

Effect of Tannin Level and Cutting Stage on Rumen Degradation Kinetics, Intestinal Digestibility, Metabolic Characteristics and Feed Milk Value of Whole Crop Faba Bean Silage for Dairy Cattle

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In Canada the production of faba bean has increased, therefore whole crop faba bean can become an additional option to produce high quality silage. However, its use as a forage source is very limited and there is little information about it. The present study was conducted to determine the effect of the variety (tannin level) and stage of cutting on whole crop faba bean silage in terms of rumen degradation kinetics, intestinal digestibility, metabolic characteristics and feed milk value. Statistical analyses were performed using PROC MIXED procedure of SAS 9.4 with significance declared at $P < 0.05$. The results of the *in situ* study showed that high tannin whole crop faba bean silage had higher ($P < 0.05$) rumen undegraded crude protein (RUP, 33 vs. 25 g/kg DM) than the low tannin whole crop faba bean silage. The RUP and the bypass starch (BSt) were higher ($P < 0.05$) at late pod stage than that at mid pod stage (34 vs. 23 and 32 vs. 18 g/kg DM respectively). The *in vitro* study showed that intestinal digested dry matter (IDBDM), the intestinal digested crude protein (IADP), the intestinal digested rumen bypass starch (IDBST), and the total digested starch (TDST) were higher ($P < 0.05$) at late pod stage than that at mid pod stage (216 vs. 182; 19 vs. 14; 32 vs. 17 and 175 vs. 95 g/kg DM respectively). There was a tendency for the whole crop faba bean silage at late pod stage to have greater ($P = 0.06$) metabolizable protein (MP^{NRC} , 73 vs. 67 g/kg DM), however the degraded protein balance (DPB^{NRC}) was lower ($P < 0.05$) and the feed milk value (FMV^{NRC}) was higher than at mid pod stage (97 vs. 109 g/kg DM and 1.37 vs. 1.20 kg of milk/kg DM silage respectively). Whole crop faba bean silage at late pod stage showed a superior feed quality and predicted milk performance. It can be used as a potentially high value ingredient for dairy cows. Animal trials are needed to support this study.