



# Supplementary Material: Monitoring of Seasonal Under-Vine CO<sub>2</sub> Effluxes in a Vineyard under Different Fertilization Practices

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**Figure S1.** Relative humidity (%) and rainfall (mm) during the two consecutive season 2021 and 2022 in Italian rainfed tested vineyard. Data were obtained by a *in situ* weather station.

EZO-CO2 Embedded Carbon Dioxide Sensor	
Reads	Gaseous CO <sub>2</sub>
Range	0 – 10,000 ppm
Calibration	Factory calibrated
Pressure	Atmosphere only
Response time	1 reading per second
Resolution	1 ppm
Accuracy	(+/- 5%) + (+/- 50 ppm)
Connector	5 lead data cable
Warmup time	10 seconds
Cable length	1 meter
Data protocol	UART & I2C
Default I2C address	105 (0x69)
Data format	ASCII
Operating voltage	3.3V – 5V
Life expectancy	~5.5 years

**Figure S2.** Technical sheet of the sensor used for the detection of CO<sub>2</sub>.

<b>SHT-10 Mesh-protected Weather-proof Temperature/Humidity Sensor</b>	
Body dimensions	14mm diameter, 50mm long
Cable length	1 meter
Humidity readings	4.5% accuracy
Temperature readings	0.5°C accuracy
Working Temperature/Humidity range	-40°C ~ 120°C, 0~100% RH

**Figure S3.** Technical sheet of the sensor used for the detection of temperature and moisture of the soil.

<b>AGROFERT MB Composition</b>	
Total NITROGEN (N) of which: 1.0% organic - 6.2% ammonia - 2.8% urea	10.00%
Total PHOSPHORIC ANHYDRIDE (P <sub>2</sub> O <sub>5</sub> )	5.00%
POTASSIUM OXIDE (K <sub>2</sub> O) Soluble in water	15.00%
Total MAGNESIUM OXIDE (MgO)	3.00%
Total SULPHURIC ANHYDRIDE (SO <sub>3</sub> )	14.00%
Total BORON (B)	0.05%
Total IRON (Fe)	0.50%
Total ZINC (Zn)	0.01%
ORGANIC CARBON C	7.50%
ORGANIC CARBON (C) HUMIC AND FULVIC ACIDS (HA+FA)	3.00%
HUMIFICATION RATE (HR)	40.00%

**Figure S4.** Technical sheet of the fertilizer used for treatment in spring.

<b>BELFRUTTO MB Composition</b>	
Total NITROGEN (N) of which: 1.0% organic - 4% ammonia	5.00%
Total PHOSPHORIC ANHYDRIDE (P <sub>2</sub> O <sub>5</sub> )	10.00%
POTASSIUM OXIDE (K <sub>2</sub> O) Soluble in water	15.00%
Total MAGNESIUM OXIDE (MgO)	5.00%
Total SULPHURIC ANHYDRIDE (SO <sub>3</sub> )	5.00%
Total BORON (B)	0.10%
Total IRON (Fe)	0.70%
Total ZINC (Zn)	0.01%
ORGANIC CARBON C	7.50%
ORGANIC CARBON (C) HUMIC AND FULVIC ACIDS (HA+FA)	3.00%
HUMIFICATION RATE (HR)	40.00%

**Figure S5.** Technical sheet of the fertilizer used for treatment in autumn.

**Table S1.** Generalized linear mixed-effect models of changes in CO<sub>2</sub> fluxes, soil temperature (Ts) and soil moisture (Rh – relative humidity %) over time (2021 and 2022 seasons).

<b>2021</b>	Effects	Num DF	F Value	P value
<b>CO<sub>2</sub></b>	Treatment	79	2.056256	0.001
<b>Ts</b>	Treatment	79	12.19611	< 0.0001
<b>Rh</b>	Treatment	79	1.474217	0.043
<b>2022</b>	Effects	Num GDL	F	Pr > F
<b>CO<sub>2</sub></b>	Treatment	76	13.419	< 0.0001
<b>Ts</b>	Treatment	76	118.9841	< 0.0001
<b>Rh</b>	Treatment	76	5.464892	< 0.0001