



## **Changes in Physical and Chemical Soil Properties on Burnt Shrub Areas in Mediterranean Mountains, Northern Portugal**

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Human induced fire in scrublands to obtain better pastures for cattle is a relatively common practice in North Portugal. During burning, plant cover and litter layers are consumed, and the mineral soil is heated, resulting in changes to physical, chemical, mineralogical, and biological soil properties. Aiming at evaluating the effect of this kind of fires on a set of physical and chemical soil properties, two study areas were selected in contrasting mountain environments: Edroso, Vinhais municipality, NE Portugal, with typical Mediterranean climate, and Revelhe, Fafe, NW Portugal, with a strong ocean-influenced climate. In both, sampling was carried out in contiguous areas burnt and not burnt, covered by shrub vegetation, predominantly *Cytisus multiflorus* and *Ulex europaeus*. In each study area (Edroso and Revelhe) 16 locations were selected for soil sampling (8 in the burned area and 8 in the not burnt area), six months after fire occurrence. Disturbed soil samples were collected in the layers 0-5, 5-10, 10-15, 15-20 and 20-30 cm depth, for assessing organic matter, N, P and K concentration, cation exchange capacity and related determinations, soil pH, electrical conductivity and soil texture. Undisturbed samples were collected, in 100 cm<sup>3</sup> cylinders, to determine bulk density in the same above mentioned layers, and permeability in the 0-5 cm layer. Compared results of burnt and not burnt areas in Edroso and Revelhe study sites, show that coarse elements content and permeability decreased and bulk density slightly increased with the fire effect. Chemical properties in both sites changed with after fire, as organic matter content, exchangeable Al and cation exchange capacity increased, the opposite trend being found for phosphorus, sum of exchangeable bases and electrical conductivity. Potassium, total nitrogen and exchangeable acidity showed different soil responses to fire in the two study areas. Results stress the clear effects of fire on fertility related soil properties, not only chemical but also physical, which is decisive for the post-fire recover of burnt shrub communities, in terms of vegetation and soil functions in these marginal mountain environments.