



A comparison between vegetable intercropping systems and monocultures in greenhouse gas emissions under organic management

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Legume crops have been proposed as a way of reducing greenhouse gas (GHG) emissions because both, their rhizosphere behaviour and their ability to fix atmospheric N reducing the need of external N fertilizer. Moreover, the establishment of organic agriculture has been proposed as a sustainable strategy to enhance the delivery of ecosystem services, including mitigation of climate change by decreases in GHG emissions and increases in soil C sequestration. The aim of this study was to assess the effect of the association between cowpea (*Vigna unguiculata* L.) and melon (*Cucumis melo* L.) growing in different intercropping patterns on soil CO₂ and N₂O emissions compared to cowpea and melon monocultures under organic management as a possible strategy for climate change mitigation. Soil CO₂ and N₂O emissions were weekly measured in melon and cowpea rows using the dynamic chamber method during one cropping cycle in 2019. Results indicated that melon growing as monoculture was related to increases in O cumulative emissions (0.431 g m⁻²) compared to the average of the rest of treatments (0.036 g m⁻²). Cowpea growing as monoculture was related to decreases in CO₂ cumulative emissions (390 g m⁻²) compared with the other treatments (512 g m⁻² average). However, N₂O and CO₂ emission patterns did not directly follow soil moisture patterns in the experimental period, with no significant correlations. Finally there were no significant differences among intercropping treatments with regard to NO₂ and CO₂ emissions. Further measurements are needed to monitor the evolution of GHG emissions under these cropping systems and confirm the trend observed.