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岷江下游小型集水区3种人工林对降雨重金属含量的影响

### Effect of *Metasequoia glyptostroboides*, *Cunninghamia lanceolata* and *Eucalyptus grandis* plantations on heavy metal contents in the precipitation of a small catchment at the downstream of Minjiang River

关键词: [集水区](#) [人工林](#) [重金属含量](#) [穿透水](#) [树干茎流](#) [淋溶系数](#)

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摘要: 为了解人工林对大气污染物质的过滤作用,分析研究了2011年11月10日到2012年3月4日期间7次降雨中,岷江下游(五通桥段)一个小型集水区中水杉人工林、杉木人工林和巨桉人工林穿透水和树干茎流中的4种重金属(Cd、Cu、Pb、Zn)含量特征.结果表明,3种人工林大气降雨、穿透水和树干茎流重金属含量呈现一致的规律,按平均值大小排列为:Zn>Pb>Cu>Cd.3种人工林穿透水重金属含量差异不显著,水杉人工林与杉木人工林树干茎流中重金属Cd、Cu和Pb含量存在显著差异.巨桉和水杉人工林对重金属Cd和Zn有较强的过滤作用,杉木林和巨桉林对重金属Cu和Pb的过滤作用较强.Pb在3种人工林中的含量均超过国家《生活饮用水卫生标准》.3种人工林穿透水和树干茎流Cd、Pb和Zn的淋溶系数小于1,为负淋溶;杉木树干茎流Cu的淋溶系数大于1,为正淋溶.大气降雨重金属含量与降雨量之间存在显著的负相关关系,水杉人工林穿透水Cu含量、杉木人工林穿透水Cd和Cu含量、巨桉人工林穿透水和树干茎流Cd和Cu含量与降雨量之间存在显著的负相关关系.

**Abstract:** In order to understand the filtering effects of plantation on atmospheric pollutants, the concentrations of Cd, Cu, Pb and Zn in rainfall, throughfall and stemflow in *Metasequoia glyptostroboides*, *Cunninghamia lanceolata* and *Eucalyptus grandis* plantations were measured in a small catchment at the downstream (Wutongqiao section) of Minjing River from November 10, 2011 to March 4, 2012. The order of metal contents in precipitation, throughfall and stemflow was similar, i.e., Zn>Pb>Cu>Cd, in all types of plantations. There was no significant difference in Zn of throughfall between plantations, while significant differences in Cd, Cu and Pb between *M. glyptostroboides* and *C. lanceolata* existed. The plantation of *E. grandis* and *M. glyptostroboides* had better filtration effects on Cd and Zn, whereas *E. grandis* and *C. lanceolata* showed a significant filtration effects on Cu and Pb. Pb content in all plantations exceeded national drinking water standard. All leaching coefficients of Cd, Pb and Zn in throughfall and stemflow of three plantations were less than 1, except for Cu in stemflow of *C. lanceolata*. There was a significant negative relationship between precipitation and heavy metal contents. In addition, Cu contents in throughfall of *M. glyptostroboides*, Cd and Cu contents in throughfall of *C. lanceolata*, and in throughfall and stemflow of *E. grandis* had significant negative relationship with rainfall.

**Key words:** [catchment](#) [forest plantation](#) [heavy metal contents](#) [throughfall](#) [stemflow](#) [leaching coefficient](#)

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