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## Effects of soybean oil and corn oil alone or in combination with Rumensin®, on methane and VFA production, in vitro

### Abstract

Soybean oil or corn oil when fed at 0, 2, 4, or 6% of the ration did not significantly reduce methane production or alter the ratios of volatile fatty acids. Soybean oil was superior to corn oil in reducing methane, and soybean oil, produced a more desirable acetate:propionate ratio. Rumensin was compared at levels simulating 0, 15, and 30 grams per ton of complete ration. Rumensin at either concentration significantly reduced methane and significantly improved the acetate:propionate ratio.

### Keywords

Cattlemen's Day, 1978; Report of progress (Kansas State University. Agricultural Experiment Station); 320; Beef; Soybean oil; Corn oil; Rumensin; Methane; VFA production

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Effects of Soybean Oil and Corn Oil Alone or in  
Combination With RUMENSIN<sup>®</sup>, on Methane and  
VFA Production, In Vitro

Jack G. Riley and Steven L. Newby

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Summary

Soybean oil or corn oil when fed at 0, 2, 4, or 6% of the ration did not significantly reduce methane production or alter the ratios of volatile fatty acids. Soybean oil was superior to corn oil in reducing methane, and soybean oil produced a more desirable acetate:propionate ratio. Rumensin was compared at levels simulating 0, 15, and 30 grams per ton of complete ration. Rumensin at either concentration significantly reduced methane and significantly improved the acetate:propionate ratio.

Introduction

Rumensin has consistently increased propionic acid and reduced acetic acid production in the rumen, which creates a more favorable acetate:propionate ratio and enables ruminants to derive more energy from a ration. A recent study indicated that Rumensin reduces methane production, which should also improve feed efficiency. Research in England with unsaturated fats (including several vegetable oil sources) indicated that methane production was reduced and volatile-fatty-acid ratios were altered with fat added up to 8 percent of a ration.

This project was to determine if Rumensin would reduce methane production and if combinations of Rumensin and either soybean oil or corn oil would give a beneficial response.

Experimental Procedure

Gas production and volatile fatty acids were measured on in vitro incubations of strained bovine rumen fluid. Twenty-four fermentation bottles were allotted to treatments according to a recognized design to compare two oil sources (soybean and corn oil), 4 oil levels (0, 2, 4, and 6% of the ration) and three Rumensin levels (0, 15, and 30 grams/ton). Results of eleven fermentation studies are summarized.

Results

By significantly reducing methane production and creating a more favorable acetic:propionic ratio, soybean oil was more desirable than corn oil. Rumensin additions significantly reduced methane production, increased propionic acid, reduced acetic acid and, therefore, gave a more desirable acetate:propionate ratio. No advantage was found in combining either soybean or corn oil with Rumensin. Table 22.1 shows some of the results.

Table 22.1. Effects of oil source and Rumensin on methane and production.

|                        | Oil source         |                    | Rumensin, gm/ton   |                    |                    |
|------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                        | Soybean            | Corn               | 0                  | 15                 | 30                 |
| Methane, ml.           | 117.4 <sup>a</sup> | 120.9 <sup>b</sup> | 125.3 <sup>A</sup> | 115.9 <sup>B</sup> | 116.1 <sup>B</sup> |
| Acetic, molar %        | 52.2 <sup>a</sup>  | 53.8 <sup>b</sup>  | 54.2 <sup>a</sup>  | 53.3 <sup>a</sup>  | 51.5 <sup>b</sup>  |
| Propionic, molar %     | 25.1 <sup>a</sup>  | 24.3 <sup>b</sup>  | 22.2 <sup>a</sup>  | 24.6 <sup>b</sup>  | 27.3 <sup>c</sup>  |
| Acetic/propionic ratio | 2.2 <sup>a</sup>   | 2.3 <sup>b</sup>   | 2.5 <sup>a</sup>   | 2.3 <sup>b</sup>   | 2.0 <sup>c</sup>   |

a,b,c Means on same line without a common superscript differ significantly (P<.05).

A,B Means on same line without a common superscript differ significantly (P<.0001).