



夏枯草内在品质及生长特性对铅、铜、镉胁迫的响应

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中文摘要: 目的: 研究不同浓度处理水平的铅(Pb)、铜(Cu)、镉(Cd) 3种重金属单一胁迫对夏枯草内在品质及生长特性的影响。方法: 以《中药材生产质量管理规范(GAP(试行))》和土壤环境质量标准为主要指导原则, 设定不同浓度水平处理夏枯草植株, 测定相关指标, 结合统计方法进行分析比较。结果: 接近土壤环境质量二级标准上限值时, 夏枯草生长正常, 减产幅度在正常范围内, 果穗重金属含量也在《药用植物及制剂外经贸绿色行业标准》限值内, 同时能一定程度上增加熊果酸的积累; 栽培夏枯草土壤中的重金属Pb、Cu、Cd临界值分别可以确定为400、100、1.0 mg·kg⁻¹。结论: 低浓度胁迫对夏枯草毒害作用较低, 同时能一定程度上增加熊果酸的积累, 高浓度水平对夏枯草的毒害作用明显, 3种重金属胁迫使植株各部位相应重金属含量增加的趋势大致相同。

中文关键词: 夏枯草 重金属 单一胁迫 生长状态 重金属富集 次生代谢

Effects of lead, copper and cadmium stresses on growth and inherent quality of *Prunella vulgaris*

Abstract: Objective: *Prunella vulgaris* was used as the experimental material to study the effects of lead (Pb), copper (Cu) and cadmium (Cd) on the related physiological and growth indexes of the plant. Method: By referencing the GAP and the soil environmental quality standard, the growth and inherent quality of the plant were observed under different concentrations of the heavy metals stresses. The data were statistically processed. Result: The results showed that the plant grew normally when the heavy metal concentrations in soil were close to up limits of the soil environmental quality standard [J]. The content of heavy metal in spica met the requirement of the standard, and under the circumstances the content of ursolic acid was increased in a certain range. The critical values of Pb, Cu, Cd in the *P. vulgaris* grown soil were set at 450, 100, 1.0 mg·kg⁻¹, respectively. Conclusion: The harmful influence of the heavy metal stress at a lower concentration is lighter than at a higher concentration, and it could increase the content of ursolic acid. The stress of Pb, Cu and Cd is more obvious than that of Zn.

keywords: *Prunella vulgaris* heavy metal single stress growth state heavy metal accumulation secondary metabolism

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