

Dual studies of dietary supplementation of phytoncide essential oil on rumen fermentation and product performance in dairy cows.

Tae-Bin Kim¹, Jae-Sung Lee¹, Won-Seob Kim^{1,2}, Dong-Qiao Peng^{1,2}, Jay Ronel V Conejos^{1,2}, Jang-Hoon Jo^{1,2}, Jung-Keun Suh^{1,2}, Won-Tae Choi^{1,2}, and Hong-Gu Lee^{1,2}

¹Department of Animal Science and Technology, Konkuk University, Seoul, Republic of Korea

²Team of An Educational Program for Specialists in Global Animal Science, Brain Korea 21 Plus Project, Konkuk University, Seoul, Republic of Korea

Introduction

In the last few years, a number of studies have been devoted to investigating the potential use of plants and plant extracts as alternatives to in-feed antibiotics in ruminant nutrition and improving ruminal condition. Among these extracts, mixture of phytoncide essential oil and linoleic acid have been shown to alter metabolism of rumen bacteria and improve conjugated linoleic acid (CLA) synthesis in rumen of dairy cows.

Aim

The effect of phytoncide essential oil(PO) and soybean oil(SO) on dairy performance is not clear yet. Therefore, we investigated the effect of PO and SO mixture on rumen environment and performance in dairy cows.

Methods

For *in vitro* rumen fermentation, rumen juice collected from a dairy cow was co-cultured with vehicle or a mixture of PO and SO, then parameters of pH, Ammonia-N, volatile fatty acids (VFA), total gas production, CH₄ gas, long-chain fatty acids were measured according to the protocols (McDougall). For *in vivo* trial, 69 dairy cows were supplied diets with total mixed ration (TMR), roughage and PO and SO based on NRC (2001).

Results

We observed the beneficial effects of PO and SO mixture on the rumen fermentation by reducing the ratio of acetate and propionate ($P<0.053$) and the level of methane gas ($P<0.001$) and elevating the CLA concentration (24 and 48 h; $P<0.001$). In addition, supplementation of the mixture in TMR of dairy cows significantly increased milk yield ($P<0.01$) and decreased the emission of methane gas compared to control. Moreover percentages of milk CLA in treatment group were increased compared to those in control group

Conclusion

we suggest that dietary supplementation of PO and SO has a functional fatty acid (CLA) promotion and methane gas reduction by improving rumen fermentation in dairy cows.