Feedback control of aeration fans using compost bed temperatures to maximise rate of decomposition is a common practice of aerated in-vessel and static pile systems. However, limited information is available on where to locate the thermocouple for control and very few studies have been presented to show the validity of the existing recommendations. This paper investigates thermocouple placement effects on composting efficiency, namely temperature histories, dry matter loss and energy use per initial compost dry matter. Results were developed by simulating system performance using a two-dimensional finite difference numerical model of the composting reactor and a two-component first-order kinetic model of decomposition. Incorporated into the simulation program is a temperature feedback closed-loop control system. Combinations of different thermocouple locations as a sensing unit were used to produce a signal for feedback control. Results show that thermocouple locations significantly affect process variables, dry matter loss and energy usage of the system and indicate that dry matter loss is higher in the middle layers than outer layers when the thermocouple sensor is placed in the middle layers. Additionally, results on temperature set point show that controlling the temperature at 60°C requires less energy than controlling the temperature at 50°C.

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