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METALLOPHYTIC PLANT SPECIES IN NICKEL DEPOSITS IN GOIÁS: PREDICTIVE MODELING WITH RANDOM FOREST

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The search for new energy sources to replace oil has driven technological change and stimulated the development of low-carbon technologies. However, the scarcity of essential mineral resources required for this transition remains a barrier. In this context, the use of metallophytic plant species has gained relevance for multiple purposes, including phytomining, phytoextraction, and phytoremediation. In Brazil, knowledge about the potential of these species is still incipient. This study applied the Random Forest algorithm to identify a set of plant species that may serve as indicators of environments with nickel (Ni) deposits, based on correlations between environmental variables and the occurrence of species in these areas. Predictive modeling with Random Forest proved effective in assessing the ability of plant species to predict different soil and environmental classes. The trained model also enabled the determination of the relative importance of each species in the classification, highlighting those with the greatest discriminative power. As a result, a set of ten priority species was identified, distributed across five botanical families that show phylogenetic relationships with families known to contain Ni hyperaccumulators, particularly in studies conducted in the Barro Alto ultramafic complex (Goiás State, Brazil). These findings may support the prospecting of Ni hyperaccumulator species as well as the development of conservation strategies for these taxa.