



## **Effects of *Eucalyptus globulus* leachates on riparian reforestation with deciduous trees**

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*Eucalyptus globulus* plantations dominate a large number of riparian areas of Central Portugal affecting the soil and stream physico-chemical characteristics, hydrology and ecological processes. There is general consensus that the potential deleterious effects of eucalypt afforestations in lotic systems may be minimized by keeping or planting deciduous buffer strips along the water line. We assessed, in laboratory conditions, the effects of eucalypt leaves leachates on (i) soil hydrophobicity (Water Drop Penetration Time Method), (ii) saturated hydraulic conductivity (Laboratory Permeameter) and (iii) alder (*Alnus glutinosa* L.) seeds germination and growth. All factors are potentially able to affect (direct or indirectly) the rehabilitation process of eucalypt streams riparian areas.

Increasing concentrations of eucalypt leaves leachate determined a significant increase in deciduous soil hydrophobicity. Deciduous samples changed from hydrophilic to hydrophobic when impregnated with leaf leachates with high phenolic concentrations. Eucalypt samples were, by far, more strongly hydrophobic than any other deciduous sample. Saturated hydraulic conductivity was significantly higher in deciduous samples than over more water repellent soil types (e.g. eucalypt and deciduous soils impregnated with soil percolate collected in situ). Low concentrations of eucalypt leachates reduced significantly alder seeds germination. High leachate concentrations suppressed seeds viability.

Leaf decomposition in riparian areas may not be an exclusively terrestrial process. Eucalypt leachates that accumulate in the soil may be the result of abiotic processes that

occur in situ or be supplied, specially in Autumn, by flooding. Highly concentrated leachates are frequently produced in Summer, when litter inputs peak and stream flow is almost inexistent or reduced to pools. Our results suggested that recovery of eucalypt streams should be made after the first rains to allow both a decrease in leachate concentration in the soil and an increase in the stream flow. Alder trees should be planted as saplings to avoid the allelopathic effect of leaf leachates over germination.