LIFE ZEOWINE: ZEOlite and WINEry waste as innovative product for wine production

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INTRODUCTION

Due to the increasing pressure imposed to agricultural soils and to their consequent fertility decrease, the development of management strategies able to increase the quality and productivity of soils has become a common priority. In particular, Mediterranean vineyards are exposed to fertility decline due to continuous tillage to maintain bare soils, and to contamination due to repeated applications of copper, to fight against vine diseases such as mildew. In particular, the loss of soil biodiversity, playing a key role in maintaining soil fertility and its health status, could irreversibly jeopardize the state of health of the soil and, therefore, crops.

PROJECT OBJECTIVES

LIFE ZEOWINE project (LIFE17 ENV/ IT/000427) will demonstrate the improvement of soil protection and sustainability, grape quality, and yield stability through the development and application of an innovative by-product derived from the composting of winery wastes and natural zeolite (ZEOWINE COMPOST). In particular, the application of ZEOWINE in viticulture will be able to improve soil agronomic and biological properties in terms of:

- carbon sequestration;
- biodiversity;
- soil structure;
- water retention capacity

Fig. 1: ZEOWINE cycle

SOIL QUALITY INDICATORS

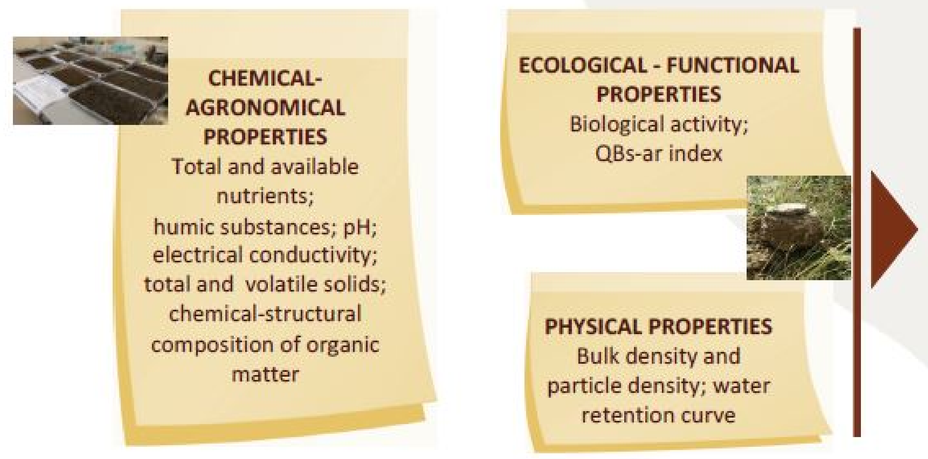


Fig. 2: Soil quality indicators

DEMONSTRATIVE VINEYARDS

The obtained ZEOWINE composts have been applied to to young and productive vineyards in different terroir.

Fig. 3: Location of vineyards; Fig. 4-6: Demonstrative Vineyards

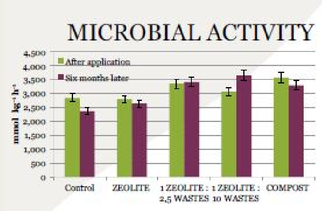
EXPECTED RESULTS

Considering a single soil application of ZEOWINE, the project will demonstrate its effectiveness in IMPROVING THE SOIL QUALITY IN TERMS OF: ORGANIC MATTER - The organic carbon will go from 39 to 45-46.8 tons/ha; the total nitrogen will go from 3.6 at 3.9 tons/ha; humic carbon will drop from 0.78 to 1.90-2.13 tons/ha; total potassium will go from 7.5 to 8.4 tons/ha. BIODIVERSITY – An increase in biodiversity in terms of enzymatic activities related to the nutrient cycles, microbial abundance and soil fauna. In particular, the QBS-ar index will go from 80 to 110; basal respiration from 5 to 10-15 mg CO_2-C/kg/day; the β-glucosidase activity from 250 to 350 mmol/kg/h; the phosphatase activity from 150 to 200 mmol/kg/h. WATER RETENTION CAPACITY OF SOIL - For one ha of soil treated with ZEOWINE, an increase in the water reserve of 8.3 m3 of water is expected. SOIL STRUCTURE - The average diameter of the water-stable aggregates of the vineyard soil will pass from 0.5 to 1-1.2 mm. REDUCTION OF BIOAVAILABLE COPPER CONTENT - Bioavailable copper it will go from 15 to 10.5 mg Cu/ kg.

PRELIMINARY RESULTS

✓ Increase of about 40% in microbial activity in ZEOWINE treated soils after six months.

✓Increase of about 15% in organic matter in ZEOWINE treated soils after six months.



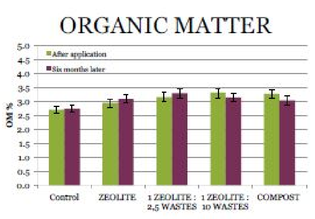


Fig. 4: Microbial Activity; Fig. 5: Organic Matter

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