The role of soil mineral composition in defining Istrian terroir attributes

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A strong debate arises nowadays concerning the concept of terroir, mainly referring to the relationship between soil properties and wine quality. In our ongoing study we investigate soils in three vineyards where Istrian Malvasia, the most widespread cultivar in Istria is grown. Our goal is to compare their mineral composition, physical and chemical properties and to explain how they could indirectly influence wine quality. We present here the first results of our study related to mineral investigation of soils. The studied vineyards are as follows: (1) Monte Coronichi characterised by soil developed on Cretaceous limestone; (2) Sveta Lucija and (3) Grimalda, both characterised by soils developed on Eocene flysch. Terra rossa soil is situated on limestone while two different soils are developed on Eocene flysch, vertic cambisol at Sveta Lucija and eutric brown soil at Grimalda. While terra rossa has the same texture throughout profile (clay), the texture of the other two soils varies from silty clay to loam, creating conditions for better drainage.

The mineral content of these soils differs significantly. Kaolinites, followed by illite, quartz and hematite dominate in terra rossa. Kaolinite which does not form intercalation compounds with dimethylsulfoxide is the dominant mineral in clay fraction which also contains illite, well crystallised kaolinite and mixed-layer clay minerals. The mean value of the Fe_d/ Fe_t ratio in terra rossa, which is taken as an index of weathering is 0.95 and reflects very high degree of weathering of Fe-containing primary silicates. Calcite, followed by quartz, mica and plagioclase dominate in vertic cambisol. Illite is main mineral phase in clay fraction which also contains mixed-layer clay minerals, kaolinites, smectite and vermiculite. The main mineral phases of Grimalda soil are calcite and quartz followed by plagioclase, K-feldspar and mica. Dominant phase in the clay fraction is illite while mixed-layer clay minerals, kaolinites, smectite and vermiculite are sporadically present. Clay mineral content of these soils is in line with cation exchange capacity indicating higher nutrient retention in soils developed on flysch.

Data acquired in this investigation could be used for the appellation, i.e. a legally defined and protected geographical indication, of Istrian Malvasia.