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**Nutrition value of pea and effective degradability and digestibility of nutrients of untreated and extruded pea****Maria Chrenkova, Mlynekova Zuzana, Formelova Zuzana, Polacikova Maria and Rajscky Matus**  
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**Statement of the Problem:** The importance of grain legumes in the world is high due to their significance in human and animal nutrition. Peas are substantial source of nitrogen and energy, which can compete with many other feeds for selected nutrients. Energy content is comparative with barley and corn. The amino acid composition is characterized by a high lysine and arginine content and low methionine, cysteine and tryptophan content. Lower nutritive value of legume seeds has been attributed to the presence of anti-nutritional factors such as trypsin and chymotrypsin inhibitors, condensed tannins, lectins, etc. Some industrial processes using heat treatment can improve the nutritional properties of legumes. Peas, like other legume seeds, are characterized also by their highly degradable protein and slowly degradable starch. The heat-based processing treatments, extrusion and expansion, increased the insoluble protein fraction and reduced the amount of the protein being degraded into the rumen with no changes to *in vitro* digestibility. The objective of this study was to determine nutritive value and effective degradability of crude protein and starch and digestibility of crude protein in untreated and extruded peas by method in sacco and mobile bag.

**Methodology & Theoretical Orientation:** In the tested feeds we assessed the content of nutrients according to the Commission Regulation (EC) No. 152/2009. Amino acids were determined by ion-exchange chromatography. In sacco experiments were carried out in three non-lactating cows with large rumen cannulae (an average of 10 cm). The animals were fed twice a day a diet consisting of 70% forage and 30% concentrate on a dry matter basis at maintenance level. The ration consisted of maize silage, alfalfa hay, wheat, barley meal (1:1) and vitamin-mineral premix. Access to water was ad libitum. Samples of untreated and extruded peas were weighed (approx. 2.50 g dry matter) into bags (9×15 cm), with pore size of 47 µm. Minimum of three separate bags for sample, incubation time and animals were used. The bags with samples were incubated for 2, 3, 4, 6, 12, 16 and 24 hours in the rumen. The 0 hour time bags were only washed in water to determine washing losses. The parameters of degradability (a, b, c, and effective degradability) were calculated using the equations by Ørskov and McDonald (1979) with outflow rate of 0.06.h<sup>-1</sup>. Mobile bag method - residues after 16 hours incubation in the rumen were lyophilized before weighed out (about 0.3-0.5 g) into small bags (3×5 cm) made from Uhelon with 47 µm pore size. Bags were incubated for 1 hour at 37 °C in pepsin/0.1 M HCl-solution. Thereafter bags were inserted into the duodenum. After recovery from the feces, the bags were washed in running tap water, dried and analyzed for nitrogen.

**Findings:** The result of higher content of globulins could be lower content of sulfur amino acid. We determined of higher content of arginine (untreated: 8.81 g/16 g N and extruded: 9.09 g/16 g N) and lower content of methionine (untreated: 0.87 g/16 g N and extruded: 0.89 g/16 g N). The content of crude protein in peas varied from 220 g.kg<sup>-1</sup> DM to 275 g.kg<sup>-1</sup>DM. We found lower content of fiber in extruded peas (extruded: 50.7 g.kg<sup>-1</sup> DM, untreated: 68 g.kg<sup>-1</sup> DM). The starch content (from 272 g.kg<sup>-1</sup> DM to 529 g.kg<sup>-1</sup> DM) correlated negatively with content of crude protein. The effective degradability of crude protein was in 88% untreated peas, while in extruded peas it was lower by approximately 20%. The degradability of starch in extruded peas was 51-65%, in untreated (76%). After extruding 35-50% crude protein passes from the rumen to the small intestine and the digestibility of 91-98% is high.

**Conclusion & Significance:** Heat treatment of peas-extrusion reduced effective degradability of nutrients and increased nutritional value of feed. Hydrothermal treatment of pea allows the highest possible utilization of the nutritional potential of peas.

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**Biography**

Maria Chrenkova is a Scientist with 36 years of experience in ruminant nutrition and feeds evaluation. Her research works are focused on feed quality, parameters of ruminal degradability, intestinal digestibility and biological value of proteins using model animals (rats and rabbits). She also studies the use of genetically modified and non-traditional feeds in animal nutrition and their effects on animal health and quality of animal products. She is involved in several national and international projects related to feed quality, animal nutrition, metabolism and production.

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