



Improvement of wine terroir management according to biogeochemical cycle of nitrogen in soil

Nassr Najat (1), Langenfeld Aude (1), Benbrahim Mohammed (1), Ley Lionel (2), Deliere Laurent (3), Goutouly Jean-Pascal (4), Lafond David (5), and Thiollet-Scholtus Marie (6)

(1) CRITT RITMO Agroenvironnement - 37 rue de Herrlisheim - 68000 Colmar - France, (2) INRA UE0871- 28, rue de Herrlisheim - F-68021 Colmar - France, (3) INRA UMR 1065 - 71 av E. Bourlaux - 33882 Villenave d'Ornon - France, (4) INRA UMR 1287 - 210 chemin De Leysotte - 33 882 Villenave d'Ornon Cedex - France, (5) IFV Institut Français de la Vigne et du Vin - 42 Rue Georges Morel - 49070 Beaucouze - France, (6) INRA UE1117 - 28, rue de Herrlisheim - F-68021 Colmar - France

Good wine terroir production implies a well-balanced Biogeochemical Cycle of Nitrogen (BCN) at field level i.e. in soil and in plant. Nitrogen is very important for grape quality and soil sustainability. The mineralization of organic nitrogen is the main source of mineral nitrogen for the vine. This mineralization depends mainly on the soil microbial activity. This study is focused on the functional microbial populations implicated in the BCN, in particular nitrifying bacteria.

An experimental network with 6 vine sites located in Atlantic coast (Loire valley and Bordeaux) and in North-East (Alsace) of France has been set up since 2012. These vine sites represent a diversity of environmental factors (i.e. soil and climate). The adopted approach is based on the measure of several indicators to assess nitrogen dynamic in soil, i.e. nitrogen mineralization, regarding microbial biomass and activity. Statistical analyses are performed to determine the relationship between biological indicator and nitrogen mineralisation regarding farmer's practices. The variability of the BCN indicators seems to be correlated to the physical and chemical parameters in the soil of the field.

For all the sites, the bacterial biomass is correlated to the rate and kinetic of nitrogen in soil, however this bioindicator depend also on others parameters. Moreover, the functional bacterial diversity depends on the soil organic matter content. Differences in the bacterial biomass and kinetic of nitrogen mineralization are observed between the sites with clayey (Loire valley site) and sandy soils (Bordeaux site). In some tested vine systems, effects on bacterial activity and nitrogen dynamic are also observed depending on the farmer's practices: soil tillage, reduction of inputs, i.e. pesticides and fertilizers, and soil cover management between rows.

The BCN indicators seem to be strong to assess the dynamics of the nitrogen in various sites underline the functional diversity of the soils.

These BCN indicators could help to manage the dynamics of the nitrogen and the nitrogenous nutrition of the vine in innovative sites/systems with various farmer's practices.