

# A practical tool to select for performance in harsh environments

Cattle performance on low protein diets can be estimated using  $^{15}\text{N}$  stable isotopic ratio in tail hair.

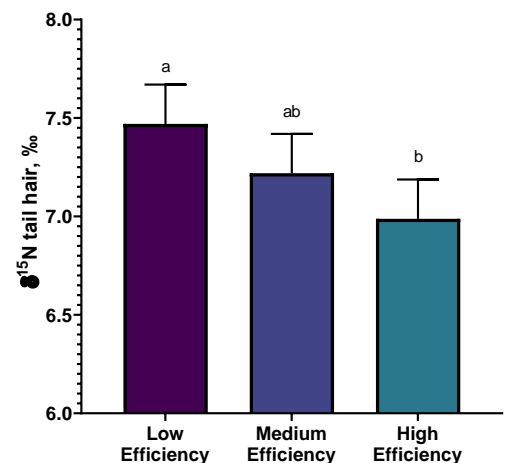
Cattle are amazing animals that can survive and perform in very harsh environments, especially the tropically-adapted breeds. When exposed to a low-protein diet, hot conditions, and water deprivation, adapted cattle will decrease urine losses and increase nitrogen recycling back to the rumen. On low protein diets, nitrogen recycling can provide 2-times more nitrogen to the rumen microbes than the diet.

There is huge variation of efficiency in a cattle cohort. A recent experiment at UQ with 90 Brahman steers demonstrated that Feed Conversion Ratio varied from 5 up to 12 kg of feed per kg of gain (140% variation!).

Also, more efficient cattle will lose less nitrogen in the urine, recycling the available nitrogen back to the rumen to produce more protein from the same poor-quality forage.

This discovery allowed us to develop a practical way to detect more efficient cattle. A more efficient animal will lose less nitrogen in the urine, changing the  $^{15}\text{N}$  concentration in body proteins. Therefore, more efficient steers, the ones that were losing less nitrogen in the urine, had less  $^{15}\text{N}$  on the tail hair.

An animal that is more efficient in harsh conditions will retain more N resulting in improved growth efficiency.



**More efficient animals have less  $^{15}\text{N}$  on the tail hair**

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## Contact

Luis Prada e Silva  
Centre for Animal Science  
E: l.pradaesilva@uq.edu.au  
T: +617 3346 2166  
M: +61 421 833 376



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# Using $^{15}\text{N}$ isotopes in tail hair to select for performance



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## A practical on-farm tool

**The development of a practical diagnostic tool using  $^{15}\text{N}$  stable isotopes in tail hair has a range of benefits**

- An easy to collect on-farm diagnostic tool to estimate feed efficiency in cattle
- Practical way to identify efficient sires and cows to improve performance of the herd
- Upcoming research into the interaction between urea supplementation and N recycling opens the possibility of targeted supplementation to more or less efficient animals reducing supplementation costs and mitigating environmental impact
- Can be used in conjunction with existing genotypic testing
- This information can be used to improve growth and reproductive performance in the herd

## Researcher Profile

**Associate Professor Luis Prada e Silva**

**Principal Research Fellow  
Centre for Animal Science,  
QAAFI**



Assoc Prof Luis Prada e Silva is a leader in the area of ruminant nutrition. Luis brings perspective from the world's largest producer of beef, Brazil, where he had a previous appointment at the University of Sao Paulo. Luis' has worked with different disciplines such as ruminant nutrition, ruminant physiology, rumen microbiology, ruminant reproduction, forage management, molecular biology, and economics of cattle production systems to improve cattle productivity.