

## Hydrogen sulphide gas production from spent mushroom compost under laboratory and field conditions

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Hydrogen sulphide (H<sub>2</sub>S) gas production was monitored during the disturbance of four heaps of Spent Mushroom Compost (SMC) that were stored for up to 12 months either outdoors or under cover (indoors). QRAE and ITX gas monitors with data logging facilities were used to measure the 10-second average concentration of H<sub>2</sub>S released into the air above the heaps of SMC as they were being disturbed. The highest concentrations of up to 2083 ppm were detected for the outdoor stored material in comparison to concentrations of up to 687 ppm detected for indoor stored material. Outdoor stored SMC had higher moisture contents (66-72%) compared to indoor stored material (53-65%). Laboratory studies were conducted to study the effects of moisture content (69-85%) and temperature (35°C or 45°C) on H<sub>2</sub>S production from fresh un-steamed and steamed samples of SMC. The H<sub>2</sub>S gas concentration in the head space of the incubation vessels was measured every 24 hours for 3 days. Un-steamed SMC produced higher levels of H<sub>2</sub>S than steamed SMC and in general the higher the moisture content the higher the H<sub>2</sub>S concentration. Higher concentrations of H<sub>2</sub>S were also produced with the higher incubation temperature of 45 °C. These results suggest that the high levels of H<sub>2</sub>S detected during disturbance of stored SMC are heavily influenced by moisture content. The higher rates of H<sub>2</sub>S production at 45 °C also suggest that thermophilic microorganisms are involved in the process. The results of this research can aid the development of guidelines for the storage and handling of SMC, particularly in relation to health and safety.

**Keywords:** hydrogen sulphide, spent mushroom compost, health and safety