



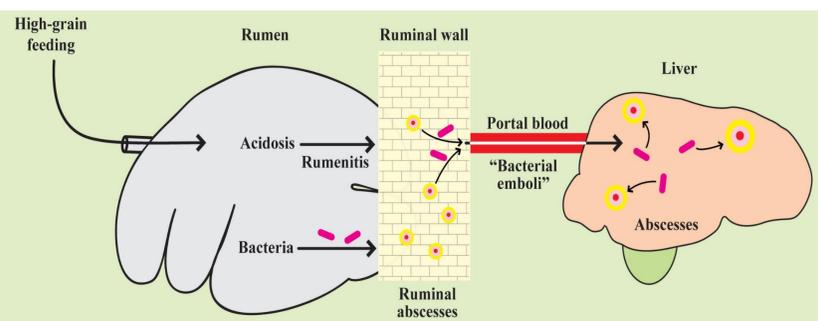
# Fusobacterium varium and its Potential Implication in the Formation of Liver Abscesses in Feedlot Cattle

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## Introduction

- Liver abscesses are the most common cause of liver condemnation at slaughter and continue to cause significant economic impact to the feedlot industry
- Fusobacterium necrophorum* is a normal rumen inhabitant, and has been identified as the primary causative agent of liver abscesses in feedlot cattle
- Another *Fusobacterium* species, *varium*, shares many similarities with *F. necrophorum*, and is also a normal rumen inhabitant
- Fusobacterium varium* has been isolated from necrotic abscesses and linked to Ulcerative Colitis in humans
- To date, no studies have investigated *F. varium* presence and/or implication in bovine liver abscesses



Liver Abscess Pathogenesis

## Objective

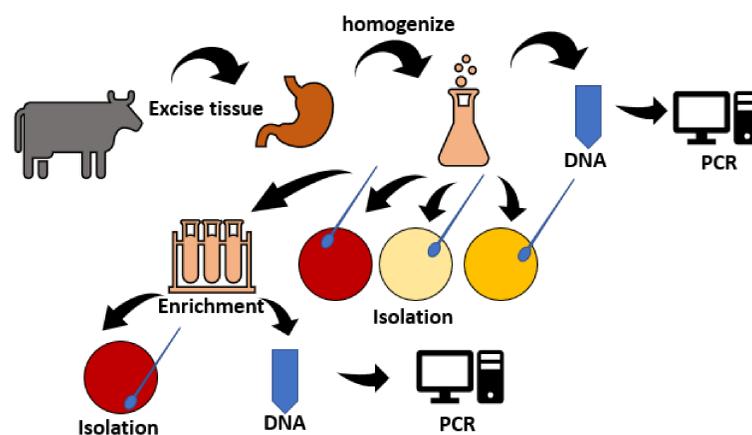
To isolate and determine prevalence of *F. varium* in liver abscesses, ruminal epithelial tissue, and colonic epithelial tissue from feedlot cattle. Additionally, to quantify *F. varium* in ruminal epithelial tissue, ruminal contents, colonic epithelial tissue, colonic contents, and liver abscesses



Abscessed Liver

## Methodology

- Matched ruminal epithelial tissue (n=144), colonic epithelial tissue (n=98), and liver abscess tissue (n=144) were collected at slaughter, homogenized into PBS, then plated both pre- and post- enrichment for isolation of *F. varium*. Additionally, pre- and post-enrichment homogenate was subjected to qPCR for *F. varium* detection/quantification
- Ruminal contents and colonic contents (n=98) were subjected to qPCR pre- and post-enrichment for *F. varium* detection/quantification



## Results

### *F. varium* Pure Culture Isolation

Tissue Type	Number of Samples	Number of Direct Isolates (%)	Number of Enriched Isolates (%)	Total <i>F. varium</i> prevalence (%)
Ruminal Epithelium	144	37 (25.7)	54/107 (37.5)	91 (63.2)
Colonic Epithelium	98	3 (3.1)	27 (27.6)	30 (30.6)
<b>Liver Abscess</b>	<b>144</b>	<b>0 (0)</b>	<b>25 (17.4)</b>	<b>25 (17.4)</b>

- For the first time, we report successful isolation of *F. varium* from bovine liver abscess origin, with a prevalence of 17.4% via culture-based methods
- Fusobacterium varium* was recovered in high frequency from ruminal epithelial tissue (63.2% of samples) and moderate frequency from colonic epithelial tissues (30.6% of samples)

### *F. varium* PCR Prevalence

Sample Type	Number of Direct PCR Positives (%)	Number of Positives after PY-La JVN Enrichment (%)	Number of Positives after PY-Ly JVN Enrichment (%)	Total PCR Positives (%)
Ruminal Epithelium	5/144 (3.5)	81/139 (58.3)	83/139 (59.7)	88 (61.1)
Ruminal Contents	21/98 (21.4)	51/77 (66.2)	62/77 (80.5)	83 (84.7)
Colonic Epithelium	1/98 (1)	41/97 (42.3)	41/97 (42.3)	42 (42.9)
Colonic Contents	2/98 (2)	59/96 (61.5)	66/96 (68.8)	68 (69.4)
<b>Liver Abscesses</b>	<b>1/144 (0.7)</b>	<b>15/143 (10.5)</b>	<b>18/143 (12.6)</b>	<b>19 (13.2)</b>

- Fusobacterium varium* was detected in 13% of liver abscesses subjected to PCR
- This lower frequency compared to culture methods is likely due to concentration below the detection limit of the PCR assay
- Fusobacterium varium* was also detected in a majority of ruminal and colonic samples

## Conclusions and Next Steps

- Fusobacterium varium* can be isolated from bovine liver abscesses, and is also frequently found in epithelial tissue/contents in the GI tract
- More research is needed to investigate the potential role of *F. varium* in liver abscess pathogenesis
  - WGS is being done on recovered isolates to identify virulence genes similar to those in *F. necrophorum*

## Acknowledgements

The authors would like to acknowledge the following for their contributions to the work presented: International Consortium for Antimicrobial Stewardship in Agriculture/Foundation for Food & Agriculture Research for their financial support; Kendra Hamman, Leigh Ann George, and Hattie Walker for their technical support

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