

The stoichiometry of soil trace elements plays a critical role in regulating *Camellia Oleifera* nutrient accumulation and production

sheng lu¹, Lu Yukun¹, Luo Zipei¹, Sun Qi¹, Deng Qin¹, Lichao Wu¹, Liao Jiayuan², and Jun Yuan¹

¹Central South University of Forestry and Technology

²Sun Yat-Sen University School of Atmospheric Sciences

June 5, 2023

Abstract

Understanding the accumulation rule of nutrients is crucial to promote the production of *Camellia Oleifera*. The stoichiometry of soil microelements is more critical than their content in affecting the growth and yield of plants. However, research on *C. Oleifera* in these aspects is limited. In this study, we examined microelement content in soil and various parts of the *C. oleifera* plant and analysed the relationship between the bioaccumulation, distribution, and production of plant trace elements with the stoichiometry of soil trace elements. Our findings indicated that high-yield plants transported more Ca, Mg, and B to the shoot, while low-yield plants stored higher Fe, Zn, and Al in the root. The significantly lower bioaccumulation factor and translocation factor of B and Mg in the high-yield plants highlighted the importance of nutrient storage in promoting *C. Oleifera* yield. Multiple regression analysis and the Mantel test demonstrated that plant yield and bioaccumulation and transportation of trace elements were more closely correlated with the stoichiometry of trace elements than their content. The significantly different stoichiometry of trace elements in soil of different yields revealed that the stoichiometry of trace elements was more sensitive and reliable in reflecting the balance in soil nutrients of *C. oleifera* and regulating its growth. This study provides a comprehensive understanding of the balance in soil trace elements and their relationship with the growth of *C. oleifera* and highlights the critical role of the stoichiometry of soil trace elements in promoting high and stable production of *C. Oleifera*.

Hosted file

Manuscript.docx available at <https://authorea.com/users/625568/articles/647507-the-stoichiometry-of-soil-trace-elements-plays-a-critical-role-in-regulating-camellia-oleifera-nutrient-accumulation-and-production>

Hosted file

Figures.docx available at <https://authorea.com/users/625568/articles/647507-the-stoichiometry-of-soil-trace-elements-plays-a-critical-role-in-regulating-camellia-oleifera-nutrient-accumulation-and-production>

Hosted file

Tables.docx available at <https://authorea.com/users/625568/articles/647507-the-stoichiometry-of-soil-trace-elements-plays-a-critical-role-in-regulating-camellia-oleifera-nutrient-accumulation-and-production>