric.* 83:644-651.
3. http://www.soymeal.org/worldlitarticles_new/smithkeith2000.html

Environmental Effects on Field Pea Nutrient Content Examined

Researchers have characterized high, medium and low protein peas in a study performed for Pulse Canada at the Canadian Grain Commission. Average proximate values for peas ranging from 20 - 27 % crude protein (DM basis) are shown in Table 1. The essential amino acid contents of lysine, threonine, histidine, isoleucine and phenylalanine were negatively correlated with crude protein. This indicated that these amino acids declined as a proportion of the increasing protein content, essentially buffering essential amino acid concentrations against changes in CP levels.

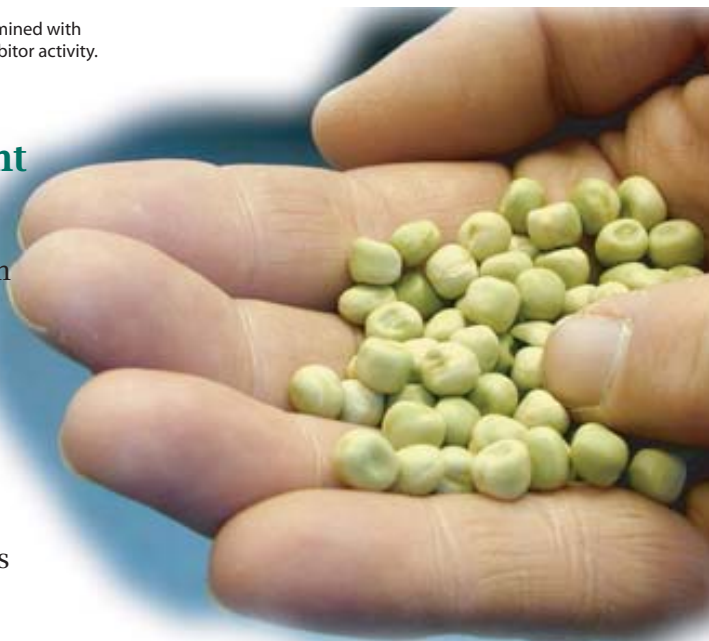


Table 1. Mean proximate (g kg-1DM), mineral (mg 100g-1 DM) and amino acid (% DM) composition of Canadian field peas.

Component	Content (g/kg)	Amino acid	Content (g/kg)
Protein (Nx6.25)	233	Alanine	1.0
Starch	448	Arginine	1.8
ADF	76	Aspartic acid	2.8
NDF	100	Glutamic acid	3.8
Fat	14	Glycine	1.0
Ash	29	Histidine	0.7
Calcium	77.7	Isoleucine	1.1
Copper	0.7	Leucine	1.7
Iron	5.9	Lysine	1.8
Potassium	1152.5	Meth + Cyst.	0.8
Magnesium	152.8	Phen. + Tyr.	1.9
Manganese	1.3	Proline	1.0
Phosphorus	489.5	Serine	1.0
Zinc	3.2	Threonine	0.9
		Tryptophan	0.2
		Valine	1.2

For nutritionists developing NE values from feed ingredient proximate data, the correlations between protein and other proximate components are insightful. Crude protein content was negatively correlated with starch (-0.86), but positively correlated with ADF (0.74) and NDF (0.44) levels. Therefore, peas that contained elevated starch had lower protein and fibre levels.

Noblet's NE prediction equation based upon proximate composition ($NE=(0.726*ME)+(1.33*EE)+(0.39*Starch)-(0.62*CP)-(0.83*ADF)$) indicated that protein and fibre were negatively related to energy content. To summarize the coefficient and correlation effects, an increase in starch means that there will be less energy-reducing protein in the peas, and therefore peas with higher starch should have higher energy contents.

When the above equation was used to calculate energy values, the insignificance of this effect became apparent. Assuming that a 1% (10g kg-1) increase in starch resulted in an equal decrease in protein, the net change in field pea NE values was approximately 11 kcal kg-1! The Canadian Grain Commission survey of high, medium, and low protein peas showed a range of approximately 4% for both protein and starch, or 40 kcal kg-1 - a negligible amount in contrast to the inherent errors associated with the development of the equation and in predicting the proximate composition of peas. Clearly the NE prediction equations are best used to describe the relative energy contents of different feed ingredients, but are not suitable for explaining the differences in the energy content between feed pea samples.

4. Noblet, J., Fortune, H, Shi, X.S. and Dubois, S. 1994. Prediction of net energy value of feeds for growing pigs. J. Anim. Sci. 72:344-354.

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