Introduction
Stoichiometry of rumen and hindgut fermentation differs as, in contrast to rumen fermentation hindgut fermentation uses part of the metabolic hydrogen in CO₂ reduction to acetate (De Graeve et al, 1990). To investigate factors that determine the balance between methanogenesis and reductive acetogenesis in the rumen and hindgut, incubations were performed with a specific methane inhibitor; 2-bromoethanesulfonic acid (BES) (Sparling and Daniels, 1987) and with the addition of ¹³C0₂.

Materials and Methods
Hindgut and rumen contents of cattle (10 g + 40 ml buffer solution) were incubated (24 h) under CO₂ with addition of BES (20 mM). Other in vitro incubations were performed with pig hindgut washed cell suspensions (WCS) (5 ml) with 50 mM NaH ¹³C0₃ added under an atmosphere of CO₂ (20%) and H₂ (80%) (De Graeve et al, 1990). BES was added (20 mM) and ¹³C-incorporation was determined with a Bruker AM 300 NMR-spectrometer.

Results and Discussion
Addition of BES to rumen incubations shifted the fermentation from acetate (786 and 551 µmol produced/incubation flask -BES and +BES respectively) to the more reduced end products, propionate (201-247 µmol) and butyrate (356-420 µmol), with a reduction of total VFA production, a total inhibition of methane and an accumulation of H₂. In the hindgut, however, an opposite effect was observed. Total inhibition of methanogenesis was accompanied by a stimulation of total VFA production, mainly due to an increase in acetate (569-670 µmol) while H₂ did not accumulate. This suggests that the addition of BES in the hindgut stimulated reductive acetogenesis, confirmed by ¹³C0₂-incubations with pig hindgut WCS. BES inhibited methanogenesis totally while acetate production (µmol/flask) and ¹³C0₂-incorporation into acetate (µmol ¹³C) were stimulated by BES from 211 and 42 µmol to 326 and 219 µmol respectively. These data suggest a shift of metabolic hydrogen to acetate. However, as similar effects were observed with or without excess of H₂, it would seem that H₂ is not an extracellular precursor for reduction of CO₂ to acetate.

Conclusion
Reductive acetogenesis, which does not occur in the rumen, is an important hydrogen acceptor reaction in the hindgut which competes with methanogenesis for metabolic hydrogen.

References