



INDICATORS OF DAIRY WASTE IN SOUTH AMERICAN COUNTRIES TO STIMULATE THE CIRCULAR ECONOMY

Julio Cesar Pascale Palhares*, Verónica Charlón, Francisco Salazar Sperberg, Maria Alejandra Herrero, Alejandro La Manna

**Embrapa Pecuária Sudeste
julio.palhares@embrapa.br*

The aims of this study were quantify and qualify the dairy wastes in some South America countries to stimulate programs and policies in circular economy. Four South America countries were considered in this study: Argentina (A), Brazil (B), Chile (C), and Uruguay (U). The reference year to quantify and qualify the dairy wastes produced by each country was 2018 and calculations only considered the intensive mixed crop–livestock systems and manure produced per lactating cows. Secondary data locally available from various sources (country official statistics, scientific articles, and experts' estimates) were collected. These data were: total number of lactating cows, total milk production (kg, Fat and Protein Corrected Milk), average milk yield (L.cow-1.day-1). The equations proposed by Nennich et al. (2005) were accounted to calculate the Total Manure Excretion (ME), Manure Dry Matter Excretion (DME), Nitrogen (N), Phosphorus (P), and Potassium (K) Excretion. From these calculations the following indicators were evaluated: kg manure cow-1.day-1, kg dry mater.cow-1.day-1, kg N–P–K.cow-1.day-1, g manure.L milk-1, g N–P–K .L milk-1. B and A presented the highest milk production and number of lactating cows and U had the highest average milk yield, 18.8 kg cow-1.day-1. The total manure excretion per cow per day was 57.5, 56.3, 52.8, and 50.2 kg to U, A, C and B, respectively. The percentage of DME varied from 12.3% to 12.5%. The ME in Ton.day-1 was 306,536 to B, 94,525 to A, 24,056 to C, and 18,251 to U. These corresponded a daily N availability of 2,224 Ton in B, 659 Ton in A, 171 Ton in C, and 126 Ton in U. P daily availabilities were 339, 106, 27, and 21 Ton to B, A, C, and U, respectively. U produced the highest nutrients excretion (per cow-1.day-1) 0.398 kg N, 0.065 kg P, and 0.181 kg K. Brazil had the lowest (per cow-1.day-1) 0.364 kg N, 0.056 kg P, and 0.164 kg K. To each litre of milk produced per cow per day in 2018, B generated 7.7 kg of manure, C 4.9 kg, A 3.4 kg, and U 3.1 kg. The values presented show the potential to recycle/reuse dairy waste as fertilizer on pastures and crops in these countries. These practices will contribute to improve the soil fertility and reduce the use of chemical fertilizers. The availability of nutrients and the prevailing production profile in these countries (mixed crop-livestock intensive system) should be incentives to internalize the "circular economy" in this sector. Dairy efficiency aspects influence the quantity of waste and the nutrients availability in it. It was identified in the dairy waste indicators calculated to each country. The authors are aware of the uncertainties in the estimates. However, we believe that it is useful to have a first approximation to compare the amounts of dairy waste produced in each country and use these results as potential information to stimulate the management of livestock production systems in a "circular" manner.