

Title: Bacterial Distribution in the Bed of a Compost Barn System

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Abstract: Bacteria plays an important role during the composting process, however their number can modify according to local characteristics and time scale. In this study we evaluate the spatial variation of the total number of bacteria in a Compost Barn system for dairy cattle. The system was implemented in February 2014 in the Retiro Vargem Farm, in the city of Itamonte-MG. Lots with different numbers of cows are separated in the system: 1st lot - 16 cows in the final stage of lactation; 2nd lot - 30 cows with high milk production; 3rd lot - 4 cows during pre-paturation; 4th lot - 33 heifers. Three lines were established to collect CB bed samples: drinker line (LB), the middle line (LM) and feeder line (LC). Samples were collected at different depths (surface, middle and bottom), on the lines of each lot, in March 2015. All samples were fixed in PFA (final concentration of 2%). The sample processing occurred starting the addition of Tween 0.0001% (0,5 mL) and distilled and filtered water (5 mL). Then the samples were sonicated (110.7 μ m of amplitude for 60 seconds) and centrifuged (500 x g for 5 min) three times. The supernatant was collected, diluted 10x and filtered on polycarbonate filter (0,2 μ m of pore). Filter pieces were cut, stained with DAPI and placed between slide and cover slip with glycerol: PBS solution. The slides were analyzed in an epifluorescence microscope in 10 random fields. The total density of bacteria in the system was $1.6 \pm 0.5 \times 10^9$ g cels⁻¹ (mean \pm standard deviation). Sources of organic matter derived from the bed itself and of the feces and urine of cows are sufficient to maintain bacterial growth on the compound. Significant differences in the number of bacteria were not found between lots of the system, or between the lines nor depths. This uniformity in the spatial distribution of the number of total bacteria may be related to efficiency in mixing the compound during the daily handling of the bed. However, no difference in the total number of bacteria, does not mean that there is no variation in the number of specific bacteria.

Keywords: composting, microbial ecology, spatial scale

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