



## Water quality response to slash-pile burning in a Mediterranean environment (Croatia)

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Slash-pile burning is a common practice in land management across the Mediterranean environment mainly for removing unwanted biomass. This practice is known to have negative effects on topsoil due to high temperatures. However, the impact on water quality has often been neglected. To address this issue, two experimental burns were conducted: one with moderate (MS), and one with high (HS) severity, to monitor the impact of these practices on water quality. The unburned (UB) treatment, was set aside from the burn treatments. The natural vegetation is composed of Maquis shrubland and meadow plants (*Foeniculum vulgare* Mill., *Elymus repens* (L.) Gould, *Digitaria sanguinalis* (L.) Scop.). The soil type is classified as *Leptosol* and has a silty clay loam texture with 11.5%, 58.9%, and 29.6% of sand, silt, and clay content, respectively. Treatments were carried out on a sloping terrain (~ 18 °) characteristic of the Mediterranean landscape. Runoff and erosion samples were collected 22 times during the two-year study after major rainfall events. The properties studied were: surface runoff, sediment yield, total carbon in sediment (TC), and water quality parameters such as pH, electrical conductivity (EC), and concentrations of bromine (Br<sup>-</sup>), chloride (Cl<sup>-</sup>), sulfate (SO<sub>4</sub><sup>2-</sup>), phosphate (PO<sub>4</sub><sup>3-</sup>), fluoride (F<sup>-</sup>), potassium (K<sup>+</sup>), sodium (Na<sup>+</sup>), calcium (Ca<sup>2+</sup>), and magnesium (Mg<sup>2+</sup>). Overall, changes in water quality were consistent with the effects of burning in the first post-burn months, while runoff and sediment yield were more dependent on precipitation patterns, regardless of vegetation cover in the later sampling period. TC had higher levels in HS than in MS, and was increased in both burn treatments at later sampling dates. In the context of changes in water chemistry, the observed effect was more pronounced in HS, while the hydrological response showed high levels in MS. However, the UB also showed significant changes in water quality following major rain events, which was attributed to soil saturation. Our research suggests that slash-pile burning has negative impact on water quality, and it is recommended that biomass be used in other ways, especially in the context of soil and water conservation.

**Keywords:** burning, runoff, rainfall, vegetation, water conservation

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