# Starch Content and in Vitro Digestibility of Barley and Wheat Samples Differing in Fibre Content

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## Summary

Starch content and in vitro starch digestibility were measured in three barley and three wheat samples differing in fibre content. Starch content was positively and fibre content was negatively related to DE content; however, in vitro starch digestibility indicated that starch was rapidly-degradable for all samples.

#### Introduction

The DE content of Western Canadian barley and wheat has a large range. The variation in DE content of barley and wheat is caused by changes in digestibility of energy. Starch is the main source of energy in cereal grains, and starch content differs among samples of barley and wheat, although it is the changes in fibre content that are mostly associated with the changes in energy digestibility. Apart from energy digestibility measured as a percentage at certain points of the gastro-intestinal tract (ileum or total-tract), rates of starch digestibility might also be important to achieve consistent protein deposition rates. Kinetics of starch digestion or degradation might be related to fibre content of cereal samples. The hypothesis was tested using three barley and wheat samples differing in fibre content.

### **Experimental Procedures**

Three barley samples and three wheat samples differing in fibre content were tested for chemical characteristics, DE content, and also in vitro starch digestibility using the analysis developed by Schothorst Feed Research.

## **Results and Discussion**

In vitro starch digestibility as a percentage did not differ among the three barley or the three wheat samples (Figure 1). The results suggest that starch in each of the samples was rapidly-digestible or rapidlydegradable. The DE content of the barley and wheat samples was measured in a total-tract energy digestibility experiment with grower pigs using 96-% cereal diets.

Starch, acid-detergent fibre (ADF), neutral-detergent fibre (NDF), and DE content differed among the cereal samples (Table 2), but crude protein (CP) content did not. These results suggest that the measured DE content was positively related to starch content and negatively related to fibre content.

#### Conclusion

Although fibre and DE content differed among the barley and wheat samples, in vitro starch digestibility did not, suggesting that starch for regular barley and wheat samples differing in fibre content is all rapidly degradable. For these cereal samples, rate of starch digestion does therefore not have to be considered for practical diet formulations. This project does not exclude the possibility that rate of starch digestion is different among samples of cereal grains that, for example, differ in

Figure 1. In vitro degradation curves of barley and wheat samples



#### Table 1. Chemical characteristics of barley and wheat samples

Sample	Starch (%)	NDF (%)	ADF (%)	CP (%)	DE (Kcal/kg DM)
Barley					
1	48.6	22.1	5.7	13.6	3,180
2	45.5	22.0	8.1	12.8	2,997
3	40.8	32.0	11.4	12.8	2,567
Wheat					
1	54.1	20.1	3.2	19.4	3,694
2	46.1	29.3	4.1	18.8	3,412
3	43.6	35.7	6.0	19.7	3,368

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