

**HUNGARIAN UNIVERSITY OF AGRICULTURE AND LIFE
SCIENCES
KAPOSVÁR CAMPUS
INSTITUTE OF PHYSIOLOGY AND ANIMAL NUTRITION**

**Ruminal degradability characteristics of different forage mixtures in dairy
cows**

MASTER'S THESIS (MSC)

Collins Moti

Animal Nutrition and Feed Safety MSc

SUPERVISOR

Dr. Róbert Tóthi PhD

associate professor, Department of Farm Animal Nutrition

HEAD OF DEPARTMENT

Dr. Veronika Halas PhD

associate professor, Department of Farm Animal Nutrition

Kaposvár

2024

SUMMARY OF THESIS

The study discussed in this thesis paper was conducted to evaluate the *in sacco* ruminal degradability of two different mixtures of winter-cereals-based silages. Forages are a critical part of any livestock production operations and hence getting the right mixture of forages for effective production while at the same time reducing the overreliance on traditional forages like alfalfa and corn silages is fundamental. Different forage crops have different qualities including digestibility and degradation in the rumen due to differences in individual variability. Understanding the ruminal degradation of the forages and their mixtures goes hand in hand with understanding the nutritive value of the feeds to the animals and their effect on the productivity of the animals.

The trial was conducted on a medium-scale farm (Hungarian University of Agriculture and Life Sciences, Kaposvar Campus, Hungary – 46°22' N 17°48' E, 153 m altitude (GeoDatos, 2020)). The different forage mixtures that were studied are Missouri (30% of two cultivars of winter oat + 40% of two cultivars of winter triticale + 10% of winter barley + 20% of winter wheat), Montana (45% of two cultivars of oats + 55% of Italian ryegrass, as well as the forage mixtures (commercial products, Agroteam S.p.a., Torrioni (RM), Via di Granaretto, 26, 00054 Italy), were studied. The forage mixtures were then harvested and prepared for ensiling after which they were subjected to ruminal degradability tests carried out on 3 multiparous Holstein Friesian cows fitted with ruminal cannulas. The ruminal digestibility tests carried were to evaluate the DM, CP, NDF and ADF digestibility.

Ruminal nutrient disappearance data were used to determine nutrient degradation parameters using the equation (Ørskov and McDonald, 1979) and a comparison of means for effective nutrient degradability was computed for 1%, 5% and 8% rumen outflow rates. The effective DM degradability at 8% rumen solid outflow rate (ED_1), which defines the high-yielding cows fed at more than twice maintenance was 67.9% and 71.4%, respectively, the ED of CP at 8% was 80.6% for Missouri while Montana showed 79.7% at a significance level of ($p < .05$) and the effective ruminal degradability at ED_1 , ED_5 , and ED_8 for the Missouri mixture were 39.0%, 0.03%, 36.2%, 21.9%, and 17.7% while that for the Montana mixture was 33.3%, 0.03, 32%, 20.1%, and 17%.

These results suggest that the mixtures had improved degradation in the rumen and could be applied as a source of feed to replace partially or supplement traditional forages in high producing dairy cows. The results suggest that it is possible to feed Italian ryegrass and winter forages to lactating dairy cows because of the mixtures' enhanced capacity for degradability. Fibre degradability in the rumen can be assisted by the use of ensiling additives,

or possibly using exogenous fibre-degrading enzymes, even in the event of harvesting in a later phenological phase. To confirm this, it is recommended to carry out additional feeding experiments.

