

Abstract

Effect of Feeding Different Cultivars of *Leucaena leucocephala* on Rumen-Based *in vitro* Anaerobic Fermentations [†]

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Abstract: The leguminous forage shrub, *Leucaena leucocephala*, is one of the few nutritional options available to significantly improve beef productivity in Northern Australia. A mixed bacterial rumen inoculum for the detoxification of mimosine (present in *Leucaena*) and its toxic derivatives 3,4 DHP and 2,3 DHP has been produced in an anaerobic fermenter for the last 23 years by the Queensland Department of Agriculture and Fisheries, using the commercial cultivar Cunninghamii. The development and release of a new psyllid-resistant cultivar ‘Redlands’, offers potential for increasing uptake by the beef industry but brings unanswered questions about its impact on the survival of the toxin degrading bacteria *Synergistes jonesii* and the overall efficacy of the current inoculum. A series of 30-day anaerobic fermentations were undertaken using the same starter cultures used in the production of commercial inoculum but fed daily with one of three *Leucaena* cultivars: Cunninghamii, Redlands or Wondergraze. Populations of *S. jonesii* were monitored daily using a quantitative PCR assay and the ability of the fermentation to detoxify mimosine and its derivatives were assayed on days 10, 15, 20, 25 and 30. Feeding the new Redlands cultivar had a negative impact on *S. jonesii* numbers and the ability to detoxify 3,4 DHP. However, as fermentation time increased, the *S. jonesii* populations adapted to the Redlands cultivar. A follow-on fermentation using a starter culture obtained from Day 30 of a Redlands fermentation, showed an immediate increase in *S. jonesii* populations and was able to detoxify mimosine and its toxic derivatives.

Keywords: *Leucaena*; *Leucaena leucocephala*; cattle; toxin; *Synergistes jonesii*; Redlands; mimosine; 3,4 DHP; 2,3 DHP; inoculum

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