

MicroResp™: A VERSATILE METHODOLOGY FOR MEASURING ENVIRONMENTAL QUALITY

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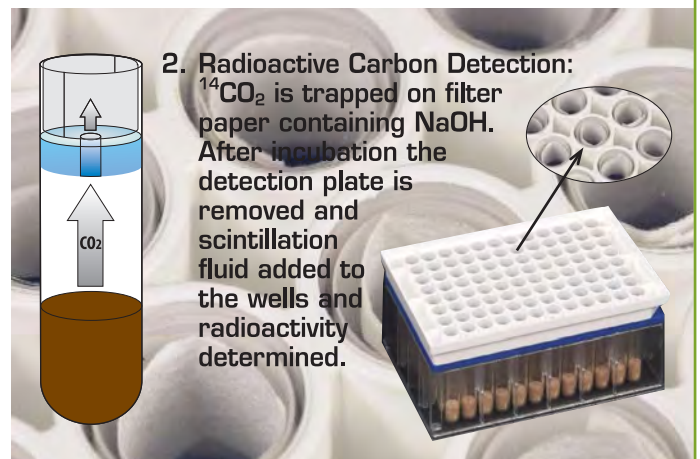
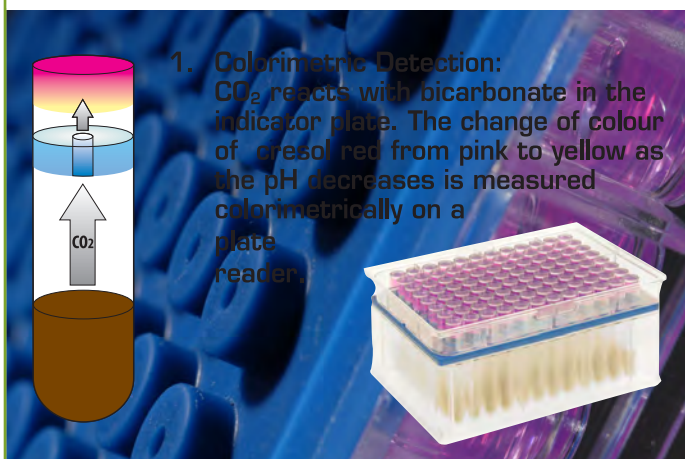
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INTRODUCTION: A primary role of soil is the degradation of organic matter and xenobiotic compounds that underpin nutrient cycling and environmental protection. Changes in the diversity of the soil microbial community is often used to assess soil health and one way this can be achieved is by measuring their respiration induced by adding a range of carbon substrates.

METHODOLOGY: What is MicroResp™?

- a microplate-based respiration system that overcomes the disadvantages of both classic carbon source growth tests (e.g. Biolog™) and the space and time needed for conventional respiration methods.
- measures the immediate (0-6h) substrate induced response reflecting activity rather than growth.
- can be used for long term degradation kinetics by sequential reads.

MicroResp™ measures the CO₂ evolved from soil and carbon substrate utilisation in two ways:



RESULTS:

i) High through-put testing of large numbers of soils (293 samples in 3 weeks) from a national soil sampling programme to relate respiration to land use and soil C using the colorimetric method (Fig. 1)

ii) Testing the degradation of (¹⁴C-labelled) xenobiotics in soils challenged with elevated levels of Cu and Zn (Fig. 2)

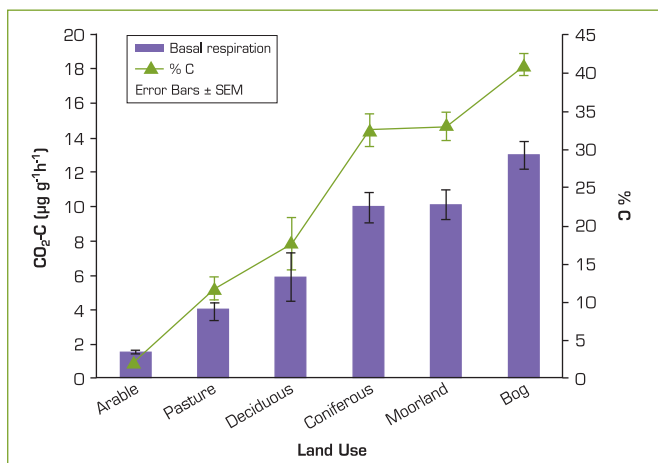


Figure 1. Relationship of %C and respiration of soils of different land use

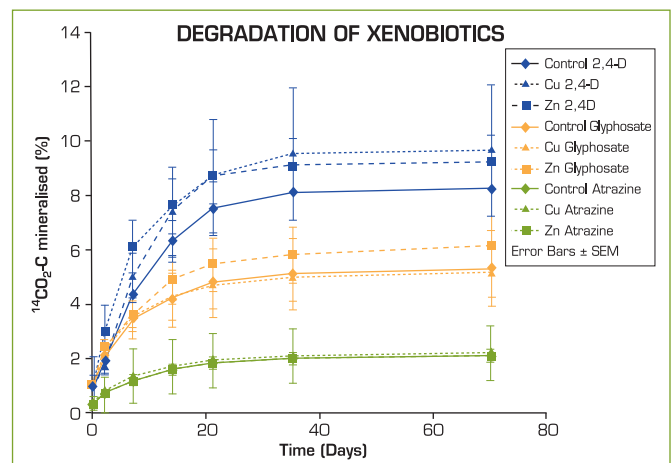


Figure 2. Degradation of xenobiotics added to sewage sludge treated soils

CONCLUSIONS: The ability to vary the C sources and the soil/sediment test conditions mean that the method is very versatile for testing a range of environmental quality issues at field and regional scales. Recent applications in testing decomposition processes in waters and sediments are also now being explored.