

# Anaerobic Rumen Fungi: Probiotic for Dairy Cows?

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## INTRODUCTION

Among the volatile fatty acids (VFA) produced by ruminal microflora, propionic is the one that directly impact on total milk production. Once absorbed by ruminal papilla, propionic is transformed into glucose in the liver, and then into lactose in the mammary gland. Changes in the cows' diet and subsequently changes in the ruminal microflora affect VFA production. Ruminal microflora consists of bacterial, protozoa, methanogenic archaea and anaerobic fungi. These anaerobic fungi penetrate the cellulose material and therefore collaborate with bacterial dry matter degradation. **We are interested in studying anaerobic fungi as probiotics for dairy cows.**

## GOAL

To study cellulose fermentation in an enriched ruminal anaerobic fungi culture.

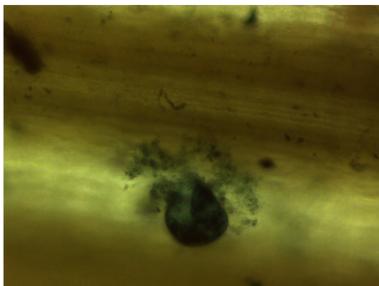


Figure 1. Neocallimastix fungi staining with lactophenol blue solution.

## MATERIALS AND METHODS

Whole rumen content from eight different cows was kindly provided by INTA (National Institute of Agriculture Technology). Ruminal fluids were cultured in anaerobic condition with 0.2 mg/ml Streptomycin and 1.25 mg/ml Penicillin (enriched ruminal anaerobic fungi); and without antibiotic (control group) in the present of Panicum Virgatum senescence leaf (Experiment 1) or green leaf (Experiment 2) as substrate. In both experiments, dry matter disappearances and volatile fatty acid concentrations (by HPLC) were determined at 48 and 160 hours.

## RESULTS

Any significant difference between the enriched fungi culture and control was observed when senescence leaves were used as substrate (experiment 1). On the contrary, when green leaves (experiment 2) were cultured, dry matter disappearances decreased at 48 h in the enriched fungi group. However, at 160 h the difference between control and treated groups was not significant. This last result could be explained by the growth of fungi. Interesting, regarding VFA, propionic acid concentration were higher ( $p < 0.05$ ) in the enriched ruminal fungi group, both at 48 h and at 160 h (Figure 2).

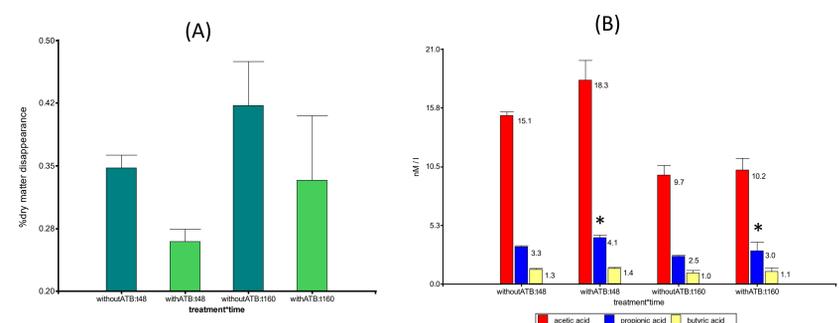


Figure 2. Dry matter disappearances (A) and volatile fatty acid (VFA) concentrations (B) at 48 and 160 h when Panicum Virgatum green leaf was used as substrate.

## CONCLUSION

Our results showed that anaerobic fungi enriched culture favored propionic production when green leaves are used as substrate. These results encourage us to continue our studies to determine whether anaerobic ruminal fungi may function as probiotic in dairy cows.

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