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The effects of high and low energy level TMR feed and association of PLAG1, FASN1, FASN2, CYP7B and SCD on growth characteristics, carcass traits, and fatty acid composition of Korean native beef cattle

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As beef consumption increases, the interests of the efficient feeding and management of cattle are also increasing. Therefore, we conducted the experiment to find out the effects of the PLAG1, FASN1, FASN2, SCD, and CYP7B genotypes fed with high/low energy total mixed ration(TMR) on growth characteristics, meat quality, carcass trait and fatty acid composition to provide efficient feeding and management based on the genotype of cattle and energy level of feed. The experiment was carried out by using TMR feed. The feeds were divided as high/low energy group according to the contents of crude protein (CP) and totally digestible nutrients (TDN) (High energy (HE)_18% CP, 70% TDN on growing stage, 15% CP, 73% TDN for early fattening, and 13% CP, 76% TDN for late fattening. Low energy(LE)_16% CP, 70%TDN on growing stage, 13% CP, 71% TDN for early fattening, and 12% CP, 74% TDN for late fattening) for 42 Korean Native steers. Steers were slaughtered at 30 months of age and then evaluated. As a result, in growth characteristics, FASN2 carrying heterozygote fed with HE showed significantly higher final body weight than fed with LE($P<0.01$). Moreover, FASN2 carrying allele2 fed with LE showed significantly higher final body weight than fed with HE ($P<0.01$). As for the carcass traits, PLAG1 carrying allele1 fed with HE showed significantly lower back fat thickness($P<0.05$) and PLAG1 carrying heterozygote showed a tendency to increase carcass weight and dressed weight ($P=0.053$, $P=0.067$). In maturity, steers fed LE diet and with FASN1 and FASN2 carrying allele2 and allele1, respectively, showed significantly high maturity than the others($P<0.001$). In the meat qualities, FASN2 carrying allele1 appeared to have significantly lower pH ($p<0.05$) and shear force ($P<0.05$). Lastly, Fatty acid composition of 5 genotypes and two diets had no significant association.

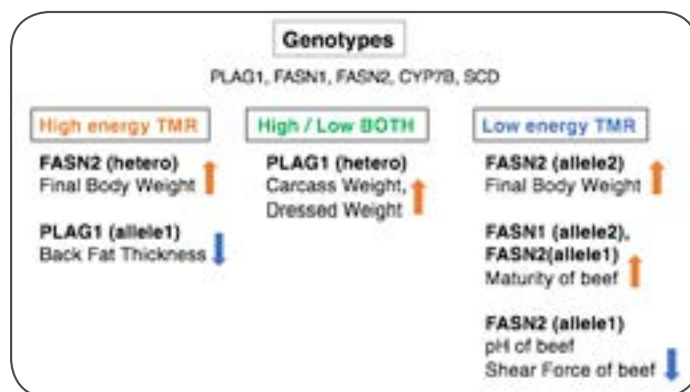


Figure 1: Effects of genotypes(PLAG1, FASN1, FASN2, CYP7B, SCD) and energy level of TMR.

Recent Publications:

1. Choi S H et al. (2016) The expression of adipogenic genes in adipose tissues of feedlots fed supplementary palm oil or soybean oil. Asian Austr. J. Anim. Sci. 29(3):404-412.
2. Seong Ho Choi et al. (2014) Conjugated linoleic acid (t-10, c-12) reduces fatty acid synthesis *de novo*, but not expression of genes for lipid metabolism in bovine adipose tissue *ex vivo*. Lipids. 49(1):15-24.
3. Seong Ho Choi et al. (2014) Abomasal infusion of arginine stimulates SCD and C/EBP β gene expression, and decreases CPT1 β gene expression in bovine adipose tissue independent of conjugated linoleic acid. Amino Acids. 46(2):353-366.

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4. S H Choi et al. (2013) Co-culture of bovine muscle satellite cells with preadipocytes increases PPAR γ and C/EBP β gene expression in differentiated myoblasts and increase GPR43 gene expression in adipocytes. *J. Nutr. Biochem.* 24(3):539-543.
5. S H Choi et al. (2013) Fatty acid biosynthesis and lipogenic enzyme activities in subcutaneous adipose tissue of feedlot steers fed supplementary palm oil or soybean oil. *J. Anim. Sci.* 91(5):2091-2098.

Biography

Ye Hyun Lee earned her Bachelor's Degree in Animal Science and is currently pursuing Master's Course of Ruminant Nutrition Physiology Laboratory at Chungbuk National University, Republic of South Korea respectively. She completed internship program at Subtropical Livestock Research Institute of National Institute of Animal Science, Republic of South Korea (July 2015) and in the Department of Meat Science Texas A&M, College Station, Texas (January 2016). She has great interests in lipid metabolism of living organisms like cattle, rats, even including human. Her studies are about the effects of fatty acid in meat or other foods.

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