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改良剂对玉米和大豆间作植株锌铬积累的影响

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摘要: 通过盆栽试验,研究改良剂石灰和过磷酸钙对玉米、大豆间作植株各器官锌铬积累的影响。结果表明,不同改良剂处理后,能显著降低土壤中锌、铬有效态含量,植株各器官锌含量为:对照>低浓度石灰>高浓度石灰;铬含量为:对照>高浓度过磷酸钙>低浓度过磷酸钙,单作>间作。在间作下施用低浓度过磷酸钙改良效果最优,其中玉米根、茎、叶的锌、铬含量分别比只施用低浓度过磷酸钙单作降低30.72%、35.96%和29.51%,69.98%、64.21%和51.56%;比不施加改良剂的对照间作玉米降低55.57%、59.68%和66.57%,64.10%、76.79%和80.75%;大豆根、茎、叶的锌、铬含量分别比只施用低浓度过磷酸钙单作降低0.26%、4.91%和16.42%,14.25%、8.16%和23.33%,比不施加改良剂的对照间作降低63.95%、69.54%和65.49%,54.15%、57.14%和57.14%。间作条件下,低浓度过磷酸钙处理在不增加大豆对锌铬吸收的前提下,大幅降低玉米对重金属的吸收,显著增加玉米产量。

关键词: 改良剂 间作 玉米 大豆 锌 铬

EFFECTS OF AMENDMENTS ON ACCUMULATION OF ZINC AND CHROMIUM IN INTERCROPPING OF CORN AND SOYBEAN

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Abstract: A pot experiment was conducted to determine effects of different amendments (lime and superphosphate) on accumulation of heavy metals (Zn and Cr) in intercropping of corn and soybean. Results showed that all treatments significantly reduced the contents of available zinc and chromium in soil plants, followed the order of control (CK) > low concentration of lime (LI(l)) > high concentration of lime (LI(h)), CK > high concentration of superphosphate (SP(h)) > low concentration of superphosphate (SP(l)), monoculture > intercropping. The effect of SP(l) treatment under intercropping condition was the best than all the other treatments with the contents of zinc and chromium in the roots, stems and leaves of corn reduced by 30.72%, 35.96%, 29.51%, 69.98%, 64.21% and 51.56%, respectively, compared with the treatment of SP(l) of monoculture corn. Compared with the intercropping corn without any amendments, the contents of zinc and chromium in the roots, stems and leaves of corn were reduced by 55.57%, 59.68%, 66.57%, 64.10%, 76.79% and 80.75%, respectively. The contents of zinc and chromium in soybean roots, stems and leaves declined by 0.26%, 4.91%, 16.42%; 14.25%, 8.16% and 23.33%, respectively, compared with the treatment of SP(l) of monoculture soybean. They reduced by 63.95%, 69.54%, 65.49%; 54.15%, 57.14% and 57.14%, respectively, compared with the intercropping soybean of no amendments. Our results suggest that the SP(l) treatment under intercropping condition could greatly reduce the absorption of zinc and chromium in corn and improve corn yield without increasing the contents of zinc and chromium in soybean.

Keywords: amendments intercropping corn soybean zinc chromium

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