

**Associative Effect of Fermenting a low methanogenic Plant *Biserrula pelecinus* with selected Forages *in vitro***

M. Joy<sup>a</sup>, Z. Durmic<sup>b</sup>, J. Vadhanabhuti<sup>c</sup> and P. Vercoe<sup>b</sup>

<sup>a</sup>CITA (Centro de Investigación y Tecnología Agroalimentaria de Aragón), Avda. Montañana, 930, 50059 Zaragoza, Spain; <sup>b</sup>UWA, 35 Stirling Hwy, M085 School of Animal Biology, 6009 Crawley, Australia; <sup>c</sup>UWA, 35 Stirling Hwy, M085 School Of Animal Biology, 6009 Crawley, Perth, Australia  
mjoy@aragon.es

Feeding management is one of the most developed strategies to reduce methane emission. In grazing situations, the production of methane depends on the plant species of forages. *Biserrula pelecinus* is a pasture legume recently discovered to have a very low methanogenic potential, however it had as some inhibitory effect on overall rumen microbial gas, without affecting volatile fatty acid (VFA) production and prompting propionate production *in vitro*. We hypothesize that it may be possible to dilute some of the negative effects of *B. pelecinus* by mixing it with other forages species in order to reduce methane without inhibiting fermentation.

The objective of this study is to evaluate combinations of *B. pelecinus* with either grass (*L. multiflorum*) or legumes (*Medicago sativa*, *Ornithopus sativus*) on the *in vitro* fermentation properties, including methane. The mixtures contained 0, 25, 50, 75 and 100% of *B. pelecinus* in combination with selected pasture species and were tested in an *in vitro* batch fermentation system. Each mixture were tested by triplicate using 100 mL serum vials, 500 mg substrate and 50 mL buffered ruminal fluid during 24h. All samples were analysed in one single run. After measuring gas pressure, 5mL of headspace gas was transferred to an exetainer tube for subsequent analysis of methane concentration by gas chromatography.

The inclusion of *B. pelecinus* at 50% and above with any of the other species tested resulted in a decrease of gas and methane production ( $P < 0.001$ ), but at 25% inclusion, reduction in gas was only 14.3%. There was no effect on total VFA at any of the level tested, but the mixtures containing *B. pelecinus* at level of 50% and above had greater production of propionate and lower acetate : propionate ratio than the mixtures that contained 25% of *B. pelecinus* or less. There was a clear dose-effect of *B. pelecinus* on the all parameters measured.

These results show that *B. pelecinus* retains its bioactivity in plant mixes, but when included at level of 50 % and above, it was accompanied with some small but significant effect on gas production. It would be necessary to look into narrower range of doses, *i.e.* between 25% and 50%, to find the optimal level of inclusion for methane mitigation. Acknowledgements: Margalida Joy had a "Salvador de Madariaga" support from the Spanish Government (PR2011-0265).