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# ANNUAL SLURRY PRODUCTION IN DAIRY FARMS AND EFFICIENT MANAGEMENT OF THE AVAILABLE NUTRIENTS FOR FERTILIZER

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## SUMMARY

Annual volume production and nutrients content in the slurry of seven dairy farms was measured. In four farms, cows grazing and, in the other three, the livestock remains indoors during all year. Annual production of slurry by LU, with a dry matter (DM) content of 6% , was 36 m<sup>3</sup>. The annual N production in slurry is only enough to satisfy the annual fertilizer recommendations in one of the seven farms. In four of the seven the annual phosphate fertilizer recommendations were overcome. It is concluded that in many dairy farms it is not necessary to buy inorganic phosphate.

**Key words:** slurry, organic fertilizer, phosphorus, nitrogen

## INTRODUCCION

In dairy farms, slurry has a natural vocation of organic fertilizer, since by means of their application in soil the nutrient cycles are closed in the soil-plant-animal system.

The mean values given in references for annual production by animal and nutrient content is not very usable (Wilkerson, et al, 1997, Dou et al., 1996) since there are big differences between the mean values and the specifics of each farm, due to the multiple management variables.

This work, had like objectives, measure the volume and the nutrients produced in the slurry of seven Galician dairy farms in order to improve the slurry management like fertilizer.

### Methodology

Seven dairy farms were selected, three with grazing management and four with the livestock into the barn all year. In table 1 appear data of these farms.

*Tabla 1: Characteristic of dairy farms*

	Mean	Grazing farms				No grazing farms		
		1	2	3	4	5	6	7
l/cow/year	7264	9313	5600	7500	6515	7500	7100	7320
LU	51,2	61,3	34	55	55,7	61,1	35,4	45,3
% time grazing	21,0	77,3 <sup>1</sup>	23,9	26,4	19,5	0	0	0
LU into the barn	45,3	51,8	25,9	40,2	57,6	61,1	35,4	45,3
LU out of the barn	4,8	10,11 <sup>1</sup>	8,1	14,4	0,82 <sup>2</sup>	0	0	0
Ha	17,6	18	20,2	17,4	19,3	20,2	11,1	17
LU ha <sup>-1</sup>	2,9	3,4	2	3,6	2,9	3	2,9	2,7
plots	18	3	35	10		30	25	3
Maize (ha)	2,8	0	0	0		5	4,9	7

1. Only dry cows and more of 2 years old cows
2. Only pregnant cows

Slurry was quantified counting the number of tankers removed from de slurry pit annually, except in the farm seven, which registered the days lasted in fill the slurry pit from their emptied previous. The sample was taken in full pits, mixed previously at less ten minutes.

Slurry of each farm was analyzed in the Galician Agrarian and Fitopatol6gic Laboratory, at less once during the year, in order to determine percentage of dry matter, total nitrogen, phophorus, potassium, calcium and other element, according to the utilized methodology by Vermes (1980).

In farms with gracing cows, was accountating the hours that the livestock was out of the barn as well as the number of animals, their productive state and age.

To compare the slurry volume produced annually by LU in each farm, it was referred to a same dry matter content (6%), that means an approximate dilution of 1: 1 with water.

The annual fertilizer recommendations was estimated in each farm for 12 tons of dry matter by hectare for grass silage, and 20 tons of dry matter by hectare for the annual rotation: grass silage - corn (table 2).

Table 2: *Estimated annual fertilizer recommendations.*

	Annual estimated production: Tons dry matter ha <sup>-1</sup> year <sup>-1</sup>	Fertilizer recommendation: kg ha <sup>-1</sup>		
		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Grass	12	200	100	200
Maice + italian ryegrass	20	300	150	300

## RESULTS AND DISCUSION

In table 3, they are shown the annual production by UGM.

Table 3: *Annual N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O and Anual slurry production purin total by LU.*

	Mean		Gracing farms				No gracing farms		
			1	2	3	4	5	6	7
Volume (m <sup>3</sup> )	1319	232	1240	1202	1499	1440	1731	995	1130
%DM	7,2	1,6	7,4	6,0 <sup>1</sup>	7,2	9,4	6,8	4,6	9,1
Volume at 6% DM (m <sup>3</sup> )	1600	4602	1531	1203	1798	2261	1973	768	1714
m <sup>3</sup> /UGM (6% DM)	36	8,1	30	47	45	39	32	22	38
N LU <sup>-1</sup> (kg)	91	10,0	91	109	91	97	78	78	93
P <sub>2</sub> O <sub>5</sub> LU <sup>-1</sup> (kg)	46	11,6	50	61	58	51	32	39	29
K <sub>2</sub> O LU <sup>-1</sup> (kg)	105	30,7	70	150	104	105	78	79	149
CaO LU <sup>-1</sup> (kg)	61	69,7	57	226	62	59	35	30	30

The mean value of annual slurry production, at 6% of dry matter by LU, was of 36 m<sup>3</sup>, varying between 22 and 47 m<sup>3</sup> by LU at (6% DM). The nutrient annual production by LU varied between 78 and 109 kg, 29 and 61 kg and 70 150 kg for nitrogen (N), phosphorus (P<sub>2</sub>O<sub>5</sub>) and potasium (K<sub>2</sub>O) (table 3). The mean value of annual slurry production, at 6% of dry matter by LU, was 36 m<sup>3</sup>. Stand out the quantity of CaO produced in farm 2, that represent approximately four times the mean of the seven farms, due to the utilization of milled limestone in the beds. In the figure 1, the estimated fertilizer recommendations are compared in each farm with nutrient contributions from slurry, multiply by a efficiency factor of 0,7 0,5 for corn and grass concerning chemicals fertilizers (G6mez Ibarlucea and Mateo, 1986; G6mez Ibarlucea y Pinilla, 1988). Was observed that only a farm covers its

nitrogen fertilizer recommendations only with slurry (figure 1). Phosphorus fertilizer recommendations are covered only with slurry in four of the seven farms (figure 2).

## CONCLUSIONS

A great variability between farms of the annual produced volume was observed from 47 to 22 m<sup>3</sup> LU<sup>-1</sup> (6% DM), being the mean value of 36 m<sup>3</sup> by LU).

Slurry nitrogen only satisfy the annual fertilizer recommendations in one of the seven farms, while in four of the seven slurry phosphorus satisfy the annual fertilizer recommendations. In many dairy farms similar to these, it would not be necessary to buy inorganic phosphate.

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Figure 1: Annual needs of nitrogen and nitrogen produced in slurry in each farm (kg ha<sup>-1</sup>).

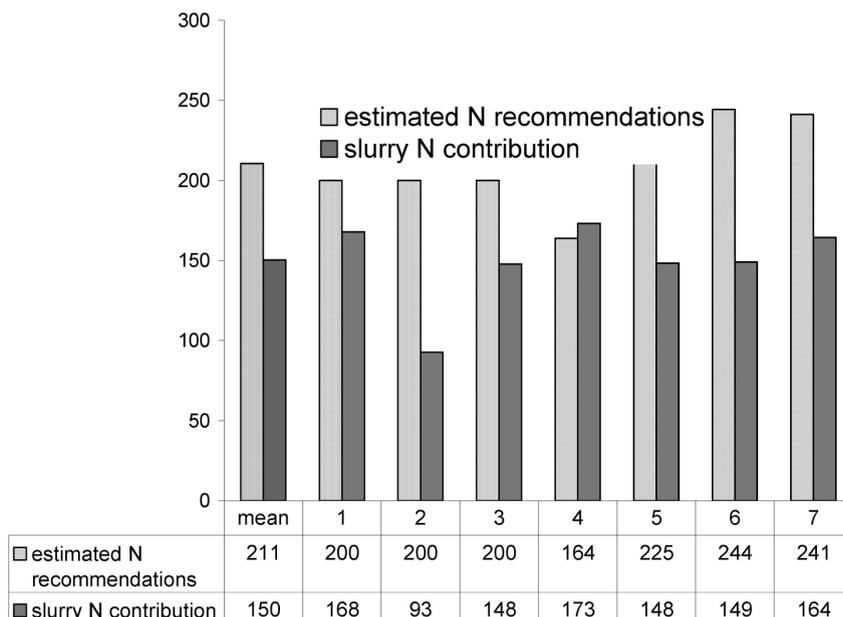


Figure 2: Annual needs of phosphorus and phosphorus produced in slurry in each farm (kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>).

