

测定土壤有效性铁锰铜锌的影响因素及优化方法

李小涵, 党海燕, 董昭芸, 王星舒, 高玉, 王朝辉, 石美

(西北农林科技大学 资源环境学院, 陕西 杨凌 712100)

摘要: 客观准确地测定土壤有效态微量元素含量对合理施肥和提高作物产量与品质具有重要意义。针对土壤有效态微量元素含量测定结果偏差较大的问题, 该文研究了仪器燃烧参数设定和浸提剂 pH 对土壤有效铁锰铜锌含量的影响。结果表明: 燃气流量与助燃气比例会显著影响测定结果, 应根据仪器的型号及测定的元素种类调整燃气流量与助燃气比例, 以获取较高的测定灵敏度。对于中性和碱性土壤, 随着 DTPA 浸提液 pH 升高, 浸提土壤有效铁、锰、铜和锌的能力下降, 选用 pH7.0 的 DTPA 浸提液较为适合。随着 DTPA 浸提液 pH 升高, 对酸性土壤的有效铁和铜浸提能力提高, 有效锌变化不显著, 有效锰显著下降。因此, 酸性土壤的有效铁和铜适合的 DTPA 浸提液 pH 为 7.3, 而有效锰和锌的浸提液 pH 为 7.0 较适合。

关键词: 微量元素; 仪器参数; 浸提液 pH; 土壤类型

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Factors affecting determination of soil available microelement elements and optimization method

LI Xiaohan, DANG Haiyan, DONG Zhaoyun, WANG Xingshu, GAO Yu, WANG Zhaohui, SHI Mei

(College of Natural Resources and Environment, Northwest A&F University, Yangling 712100, China)

Abstract: It is of great importance to objectively and accurately determine contents of soil available micronutrients for rational fertilizer application and improvement of crop yield and quality. In order to solve the problem of large deviation in the determination of soil available micronutrient contents, the effects of combustion parameters and pH of extractant on available Fe, Mn, Cu, Zn content in soil are studied. The results show that the combustion gas flow and the supporting gas proportion significantly affect the determination of the micronutrients. The proportion of gas flow and auxiliary gas should be adjusted according to the type of instrument and measured elements, so as to get the suitable sensitivity for determination. For neutral and alkaline soils, DTPA leaching capacity of available Fe, Mn, Cu and Zn decreased with the increase of pH, so the DTPA extract with pH7.0 is more suitable. For the acid soil, with the increase of pH of DTPA, the extraction capacity of available Fe and Cu increased, but the change of Zn available is not significant, while the available Mn decreased significantly. Therefore, the suitable pH for DTPA extraction of available Fe and Cu in acidic soil is 7.3, while that of available Mn and Zn is 7.0.

Key words: microelement element; equipment parameter; extration solution pH; soil type

土壤是农业生产的物质基础, 其营养元素的含量和生物有效性是衡量土壤肥力水平的重要指标, 直接影响生态系统的物质能量循环和生产能力^[1-2]。在植物

生长过程中, 任何一种微量元素缺乏或过剩都会直接影响作物生长发育、产量及品质形成^[3-4]。明确土壤有效态微量元素含量, 有助于正确判断土壤微量元素的

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作者简介: 李小涵(1971—), 女, 陕西永寿, 硕士, 实验师, 主要研究方向为土壤植物养分利用与大型仪器分析, zhlxh@nwfau.edu.cn。

通信作者: 石美(1987—), 女, 河北保定, 博士, 副教授, 主要研究方向为土壤环境保护与作物安全生产, meishi@nwfau.edu.cn。

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