

# Summary

During 1997 and 1998, samples were collected during two seasons on nine commercial farms located in the Cesar valley in northern Colombia (between  $9^{\circ} 31'$  and  $10^{\circ} 58'$  N latitude and between  $72^{\circ} 48'$  and  $74^{\circ} 05'$  W longitude). Samples were used to quantify the effect of

different nutritional and animal factors on urea levels in blood (BUN) and milk (MUN) and on milk composition. The Cesar valley corresponds to a semiarid ecosystem located at 110 to 180 masl. Average annual rainfall ranges between 700 mm and 1400 mm, and is distributed in two rainy seasons: from April to May and from August to October. Average annual evapotranspiration is 2000 mm, and water stress occurs during 10 months of the year. Average temperature ranges from 27 to 30 °C. Farms with different technological levels were selected to obtain representative results for a wide range of production systems. Important characteristics for determining the technological level were feeding (pasture type and quality, type of supplementation) and average milk production level.

On each farm, 12 healthy cows were selected, covering different phases of lactation: between 0 and 90 days, 91 and 180 days, and more than 180 days. Daily milk production was measured the same day of the sampling. Two samplings were carried out on those farms that performed two milkings, one in the morning and the other in the afternoon. To determine milk composition for each cow, approximately 250 ml milk were taken from all teats and 50 ml of this milk was used to measure fat, protein, lactose, and total solids contents. MUN content was determined in milk serum. Daily milk production was measured the same day of the sampling. A blood sample was taken from the coccygeal vein of each selected cow using disposable needles and tubes with anticoagulant (K-EDTA). Hematocrit content (Hto) was determined by centrifugation in capillary tubes with heparin for 5 min at 10000 r.p.m. To analyze BUN content, samples were centrifuged for 15 min at 3500 r.p.m. to separate blood plasma.

The factors involved in cow nutrition showed little effect on milk composition, but a high variability was observed among animals, especially regarding fat content, suggesting that this variable should be determined in trials with cows in dual-purpose systems to correct milk production according to fat content. The protein:energy ratio in total dietary intake was the factor most related with variations in BUN and MUN. In grazing cows this factor accounted for 55% of total variation in MUN and 52% of total variation in BUN. This confirms that both parameters are good indicators of the nutritional status of animals and may serve as tools to adjust protein and energy supply of cows grazing in dual-purpose systems. Study results indicate that the optimal MUN range for cows in dual-purpose systems is between 10 and 19 mg/100 ml. Values below 10 mg/100 ml are usually associated with dietary

protein deficiency, and cows at these levels will probably respond to protein supplementation. Levels higher than 19 mg/100 ml indicate an excess of protein or a deficiency of energy in the diet.