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## Spatial Variability of Nitrogen Mineralisation in Wine Grape Fields in Chile

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### Abstract

Nitrogen is the most important element determining yield and quality of wine grape.

Actual management has tended to minimise the use of mineral N on vineyards, relying more on the soil N being mineralised each season. The balance between vineyard N demand and N supply is critical, not only from the production stand point but also from the environmental one; however few studies have been performed to estimate the amounts of N mineralised and the variability of the mineralisation in vineyard fields, in Chile.

Two fields of different soil texture, of approximately 2-ha each, were studied during the growing season (November through April). Intact soil cores (0–20 cm), containing ionic resins in the bottom, were incubated *in situ*, for 4 or 5 periods lasting 35 days each. Sampling points were systematically distributed over the fields with the help of a GPS receiver and a Geographic Information System, with an intensity > 10 samples ha<sup>-1</sup>. After each incubation period soil and resins were extracted with 2 M KCl to determine N-NH<sub>4</sub> and N-NO<sub>3</sub>; N mineralised during each period was estimated subtracting the amount of N present in the soil + resin at the end of the incubation from that at the beginning of it.

Results showed a large spatial variability (CV > 60%) of N mineralised in both fields. Over the entire season, net mineralisation was positive in all areas of the fields, ranging from 0.1 to 1.5 kg N ha<sup>-1</sup> d<sup>-1</sup>. Average mineralisation rate was approximately 0.5 kg N ha<sup>-1</sup> d<sup>-1</sup>, which would yield enough nitrogen for sustaining grape yields of up to 15 ton ha<sup>-1</sup>, much higher than actual yields for high quality grapes.

**Keywords:** N mineralisation, spatial variability, wine grape, GIS