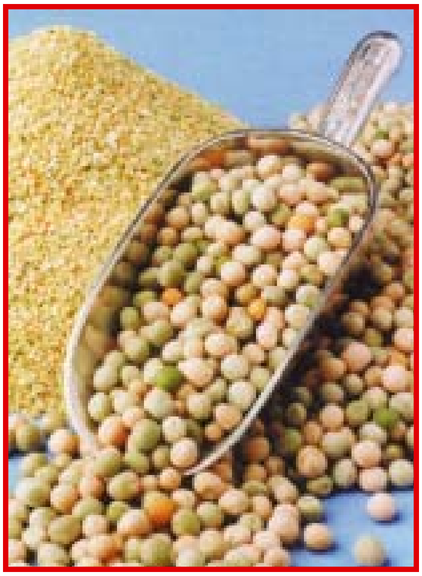
September 2002

The Feed Pea FOCUS

Canada's Feed Pea Newsletter

Steam Flaking Peas - Interesting New Discoveries

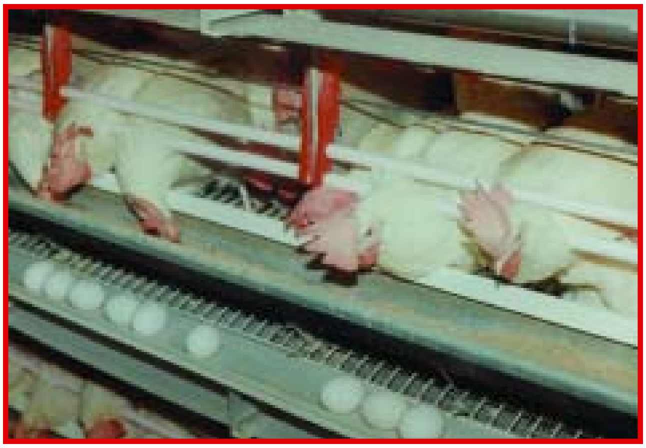


Whole field peas were placed on top of corn in the steam chest of a 16" x 12" Roskamp flaking roll. The field peas were steamed for approximately 15 minutes and reached a temperature of 100C (212F) and a moisture content of about 16% prior to flaking. Field peas were very easy to flake to a light bulk density (22-23 lb/bu or 40 Kg/hL) compared to corn. The most noticeable difference during flaking was that the mill was very stable and ran much quieter than during the corn flaking operation. Surprising was the low level of gelatinization found following steam flaking. In corn, steam flaked to a low bulk density (< 26 lbs/bu), the level of gelatinization in the starch (% gel) is often in the range of 50-60%. For peas, it was found that only ~ 10% of the starch had been gelatinized. Apparently, the starch in field peas is in a form that resists water infusion and swelling. This may help explain why field pea starch is typically more slowly degraded than is cereal starch. Further research is ensuing. Behnke 2002 {2769}.

Processing Peas for Poultry Significantly Improves Energy Digestibility

As reviewed by Dr. Carre at the Eastern Nutrition Conference{2770}

For poultry, the key to utilizing the large stores of energy in peas is accessing intra-cellular space in pea seeds and disruption of the cell walls inside the particles. A comparison of ground seeds to whole unground seeds showed a 17% improvement in the starch digestibility of peas in adult cockerels (Longstaff and McNab, 1987). Reducing the mean particle size of seed flours by 300-1000 mm was shown in poultry to improve the starch digestibility or metabolisable energy value of peas (Conan et al., 1992; Daveby et al., 1998) and faba beans (Totsuka et al., 1977; Lacassagne et al., 1991) by 7-30%. However, in most cases, the reduction in the mean particle size was not sufficient to reach pea starch digestibility values close to that of corn. Very low mean particle size (< 60mm) seems to be needed to reach high values for pea starch digestibility, as shown by results obtained from pea flour fractions separated according to their particle size (Carré et al., 1998a). However, small particles in poultry diets may result in increased water losses with subsequent reduction in the litter quality (Carré, 2000). Interestingly, adding 3% water to seeds before grinding in a hammer-mill, resulted in a four-fold increase in the energy supplied for grinding. Despite no difference in particle size, pea flours that received high energy showed 20% mean increase in starch digestibility (Carré et al., 1998a).



Grinding and pelleting

Pelleting improves starch digestibility by disrupting both the starch granules and cell walls. Apparently, these damages can happen without particle size reduction, as the AMEn value of peas was not modified by type of grinding before pelleting (hammer-mill fitted with 0.8mm or 4mm screens: Conan et al., 1992; 0.5mm or 3mm screens: Carré and Melcion, 1995). Gelatinization of starch due to pelleting concerns probably only the outer part of pellets, since the temperature required to reach gelatinization during pelleting, needs to approach 120°C (Colonna and Champ, 1990). Increasing the mechanical energy for pelleting by increasing either the length of the dies or the flow rate generally results in increased pea starch digestibility with a subsequent pea AMEn increase (Carré and Melcion, 1995).

Table 1. *in vivo* AMEn (MJ/kg) values of peas (dry matter basis), untreated (mash) or pelleted

		Adult birds		Young birds	
		Mash	pellet	Mash	pellet
Moran et al., 1968	?	11.53 (1)[1]	12.56 (1)		
Huyghebaert et al. 1979	0t[2]	12.98 (1)	13.44 (1)		
Farrell, 1983	?		13.44 (3)		
Carré et al., 1987	0t	12.47 (1)	12.91 (1)		
Askbrant, 1988	0t	12.21 (1)			
Conan & Carré, 1989	0t			10.40 (4)	
Carré et al., 1991	0t	11.54 (2)	12.60 (2)	11.23 (2)	12.59 (2)
Conan et al., 1992	0t	11.75 (2)	13.36 (2)		
Brenes et al., 1993	0t			10.18 (1)	
	+t			9.04 (1)	
Igbasan & Guenter,1996	0t			11.35 (2)	
	+t			9.21 (1)	
P.E.A. Programme,1996	0t	11.98 (32)	13.20 (15)	10.90 (4)	12.19 (8)
	+t	11.36 (12)	12.73 (5)		
Inter-publication means	0t	12.15 (6)[3]	13.10 (5)	10.81 (5)	12.39 (2)
	+t	11.36 (1)	12.73 (1)	9.12 (2)	

[1] Number of pea samples. [2] 0t : seeds without tannin; +t : seeds with tannin.
[3] Number of publications. [4] Autoclaving. [5] Micronization.

* 23rd Western Nutrition Conference
September 18-20, 2002
Sheraton Grande Edmonton Hotel
Edmonton, Alberta

* 4th Annual Swine Technology Workshop
October 29 & 30, 2002
Harvest Centre (on the Western Grounds) 4847-19 St.
Red Deer, Alberta

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Looking for Pulse Information?
Check out the following websites:
www.pulse.ab.ca, www.saskpulse.com, www.pulsecanada.com
www.infoharvest.ca/pcd/

Chemical composition (%)

90% Dry Matter Basis

Nutrient	Feed Pea	Chickpeas Desi	Chickpeas Kabuli
Crude Protein	22.60	20.5	19.7
Crude Fat	1.1	4.8	7.3
Lysine	1.67	1.37	1.29
Threonine	0.94	0.73	0.66
Methionine	0.27	0.31	0.26
Cystine	0.21	–	–
Tryptophan	0.24	–	–
Crude Fibre	5.50	9.1	3.4
Acid Detergent Fibre	8.19	12.08	4.8
Neutral Det. Fibre	16.65	19.58	8.44
Starch	46.80	–	–

Energy values of feed peas

Poultry	ME kcal/kg	2,650
Swine	DE kcal/kg	3,485
	ME kcal/kg	3,240
	NE kcal/kg	2,450
Cattle	TDN %	78.3
	DE Mcal/kg	3,456
	ME Mcal/kg	3,078
	NEL Mcal/kg	1,809

SOURCE: Feed Pea Industry Guide and Prairie Feed Resource Centre

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