

### Quantification of soluble betaglycan in porcine milk

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**Background** - Betaglycan is a transmembrane proteoglycan in various types of cells. Betaglycan has a high binding affinity to transforming growth factor beta (TGF-beta) and it plays a physiological role in TGF-beta signal transduction. We have reported earlier the existence of soluble betaglycan in porcine and human milk.<sup>1</sup>

**Objectives** - This study reports the quantification of betaglycan in porcine milk at different stages of lactation.

**Methods** - Milk samples were collected from four Large White x Landrace sows at day 1, day 3, day 7 and day 14 of lactation. They were centrifuged at 10000 g for 30 min at 4°C to remove cell debris and fat and were then stored at -70°C till further analysis. The level of betaglycan in the samples was determined by an enzyme-linked immunosorbent assay using a specific antibody (Santa Cruz, CA, USA).

Milk sample	Protein (mg/ml)	Betaglycan (ng/ml)	Betaglycan/protein (ng/mg)
Day 1	145 +/- 15	410 +/- 90	2.8 +/- 0.5
Day 3	37 +/- 2	300 +/- 50	8.1 +/- 1.0
Day 7	32 +/- 5	270 +/- 80	8.2 +/- 1.1
Day 14	26 +/- 4	250 +/- 90	9.7 +/- 3.7

**Results** - Although the highest level of betaglycan was detected in the milk of the first day of lactation, significant amount of betaglycan was detected in the milk throughout the lactation. When expressed as per unit milk protein, the concentration was greater in milk of later lactation than that in the first day of lactation.

**Conclusions** - This study indicates the existence of betaglycan in porcine milk throughout the lactation. The origin and the physiological function of the milk-borne betaglycan remain to be investigated.

1. Cheung HK, Mei J, Xu RJ. Detection of betaglycan in porcine and human milk. *Asia Pacific J Clin Nutr* 2002; 11(Suppl.): S317.

### Enhancing milk quality and yield in the dairy cow and buffalo by feeding protected nutrient supplements<sup>A</sup>

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**Background** - The major limitation to ruminant production in many regions of the Indian sub-continent and parts of Australia is poor nutrition. This results in a lack of availability of key nutrients, eg, essential amino acids and energy to sustain reasonable levels of milk production. To overcome these deficiencies by-pass fat and protein supplements have been developed from oilseeds/meals and by-products.<sup>1</sup>

**Objective** - To assess the role of by-pass nutrients in a straw based feeding system in India

**Design** - Protected nutrient supplements of by-pass fat and by-pass protein were fed to cows and buffaloes; the milk composition was assessed and an economic evaluation was undertaken.

**Outcomes** - Feeding protected fat supplements increased fat, protein and yield of milk significantly. The concentration of oleic (C<sub>18:1 cis</sub>), linoleic (C<sub>18:2</sub>) and linolenic (C<sub>18:3</sub>) acids increased with a reduction in the saturated fatty acids eg, palmitic (C<sub>16:0</sub>); this response was similar to that observed with cows in Australia.<sup>2</sup> The transfer of C<sub>18:2</sub> from rumen protected fat supplements into milk were 25% and 15% for cows and buffaloes respectively; these values are lower when compared to a transfer of 35-40% for dairy cows in Australia. Feeding by-pass protein supplements, of which 75% of the protein is rumen undegradable, to lactating ruminants on a pasture (Australia) or a straw based diet in India, significantly increased fat, protein and yield of milk in buffaloes (India) and cows (India & Australia).

**Conclusions** - In India about 1-1.2 L extra milk per day per cow / buffalo with a higher fat content (the farmer is paid on the basis of volume and fat content), provides an additional income of Rs10 /A\$0.32c per animal per day, for food, education and improving the status of women who manage most of these small village holdings, dairying is the sole source of income for about 11 million farming families.<sup>1</sup> A semi-commercial unit to produce by-pass protein feed supplements has been established in India, to provide feed for further trials at the village level.

1. Gulati, SK, Garg, MR, Scott, TW. *Indian Dairy Man* 2002; March:31-35.

2. Gulati, SK, May, C, Wynn, PC, Scott, TW. *Anim Feed Sci and Tech.* 2002; 98:143-52.

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