IS THERE A ROLE FOR HYDROPONICS IN THE BEEF INDUSTRY?

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The concept of using hydroponically sprouted cereal grain as nutritious fodder is not new (Leitch 1939, cited by Peer and Leeson 1985). Sprouting in grain is associated with losses in dry matter (DM) and increases in crude protein concentration. Hydroponic fodder is nutritious, but the high moisture content, 84-91%, significantly reduces the concentrations of energy or protein in the feed. When 'converts' talk about the benefits, they do not consider DM content.

Daily gain of 20 Droughtmaster steers, 15-18 months of age, fed hydroponically sprouted barley shoots and hay on 'Lyndon' Station (115°3′ E, 23°6′ S) in the Gascoyne/Pilbara region of Western Australia was measured. The cattle grazed the native and improved pasture on the property prior to them being introduced to the hydroponically sprouted barley (Autograss) and some hay 4 days before starting the trial.

The Autograss was grown in fibreglass trays held in racks in a specifically constructed shed. About 14 kg of barley seed (*v.* Mundah) was spread on each tray which was intermittently flood irrigated with a nutrient solution. The young sprouted barley, which grew into a grass mat, was harvested at 6 – 7 days and fed daily to the animals. The average weight of each grass mat was 71.5 kg. Cattle were fed Autograss each day and hay, either limited (48 days) or *ad lib* (22 days), every 2nd day, plus the day before the animals were weighed. The cattle were weighed weekly at about the same time each morning**.** Autograss and hay samples collected during the feeding period were analysed for DM, metabolisable energy and crude protein concentration. Two animals died from unknown causes. At the end of the feeding period, the cattle had high plasma methylmalonic acid (MMA) concentrations, but these were not associated with vitamin B_{12} deficiency. Concentrations of MMA may also become elevated if there are high concentrations of plasma propionic acid, which may have resulted if there had been an immediate absorption of the fermentation end products.

Table 1. The intake and daily gain of cattle fed Autograss and hay in 2 periods.

		Period 1 (48 days)			Period 2 (22 days)		
		Autograss	Hay	Total	Autograss	Hay	Total
Initial LW (kg)				331 ± 8.66			382 ± 8.95
Final LW (kg)				382 ± 8.95			393 ± 9.41
ADG (kg/d)				1.01 ± 0.048			0.43 ± 0.077
Intake	Wet (kg)	15.4	3.4	18.8	13.0	8.0	20.9
	DM (kg)	1.8	3.1	5.0	1.5	7.0	8.5
	ME (MJ)	21.4	25.1	47	18.0	56.0	74

Traditional nutritional standards for feeding beef cattle cannot explain the liveweight gain, particularly in the 1st period (Table 1). There was no obvious weight gain due to gut fill or compensatory growth. The better-than-expected performance may be associated with the readily available nutrients and associated enzymes in the 6-7 day old fodder being very rapidly utilised by the animal, immediately they are formed. They may not be included by the assay when *in vitro* DM digestibility is being measured. These nutrients could result in enhanced microbial activity and growth in the rumen, and consequently, better than expected utilisation of the poor quality hay that was also fed. Therefore, the fermentation of the young hydroponically sprouted barley may have provided far greater energy than was estimated by the *in vitro* DM digestibility assay.

PEER, D.J. and LEESON, S. (1985). *Anim. Feed Sci. Technol*. **13**, 191-202.

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