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**Digestibility of FiberEzy® and Timothy Haylage and Behavioural
Observations and Voluntary Feed Intake of FiberEzy® and Rye
Clover hay in Thoroughbred horses**

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ABSTRACT

This thesis describes a field study, a laboratory study and two animal studies evaluating the production of timothy grass grown under New Zealand conditions, the composition of a commercially prepared ensiled lucerne and timothy mix (FiberEzy®: a 50:50 timothy lucerne mix) and ensiled timothy grass;, the stability of FiberEzy® during 12 months of storage; and also the digestibility and voluntary feed intake of FiberEzy®, ensiled timothy grass and Rye-clover hay when fed to Thoroughbred horses.

For the field study, grass samples were collected from a representative section (6m x 16m) of a field in Reporoa, (Waikato, New Zealand) sown with timothy grass (*Phleum pratense L.*) on the 10th of March 2010 at Longitude 176°34'E, Latitude 38°39'S. The samples were collected at regular intervals to investigate changes in the dry matter (DM), acid detergent fibre (ADF), neutral detergent fibre (NDF) and lignin content of the crop over the growing season. There was an increase (17.7to 35.89%) in the dry matter content and lignin content (3.0to 6.3%) of timothy grass over time as the grass matured.

Once harvested and ensiled, a sample of timothy grass and FiberEzy® were analysed for total DM, percentages of: crude protein; crude fat; crude fibre; ash; gross energy; hot water soluble carbohydrates; pectin, (NDF), (ADF), lignin, and vitamin E content. Lab analysis showed that FiberEzy® had higher levels of crude protein, pectin, lignin, ash and vitamin E ($p < 0.05$), and lower levels of crude fibre and NDF ($P < 0.05$) than the timothy grass.

A shelf life stability study of FiberEzy® (was carried out by sub-sampling a stored bag of the product every 3 months and analysing for total DM, percentage crude protein, percentage hot water soluble carbohydrates and vitamin E (mg/kg) for a total of 12 months. During the storage trial, analysis of FiberEzy® showed an increase in the content of vitamin E (37.6to 124.9mg/kg) over time.

A digestibility study was conducted to compare FiberEzy® and New Zealand grown and ensiled timothy haylage on Thoroughbred horses. FiberEzy® and timothy haylage was offered on a DM basis at 2.5% of the body weight to four Thoroughbred horses (10 ± 1 yr; 562.5± 30.7 kg initial BW). The horses were stalled individually in loose boxes (4 x 4

m) lined with rubber matting. Horses were randomly paired and assigned to be fed FiberEzy® or timothy haylage for two 18 day periods, in a 2 x 2 Latin square experimental design. Each 18 day period comprised of a 14 day dietary adaptation period where the horses were habituated to the pens and diet, and a 4 day (96 h) total faecal collection. The apparent digestibility of DM and GE were measured on days 15-18; at 12 hourly intervals faecal material from each horse was collected, weighed, and a subsample was taken and frozen at -20°C. One kg samples of the feed were collected and frozen at -20°C on day 15. The energy content of the FiberEzy® and timothy haylage varied between the first and second part of the study, with the DE of timothy haylage varying from 6.9 MJ/kg DM to 9.4 MJ/kg DM. Total energy intake of FiberEzy® and timothy haylage varied between horses, and between groups, with horses fed timothy haylage after FiberEzy® reducing their total energy intake. The apparent digestibility of FiberEzy® tended to be greater than that of timothy haylage. The apparent DM, crude protein and energy digestibility of the feed was similar to values reported in other studies using young horses.

A voluntary feed intake (VFI) trial was conducted using six thoroughbred geldings, (10 ± 1 yr; 550.6 ± 15.8 kg) were offered FiberEzy® or Rye-clover hay at >3% of the body weight. The horses were again stalled individually in loose boxes (4 x 4 m) lined with rubber matting. Voluntary feed intake was measured over 17 days. Day 1 to 8 was the adaptation phase and from day 9-17 of the study the horses were scan sampled and videoed for two hours every morning (9:30-11:30 am) after feeding and two hours in the evening (4:30-6:30 pm) after feeding. There were significant differences in VFI between time periods (24.3 ± 0.9 vs 17.8 ± 0.4 kg DM /day, $p < 0.05$) and between feeds (FiberEzy®: 24.3 ± 0.4 vs. Rye-clover hay: 17.8 ± 0.7 kg DM /day) but not an interaction. Behaviours were typical of loose box housed horses and differences in feeding behaviour observed correlated with the differences in VFI measured between feeds.

The results of this thesis suggest that FiberEzy® is a suitable alternative to concentrate-based supplementary feed

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LIST OF ABBREVIATIONS

BCS	Body condition score
BW	Body weight
CP	Crude protein
DE	Digestible energy
DM	Dry matter
GE	Gross energy
NRC	National Research Council
VFI	Voluntary feed intake
FE	FiberEzy®
T	Timothy grass haylage