Potato meal as an alternative to fish and soybean meal to complement grazing dairy cow's feeding

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This experiment was carried out in a dairy farm of Terceira Island.

At the initial phase of lactation 21 cows were divided in 3 groups according to their weight, lactation days and calving number. Our main goal was to compare potato and soybean protein in the diet of dairy grazing cows as potential replacements for fish meal (banned in animal feeding since January 2001).

The only factor of variation was the quality and the degradability of protein sources. After calving, animals for each group were identified, and affected to the following treatments: soybean, fish meal and potato.

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Experimental Design

The animals were submitted to the assay during 6 successive weeks and two milkings, at 7 a.m. and at 5 p.m. were performed. Milk production was measured automatically, and samplings for the analysis were made at the beginning of milkings, twice a week. The weighing of the animals and the harvest of the food, were made at the beginning and at the end of the assay for the determination of the chemical composition (Table 2 and 3). Eight kilos of concentrate were distributed to each cow per day.

Statistical Analysis

To determine the differences in the milk production a covariant analysis was applied, where the two weeks of pre-assay were the covariates.

Chemical composition of feed (concentrates, protein sources and forages)

	DM	CP[(1)]	NDF[(1)]	ADF[(1)]	Ash[(1)]	Ca[(1)]	P[(1)]
Fish meal	89.3	55.9	-	-	19.2	5.70	0.22
Potato meal	86.5	75.9	6.5	4.7	2.1	0.16	0.19
Soybean	96.3	52.3		10.1	5.6	0.25	0.55
Potato meal concentrate	87.4	15.6	17.4	10.7	6.6	1.51	0.67
Fish meal concentrate	85.3	14.6	21.7	13.0	6.9	1.27	0.57
Soybean concentrate	86.6	15.4	21.2	9.8	6.2	1.24	0.63
Lolium perenne I	14.1	24.9	41.5	23.6	9.7	0.9	0.5
Lolium perenne II	17.4	22.0	44.0	28.0	8.6	0.9	0.5

(1) Values percent of the dry matter

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Results

A significant increase ($p<0.05$) was observed in the milk production for the treatment using the potato protein, when compared to the other two treatments (29.5, 31.7 and 33.9 kg/day for soybean, fish meal and potato respectively). For milk protein content, the highest value ($p<0.05$) was observed in the treatment with soybean (3.55, 3.50 and 3.35%). For urea nitrogen in milk (15.6, 13.4 and 15.5 mg/100ml), the treatment using fish showed significantly lower levels ($p<0.05$). Results clearly demonstrate a significant increase of milk production ($p<0.05$), and significant differences towards fish ($p<0.05$) for cows fed with the potato supplement.

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Effect of three protein sources on the average milk production and content composition in protein and urea nitrogen.

	Soybean	Fish meal	Potato meal
Milk Yield (l/day) S.E.M	29.49[a] 0.297	31.74[b] 0.248	33.94[c] 0.242
Milk Protein (%) S.E.M	3.55[a] 0.029	3.50[a] 0.001	3.35[b] 0.025
Urea Nitrogen (mg/100ml) S.E.M	15.57[a] 0.253	13.38[b] 0.863	15.51[a] 0.639
Milk Protein Production (g/day) S.E.M	1044.80 [a] 4.965	1099.05[b] 4.914	1122.99[c] 4.837

a, b, c – Within the same line, mean displaying the same letter do not differ significantly (P<0.05).
S.E.M – Standard error of the interaction mean.

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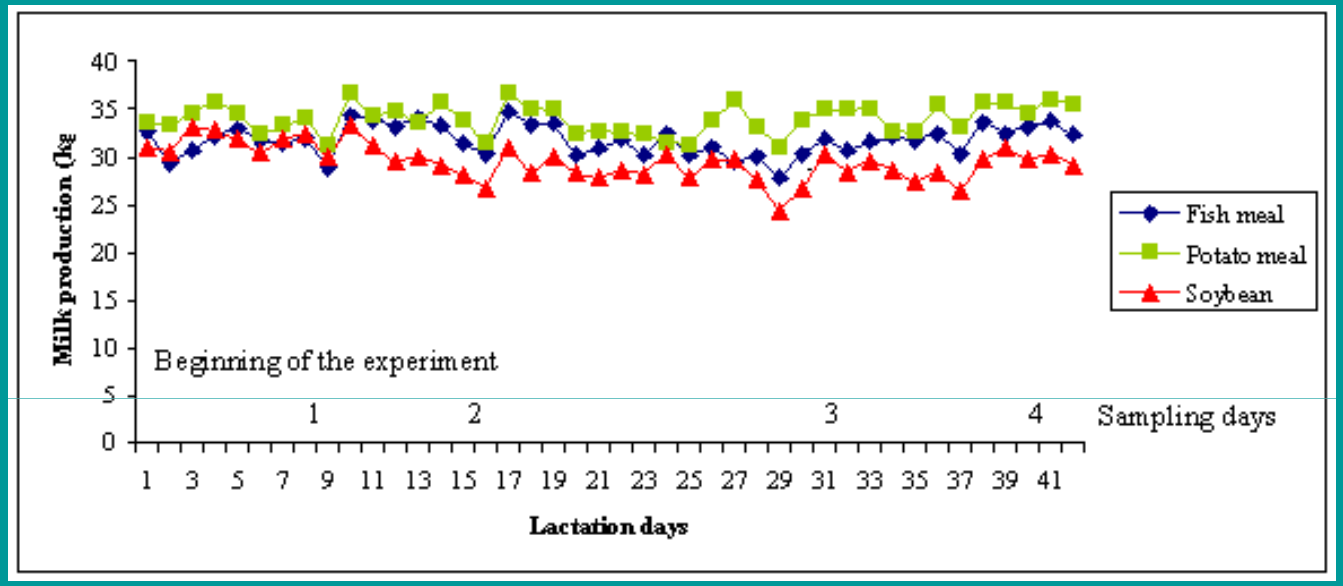

Effect of protein source on milk production in dairy cow

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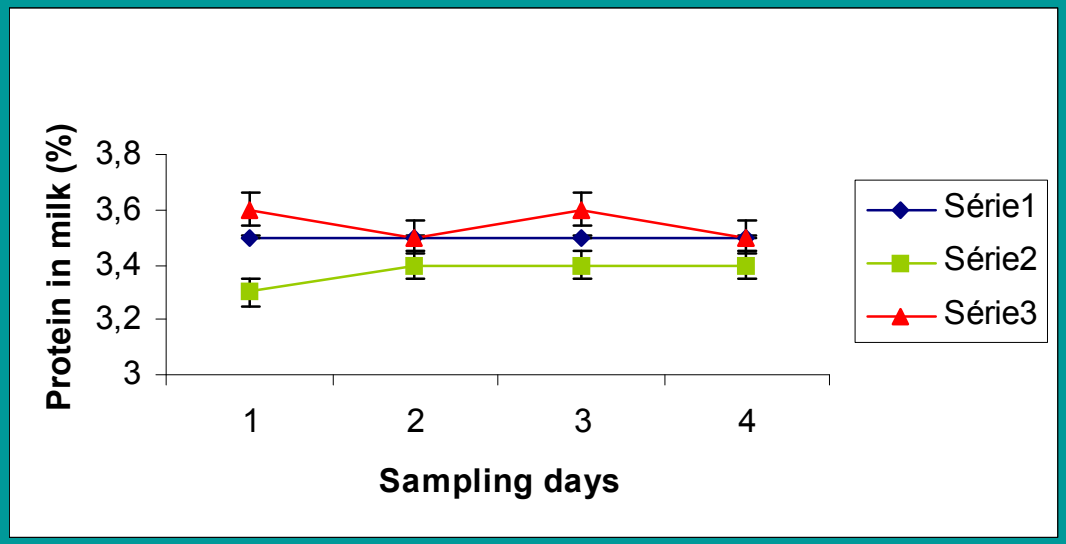

Effect of dietary protein source on the protein content of milk

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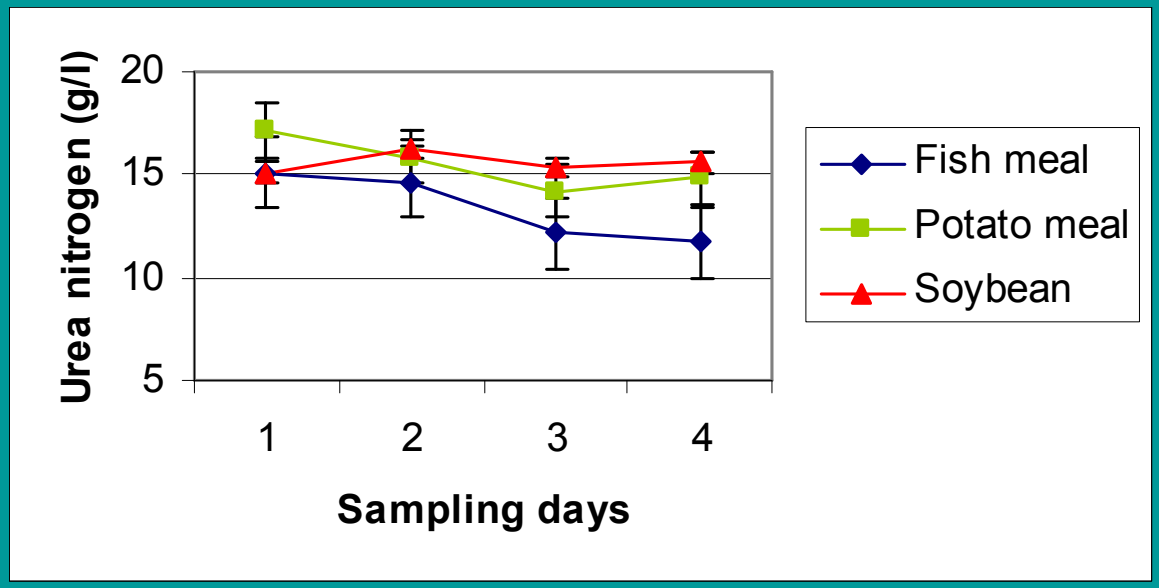

Behavior of the urea nitrogen contents, the effect of the source of protein in the complementary feed on the content of urea nitrogen in milk

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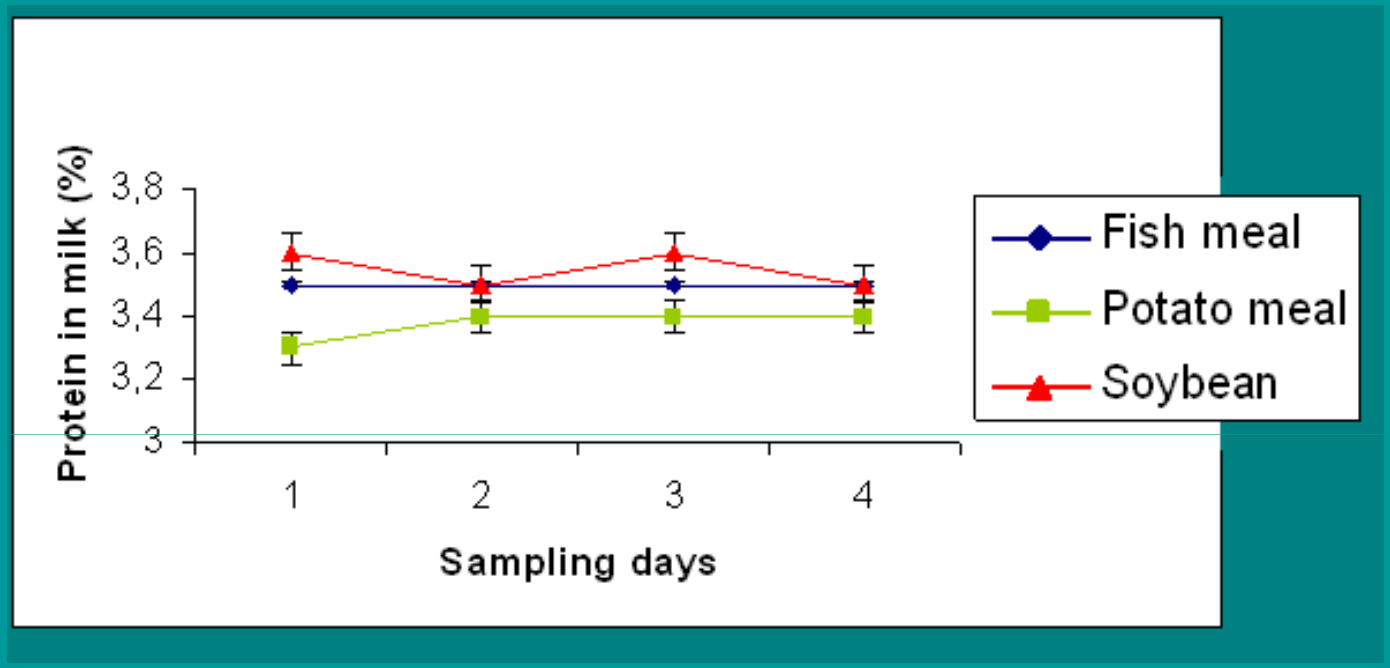

Effect of dietary protein source on the milk protein production

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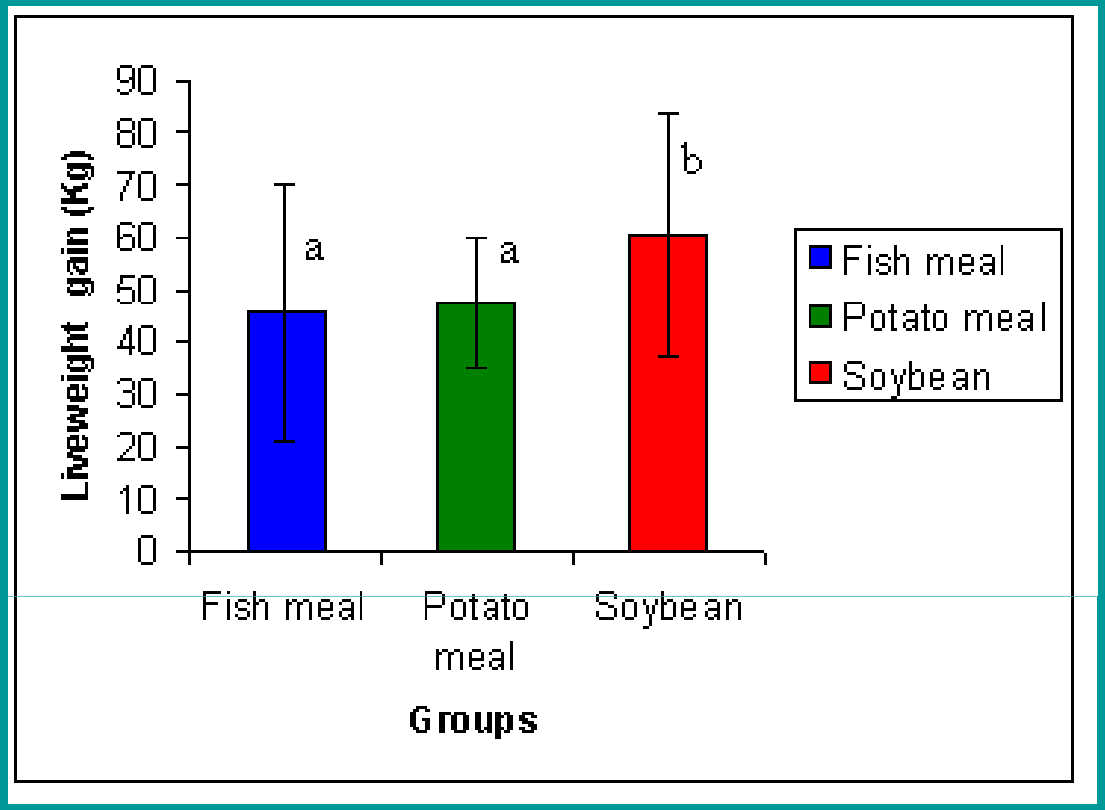

Effect of protein source in the complementary feed of dairy cow on live weight change during lactation

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Conclusion

The present experiment demonstrated that potato meal is a alternative and efficient source of protein to formulate complementary feeds for high producing dairy cows grazing pasture al over the year.

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