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Composting broadleaved tree branches: An innovative alternative to conventional forest nursery substrates in developing countries.

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Topsoil collected under forest stands and mineral soil mixed with manure, clay and straw are still the basic growing media used in the majority of forest nurseries in developing countries such as Morocco where peatlands are either protected, or non existent. The large variability in the physio-chemical properties of these materials, given that they are collected from multiple sites, inhibits the standardization of cultural regimes and the control of morpho-physiological qualities of seedlings produced in forest nurseries. These soil mixtures, which are usually dense, negatively affect normal seedling root development and constitute a potential source of pathogens and weed seeds. The removal of forest and mineral soil contributes to the depletion of local forest and agricultural soils, and consequently, decreases their productivity.

Composting chipped branches from fast growing broadleaved forest species, particularly *Acacia cyanophylla* and *Acacia Cyclops*, which are both abundant and frequently used for reforestation in semi-arid and arid zones, constitutes an innovative and viable alternative over the long term. This composting technique eliminates the need to import peat and vermiculite as well as the excessive use of forest soil. Moreover, it has been adapted to the resources and infrastructure of forest nurseries in the targeted countries. The compost meets the principal quality criteria for standard artificial substrates. Its physical properties include high water-holding capacity and air porosity. It exhibits good drainage and is well suited for use as a substrate for containerized seedling production. The chemical characteristics of the material evolve normally during the composting process, resulting in a neutral to slightly basic pH, a low C/N ratio, a decrease in ammonia and an increase in nitrates and CEC as the material matures. With irrigation, salts are leached from the system, bringing high initial electric conductivity (EC) values down to acceptable levels for containerized forest seedling production. Pure Acacia compost has good physio-chemical properties and can be used to modernize forest nursery production in developing countries. Finding additional local sources of readily available organic materials with stable physio-chemical properties would not only improve the quality of the resulting compost but could also improve seedling growth and survival, important factors in the efficient use of plantation establishment to reduce desertification.