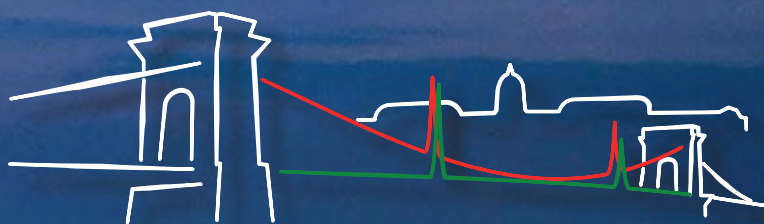


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Grain Sorghum Crops: Use of Green Manure as Biofumigant and to Increase Soil Fertility

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Cyanogenic glycosides are phytochemicals involved in plant defence against herbivores by virtue of their ability to release toxic hydrogen cyanide (HCN) upon tissue disruption. In addition, endogenous turnover of cyanogenic glycosides without the liberation of HCN may offer plants an important source of reduced nitrogen at specific developmental stages [1]. Dhurrin is the major cyanogenic glycoside in Sorghum, its level is higher in young sorghum seedlings and it declines with age, although nitrogen fertilization of older plants is known to increase dhurrin synthesis by transcriptional regulation. In this work the effects of green manuring on the soil, in terms of bio-fumigation activity towards the elaterids that can damage potato crops and the soil fertility, were evaluated. In particular, five soil treatments were carried out in different parcels of a cultivation field, then potatoes were planted and cultivated. The ground land of the present study is located in a countryside near Bologna (Italy), where representative samples of soil and sorghum leaves were collected to evaluate the release of organic matter and humic acids, and dhurrin content, respectively. To evaluate the influence of sorghum green manure treatment on soil fertility, the humification index was calculated as the ratio between the carbon concentration of humic acids (HA) and fulvic acids (FA). The quantification of dhurrin content in leaves was carried out by solid-liquid extraction followed by HPLC / MS analysis and reported as mg of dhurrin per gram of dry matter. The results showed that an improvement in humic acid content in soil was verified after sorghum green manuring and how different soil treatments can affect dhurrin synthesis in sorghum leaves.

[1] De Nicola et al., J. Agric. Food Chem. 2011, 59, 8065–8069

Keywords: Biofumigation, cyanogenic glycosides, dhurrin