methane emissions via feed intake was predicted to be more cost effective than direct measurement via methane emissions. It is suggested that pasture feed intake of cattle is preferable to residual feed intake, measured in a feedlot, as a selection criterion for grazing cattle. A pasture intake measurement system to assist such genetic selection is being developed.

T55. Australian native plant *Eremophila glabra* affects fermentability and reduces methane output from a sheep diet fermented in artificial rumen (Rusitec)
Z. Durmic, O. Kephalen and P. Vercoe*

Recent studies showed that Australian native plant *Eremophila glabra* produces significantly less methane than oat chaff or lucerne when incubated in vitro in batch culture with rumen fluid and addition of this plant may moderate methane output during fermentation of these substrates in the rumen. An experiment was conducted using Rumen Simulation Technique (Rusitec), to compare the fermentation patterns of a standard sheep ration (SR: 1 kg oat chaff: 0.25 g part lupins: 0.025 g minerals) with or without supplementation with *E. glabra*. The system was allowed to stabilize for 7 days on SR before introducing freeze-dried leaf material from *E. glabra* in three vessels, at a level of 25% of total substrate (EG; 15 g *E. glabra* and 45 g SR). The remaining three control vessels continued receiving daily 60 g of SR. This regime was maintained for 8 days, during which pH, VFA and NH₃ concentrations as well as volume and the composition (CH₄ and CO₂) of gas produced were measured daily. Overall, gas production and CO₂ concentrations were not affected by the addition of *E. glabra*, but CH₄ concentrations were significantly decreased on all sampling days. The CH₄ was reduced from 13.1% (day 0) to 1.7% immediately after the *E. glabra* addition (day 1) and continued to decrease daily until it reached 0% (day 7). Zero readings for methane in the EG treatment maintained until the end of the experiment (day 8). Inclusion of *E. glabra* was also accompanied with a significant increase in pH (from day 5 onwards), and decrease in VFA and NH₃ concentrations (from day 2 onwards). The results from this study are preliminary, but demonstrate that inclusion of *E. glabra* can reduce methane production when added to a sheep diet. The antimethanogenic effect persisted over eight days; however, it was also accompanied with inhibition of fermentative traits. Supplementation of *E. glabra* may be beneficial in reducing methane in ruminants consuming fibrous diets, but further studies are required to optimize the inclusion level that is less detrimental on rumen fermentation.

T56. Dietary linseed and starch supplementation decreases methane production of fattening bulls
M. Eugène*, C. Martin, M. M. Mialon, D. Krauss, G. Renand and M. Doreau

Greenhouse gases (GHG) impacts on climate changes are a major concern worldwide and enteric methane (CH₄) is the most important GHG emitted at the farm scale (50–60%) in ruminant production systems. Dietary concentrate and lipid supplantations reduce CH₄ emission, but their association is not known. This study aimed to determine CH₄ production from bulls fed a high-concentrate diet supplemented or not with extruded linseed. Fifty-six Charolais bulls were allocated to 2 treatments and fattened during 16 months (start at 8.5 months and 339 kg BW). Control diet (C) contained a concentrate rich in fiber (40% NDF, 2.8% EE) and linseed supplemented diet (LS) contained a concentrate rich in starch and with 6% DM of extruded linseed (33% starch, 4.7% EE). Concentrate and straw were available ad libitum. Feed intake was measured 5 d per week and animals were weighed bimonthly. Methane production was determined using the SF₆ gas tracer method for each bull at 3 periods (start, middle and end of fattening). Ruminal fluid sample was collected by
ruminocentesis to measure pH and VFA. Data were analyzed with Proc Mixed (SAS). Concentrate: straw ratio was 87:13 on DM basis for both diets and average daily gains (ADG) were 1.385 vs 1.465 g/d for bulls fed C and LS diet ($p = 0.09$), respectively. Bulls fed LS diet had lower DM intake ($p < 0.05$) and higher net energy (NE) intake ($p = 0.05$) than bulls fed C diet. Bulls fed LS diet had lower CH₄ production (g/d and g/NE intake) than bulls fed C diet (-19% and -24% for the first 2 periods, $p < 0.01$, respectively), but no differences were observed at the end of fattening. Bulls fed LS diet had higher CH₄ (g/kg DM intake) than bulls fed C diet (+22%, $p < 0.05$,) at the end of fattening, whereas no difference was observed before. Bulls fed LS diet had lower ruminal VFA and acetate concentration than bulls fed C diet (-13% and -23%, $p < 0.001$ respectively), but diet had no effect on pH. A moderate supplementation with extruded linseed lipids, combined with high-starch diet, decreased methanogenesis. This was mainly due to a lower DM intake, and was stable at the start and middle of fattening for CH₄ (g/d, and g/NE intake), however it declined at the end. Overall, bulls fed LS diet produced the lowest CH₄ output when expressed as g/kg ADG (-18%, $p < 0.001$).

T57. Effect of digestibility of grass-clover silage and concentrate to forage ratio on methane emission from dairy cows
A. L. Frydendahl Hellwing* and M. R. Weisbjerg

That methane emission from dairy cows is affected by concentrate to forage ratio is well known, whereas the effect of the quality of grass-clover silage is not well described. Besides this, the purpose of the present study also was to test our new facilities for measuring methane emission from dairy cows and the working routines. Twenty-four Holstein cows were allocated to eight different treatments and blocked according to parity. Treatments were in a $2 \times 4$ design, two concentrate to forage ratios and four different grass-clover silages. The grass-clover silages (A, B, C, D) were produced during the 2009 growth season. A was primary growth made in the beginning of May, B was second 1st regrowth made in middle of June, C was 3rd regrowth made in the beginning of August and D was 3rd regrowth made at the end of August. The energy concentrations were 6.6, 6.0, 6.5 and 6.1 MJ NEL kg⁻¹ DM for silage A, B, C and D, respectively. Total mixed ration forage DM consisted of 2/3 of one of the respective grass-clover silages and 1/3 maize silage, and concentrate (soya meal and wheat) proportion of DM was 20% (low) or 50% (high). Methane emissions from the cows were measured 20-22 h in one of four chambers working after the principles for indirect calorimetry. The air flow was measured continuously, and the concentrations of methane, oxygen and carbon dioxide were measured in ingoing and outgoing air from the chambers every 12.5 min. The cows were milked and feed twice daily, and yield and intake were registered. The experiment was analyzed as a $2 \times 4$ factorial design with parity as block effect. The methane emissions as total emission and per kg milk yield were significantly affected by concentrate proportion, but not by silage type. Cows on the high concentrate diets produced on average 617 L of methane and cows on the low concentrate diet 770 L of methane per 24 h. The experiment showed that the system worked and measured reliable values for methane emission in relation to diets and feed intake, although accuracy of relating methane emission to feed intake was hampered by the short 20-22 h chamber measuring periods.

T58. Poultry litter as a source of minerals for growing calves fed corn silage

Twenty four male Friesian calves averaging 175 kg body weight were used to study the effect of feeding rations containing different levels of poultry litter and corn silage on mineral balance and concentration of in hair,