

Biofumigation: the effect of incorporating green manure or compost in the soil on the control of agricultural pests and diseases.

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Abstract

Biofumigation refers to the suppression of soil-borne pests, diseases and pathogens by biocidal compounds of plant origin such as isothiocyanates and polyphenols. Isothiocyanates derive from glucosinolate hydrolysis, a process mediated by the enzyme myrosinase that occurs endogenously in plants of the family *Brassicaceae*. *Brassicaceae* species are then important sources of bioactive compounds, which makes them good candidates for biofumigation applications. Biofumigation is regarded as an important alternative crop protection technique and its procedures and methodologies are currently studied in several countries. Biofumigation might be especially useful in areas of soils with low levels of organic matter, such as the vast majority of the Mediterranean region. The aim of this work is to discuss current biofumigation strategies as part of integrated farming management plans. The effects of this technique on soil quality, plant productivity and the environment are considered. Special focus is given to the effects of biofumigation on nitrogen and carbon cycles since these are strongly linked to the level of biological activity in the soil. The most recent scientific advances in phytochemical substances are reviewed, emphasizing the advantages and disadvantages of biofumigation for microorganisms and food safety. Finally, future perspectives for the utilization of this crop protection method are presented.