Growth of Benthic Algae on Dairy Manure. (A05-mulbry125832-Oral)

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Abstract:

An alternative to land spreading of manures is to grow crops of algae on the nitrogen and phosphorus present in the manure. Compared to terrestrial plants, filamentous algae have exceedingly high growth and nutrient uptake rates. Moreover, they are capable of year-round growth in temperate climates, can be harvested on farm-scale equipment, and yield a potentially valuable biomass. The primary objective of this research was to evaluate and develop algal turf scrubber (ATS) technology to remove N, P and soluble carbon from dairy manure. Laboratory-scale ATS units were seeded with algal consortia from nearby streams. After the turfs were established, daily additions of manure were increased each week until the amounts reached 1.4 g ammonia-N and 0.34 g phosphate-P/day. Each week, algal biomass was harvested and dried prior to analysis for total nitrogen (TKN), total phosphorus (TP), and inorganic constituents. Wastewater samples were collected weekly and analyzed for TKN, TP, ammonia, nitrate, nitrite, and orthophosphate. The dried algae contained 1.3% P and 7% N. Algal nitrogen and phosphorus accounted for about 60% of input ammonia-N and phosphate-P added, respectively.

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