

EFFECT OF SOME FACTORS ON THE CONCENTRATION OF LINOLENIC ACID OF FORAGES.

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TÓM TẮT:

Forage plants present a significant source of fatty acids (FA) in ruminant diets. The fatty acid composition of forage lipids is dominated by α -linolenic acid (C18:3). The objective of this study was to determine the effects of species, cultivar, growth stage, fertilization, and conservation method on the C18:3 concentrations of forages. In experiment 1, FA concentrations were measured in spring growth and summer regrowth of four species (orchardgrass, timothy, alfalfa, and red clover). The C18:3 concentrations were higher in summer regrowth than spring growth in orchardgrass, timothy and red clover, but they were similar in alfalfa during the two harvest periods. In experiment 2, twelve forage species, with two to four cultivars by species, were harvested at 10% bloom for legumes and early heading for grasses to determine variabilities of C18:3 concentrations between species and between cultivars within species. Among all species and cultivars, C18:3 concentrations ranged from 20.6 mg g⁻¹ DM in annual ryegrass cultivar Maris Ledger to 6.0 mg g⁻¹ DM in alfalfa cultivar 5262. In the experiment 3, the effects of growth stage (stem elongation, early heading, late heading, and early flowering) as well as nitrogen (0 and 120 kg N ha⁻¹) and phosphorus (0 and 45 kg ha⁻¹) fertilization on timothy C18:3 concentration were determined. The C18:3 concentrations decreased with maturity from 10.1 at stem elongation to 6.9 mg g⁻¹ DM at early flowering. Nitrogen fertilization increased timothy C18:3 concentrations at all maturity stages, Phosphorus fertilization had no significant effect ($P > 0.05$). In the experiment 4, the effects of conservation method on timothy FA profile were evaluated. The C18:3 concentration in fresh grass was higher than wilted grass ($P < 0.01$) and grass hay ($P < 0.01$), but it was lower compared with silage ($P < 0.01$). Haylage contained more of C18:3 than wilted grass ($P < 0.01$) and grass hay ($P < 0.01$). Silage had higher concentration of C18:3 compared with grass hay ($P < 0.01$) and haylage ($P < 0.01$). The addition of *Lactobacillus plantarum* inoculant and formic acid in both haylage and silage declined C18:3 concentrations as compared to control treatments. These results suggest that forage C18:3 concentrations varied among species and cultivars, is higher in summer regrowth than in spring growth, decreased with maturity, drying, wilting and both silage and haylage additives, and increased with nitrogen fertilization.