Dr. Leonello Anello Biodynamic Agronomist

business consultant

- In 2014 I included in the research on the state of soils and plants of vine conducted for over 10 years with the modern biodynamic method, San Giuseppe from Stella di Campalto too.
- Field and laboratory research has involved researchers from Italian such as UNIBO, UNISI and Spanish universities.
- The company management from 2001 has not provided for nutritional contributionsin the vineyards and the removal of all the grape and wood products pruning.
- The practical evidence of the quantitative and qualitative productions, the absence of manifestations of deficiencies on the plants, confirmed the assumptions of modern biodynamics on the origin of the plants nutritional elements.
- The analyzes performed were intended to confirm or refute these circumstances.

- Data of the research in this company and the comparison with a neighboring vineyard with conventional chemical management.

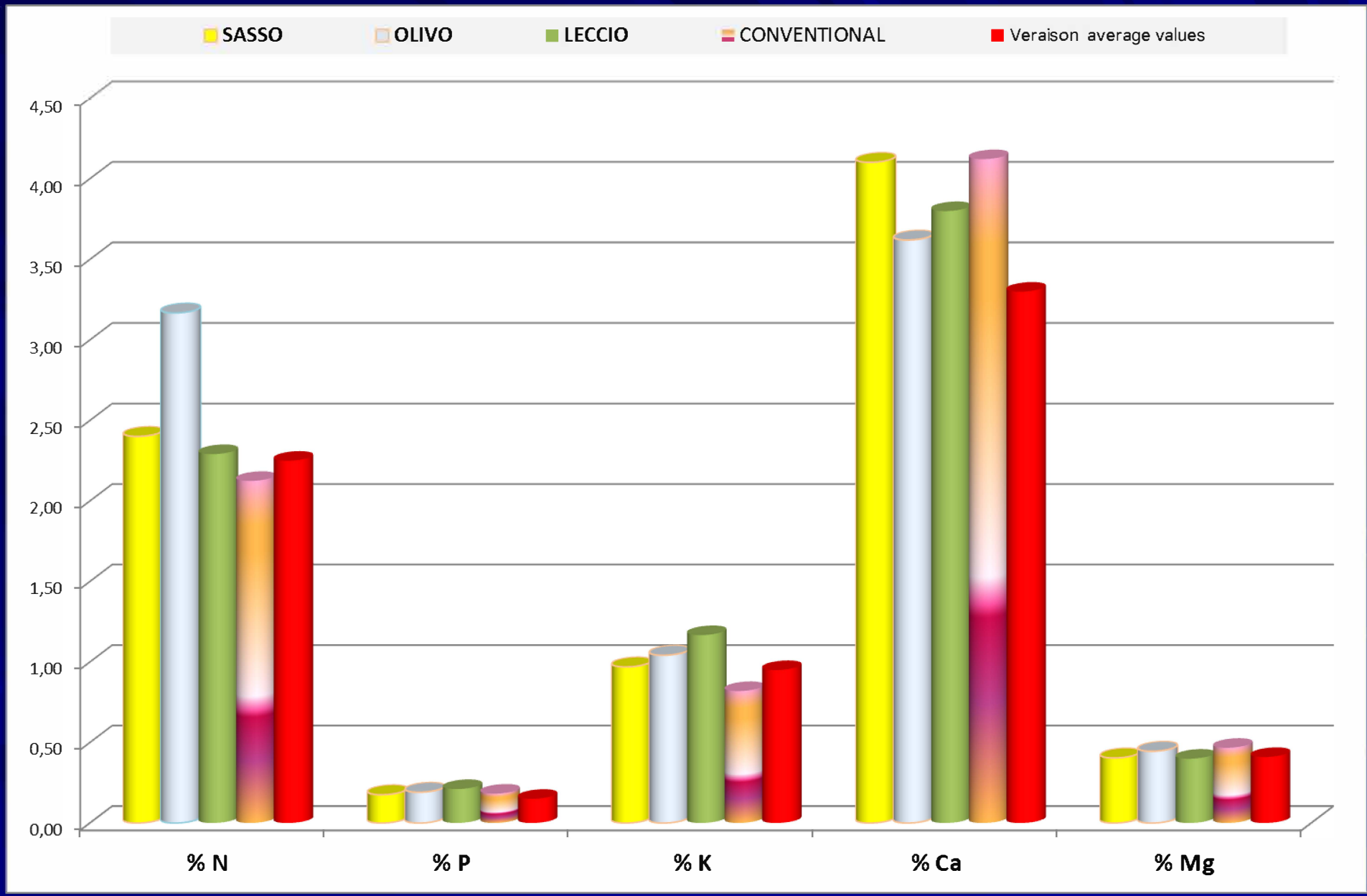
- 2019 results of the presence of total copper metal in the soil

VINEYARD	TRT	AREA	%N	%P	%K	%Ca	%Mg
SASSO	DIN	A1	2,45	0,179	0,97	3,99	0,443
SASSO	DIN	A2	2,32	0,171	0,98	4,01	0,378
SASSO	DIN	A3	2,44	0,178	0,96	4,31	0,391
OLIVO	DIN	A1	2,29	0,167	1,06	3,48	0,403
OLIVO	DIN	A2	2,33	0,205	1,13	3,60	0,433
OLIVO	DIN	A3	2,42	0,201	0,94	3,78	0,501
LECCIO	DIN	A1	2,60	0,197	1,06	3,80	0,445
LECCIO	DIN	A2	2,10	0,206	1,25	3,74	0,361
LECCIO	DIN	A3	2,18	0,230	1,19	3,86	0,392
CONVENTIONAL			2,24	0,187	0,78	3,77	0,468
CONVENTIONAL			2,12	0,183	0,78	4,42	0,503
CONVENTIONAL			2,01	0,178	0,89	4,17	0,430

REFERENCE VALUES	TRT	AREA	%N	%P	%K	%Ca	%Mg
ALLEGATION	DIN	A1	2.40-3.70	0.16-0.35	0.70-1.60	2.00-3.70	0.20-0.44
Veraison	DIN	A2	1.60-2.90	0.10-0.20	0.50-1.40	2.40-4.20	0.17-0.65

VINEYARD	TRT	AREA	ppm Fe	ppm Mn	ppm Zn	ppm B	ppm Na
SASSO	DIN	A1	114	111	14	76	66
SASSO	DIN	A2	118	120	28	71	69
SASSO	DIN	A3	126	122	17	66	59
OLIVO	DIN	A1	140	124	14	82	68
OLIVO	DIN	A2	149	123	13	79	90
OLIVO	DIN	A3	143	128	19	72	115
LECCIO	DIN	A1	112	168	15	103	107
LECCIO	DIN	A2	109	159	11	78	92
LECCIO	DIN	A3	106	228	13	69	85
CONVENTIONAL			105	93	21	89	70
CONVENTIONAL			88	95	16	69	58
CONVENTIONAL			133	106	21	82	58

REFERENCE VALUES			ppm Fe	ppm Mn	ppm Zn	ppm B	ppm Na
ALLEGATION			0.13-0.30	60-140	20-80	40-180	
Veraison			60-200	40-180	5. - 60	20-60	


SASSO
OLIVO
LECCIO
CONVENTIONAL
Veraison average values
4,50
4,00
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
% N
% P
% K
% Ca
% Mg

60 leaves taken on 3 areas

	Leaf Macroelements (% by weight))					Leaf Microelements (µg · g-1 by weight)				
Thesis	**N**	**P**	**K**	**Ca**	**Mg**	**Fe**	**Mn**	**Zn**	**B**	**Na**
LECCIO	2,29	0,211	1,16 a	3,80 ab	0,40	109 b	185,0 a	13,0	83,3	94,6
SASSO	2,40	0,176	0,97 bc	4,10 a	0,40	119 b	117,6 b	19,6	71,0	64,6
OLIVO	2,34	0,191	1,04 ab	3,62 b	0,44	108 b	125,0 b	15,3	77,6	91,0
CONVENTIONAL	2,12	0,182	0,81 c	4,12a	0,46	144 a	98,0 b	19,3	80,0	62,0
Significances	*n.s.*	*n.s.*	**	*	*n.s.*	*	**	*n.s.*	*n.s.*	*n.s.*

n.s.: not significant (P=0,05); * significant by P < 0,05; ** significant by 0,01≥P>0,001

The concentrations of the mineral elements and the total chlorophyll content (SPAD Index) of the leaves of the company vineyards show an excellent nutritional status.

Soil

AZIENDA "STELLA DI CAMPALTO"												
Campione suolo	pH [a]	Cond. Elettr. [b] (dS m^{-1})	Sost. Org. [c] (%)	Calcare tot. [d] (%)	CSC [e] ($cmol_{(+)}$ kg^{-1})	Analisi granulometrica [f]				P [g] (%)	K [g] (%)
						% Sabbia (>50 µm)	% Limo	% Argilla (<2 µm)	Tessitura		
1 CURVA LATO BOSCO	-	-	1.61	-	-	-	-	-	-	-	-
2 CURVA LATO CANTINA	-	-	1.53	-	-	-	-	-	-	-	-
3 SASSO	7.9	0.45	1.52	15.4	15	37	38	25	FRANCA	0.06	1.8
4 PISCINA	-	-	1.77	-	-	-	-	-	-	-	-
5 LECCIO	7.9	0.48	1.25	14.5	12.5	41	38	21	FRANCA	0.05	2.5
6 BOSCO	-	-	1.11	-	-	-	-	-	-	-	-
7 OLIVO	7.7	0.41	1.47	3.9	12.1	47	30	23	FRANCA	0.05	2.3
8 BASSA	-	-	1.76	-	-	-	-	-	-	-	-

		pH	Condu Electrical conducti-vity (dS m^{-1})	Sostanz Organic substances (%)	Total limestone (%)	CSC ($cmol_{(+)}$ kg^{-1})	P_2O_5 (%)	P (%)	K_2O (%)	K (%)
1	CURVA LATO BOSCO	-	-	1,61	-	-	-	-	-	-
2	CURVA LATO CANTINA	-	-	1,53	-	-	-	-	-	-
3	SASSO	7,9	0,448	1,52	15,4	15	0,14	0,06	2,2	1,8
4	PISCINA	-	-	1,77	-	-	-	-	-	-
5	LECCIO	7,9	0,475	1,25	14,5	12,5	0,11	0,05	3	2,5
6	BOSCO	-	-	1,11	-	-	-	-	-	-
7	OLIVO	7,7	0,41	1,47	3,9	12,1	0,11	0,05	2,8	2,3
8	BASSA	-	-	1,76	-	-	-	-	-	-

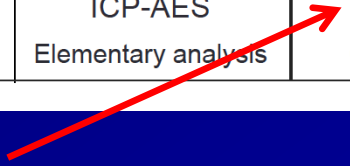
- To confirm the practical evidence, the research gave the reported results.

- We report the results of soil analysis carried out according to usual laboratory procedures and the comparison with the standard values.

SAMPLE Nr: 1523660 DATE OF RECEIPT: 07/05/2015

Identification: Soil - V. SASSO

Analysis description	METHOD	RESULT	U.M.	NOTES	
Sand (2.0 -0.02 mm)	Densimetry	54	%		
Silt (0.02-0.002 mm)	Densimetry	26	%	SL	
Clay (<0.002 mm)	Densimetry	20	%		
pH (in water)	Potentiometry	8.3	unit pH mg		
Exchangeable potassium	ICP-AES	226	K/Kg mg		
Exchangeable potassium (as K20)	ICP-AIES	272	1<20/Kg	Very Rich	
Organic substance	Elementary analysis	11.55	g/kg	Very Low	
Organic carbon	Elementary analysis	6.70	g/kg		
Cation Exchange Capacity	ICP-AIES	19.7	meql100 g	dium	
Limestone active	Permanganatometric titration	2.1	%	Normal	
Total limestone	Volumetry	10.6	%	Average limestone	
Assimilable phosphorus	ICP-AES	1	mg/kg	Very Low	
Total nitrogen	Elementary analysis	0.37	g/kg	Very Low	

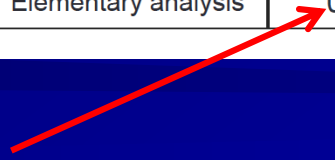


Standard values 30-60

SAMPLE Nr: 1523660 DATE OF RECEIPT: 07/05/2015

Identification: Soil - V. SASSO

Analysis description	METHOD	RESULT	U.M.	NOTES	
Sand (2.0 -0.02 mm)	Densimetry	54	%		
Silt (0.02-0.002 mm)	Densimetry	26	%	SL	
Clay (<0.002 mm)	Densimetry	20	%		
pH (in water)	Potentiometry	8.3	unit pH mg		
Exchangeable potassium	ICP-AES	226	K/Kg mg		
Exchangeable potassium (as K20)	ICP-AIES	272	1<20/Kg	Very Rich	
Organic substance	Elementary analysis	11.55	g/kg	Very Low	
Organic carbon	Elementary analysis	6.70	g/kg		
Cation Exchange Capacity	ICP-AIES	19.7	meql100 g	dium	
Limestone active	Permanganatometric titration	2.1	%	Normal	
Total limestone	Volumetry	10.6	%	Average limestone	
Assimilable phosphorus	ICP-AES	1	mg/kg	Very Low	
Total nitrogen	Elementary analysis	0.37	g/kg	Very Low	

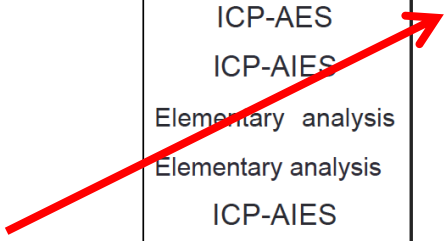


Standard values 1 – 1,5

SAMPLE Nr: 1523658 DATE OF RECEIPT: 07/05/2015

Identification: Soil - V. SASSO

Analysis description	METHOD	RESULT	U.M.	NOTES	
Sand (2.0 -0.02 mm)	Densimetry	68	%		
Silt (0.02-0.002 mm)	Densimetry	24	%	S	
Clay (<0.002 mm)	Densimetry	8	%		
pH (in water)	Potentiometry	7.8	unit pH mg		
Exchangeable potassium	ICP-AES	309	K/Kg mg		
Exchangeable potassium (as K20)	ICP-AIES	372	mg K20/Kg	Very Rich	
Organic substance	Elementary analysis	8.10	g/kg	Very Low	
Organic carbon	Elementary analysis	4.70	g/kg		
Cation Exchange Capacity	ICP-AIES	19.5	meql100 g	Medium	
Limestone active	Permanganatometric titration	0.2	%	Normal	
Total limestone	Volumetry	4.8	%	Average limestone	
Assimilable phosphorus	ICP-AES	7	mg/kg	Very Low	
Total nitrogen	Elementary analysis	0.17	g/k	Very Low	



Objective indicators do not reveal any nutritional problems

- Quantity of produced grapes
- Grape quality
- Absence of anomalous manifestations on the foliage Quantity of elements in the leaves
- Quantity of total elements in the soil

- **SOIL ANALYSIS BASED ON SUPPOSED SIMULATION PROCEDURES OF THE EXTRACTIVE CAPACITIES OF THE PLANTS AND REFERENCES AT STANDARD VALUES DENOTE DEFICIENCIES OR EXCESS**

What is the reality?

- From 2001 to 2019 the anti-peronosporic treatments in the San Giuseppe factory were carried out exclusively with copper

- The assumptions of modern biodynamics do not foresee accumulations. The following results confirm this (analysis of the copper supply outside the vineyard is also reported)

SOIL ANALYSIS 2019 TOTAL COPPER 58.8 mg / kg

SAMPLE Nr: 19028073 DATE OF RECEIPT : 18/04/2019

Identification: Soil Sample date: 06/03/2019 Sample ID: VIGNA CURVA SELLAR SIDE

Tipologia del campione: SOIL

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	19.33	g/kg		
Total copper	ICP-AOES	58.8	mg/kg		
Total potassium	ICP-AOES	2 094.8	mg K/Kg		
Total phosphorus	ICP-AOES	326.15	mg P/Kg		
pH (in water)	Potentiometry	8.3	unit pH		
Sand (2.0 - 0.02 mm)	Densimetry	35	%		
Silt (0.02 - 0.002 mm)	Densimetry	46	%	LS	
Clay (<0.002 mm)	Densimetry	19	%		
Cation exchange capacity	ICP-AOES	18.4	meq/100g	Med	
Conductivity at 20°C	Conductometry	0.4	mS/cm		
Total limestone	Volumetry	7.0	%	LgCa	

SOIL ANALYSIS 2019
TOTAL COPPER 45 mg / kg

SAMPLE Nr: 19028075
DATE OF RECEIPT : 18/04/2019
Identification: Soil Sample date: 06/03/2019
Sample ID: VIGNA SASSO TILLED GROUND
Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	12.12	g/kg		
Total copper	ICP-AOES	45	mg/kg		
Total potassium	ICP-AOES	1709.1	mg K/Kg		
Total phosphorus	ICP-AOES	330.76	mg P/Kg		
pH (in water)	Potentiometry	8.3	unit pH		
Sand (2.0 - 0,02 mm)	Densimetry	36	%		
Silt (0.02 - 0.002 mm)	Densimetry	45	%	LS	
Clay (<0.002 mm)	Densimetry	19	%		
Cation exchange capacity	ICP-AOES	19.9	meq/100g	Med	
Conductivity at 20°C	Conductometry	0.4	mS/cm		
Total limestone	Volumetry	13.9	%	MeCa	

TOTAL RAE 43.3 mg / kg

SAMPLE Nr: 19028076 DATE OF RECEIPT : 18/04/2019

Identification: Soil Sample date: 06/03/2019 Sample ID: VIGNA BOSCO – NOT TILLED GROUND

Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	15.86	g/kg		
Total copper	ICP-AOES	43.3	mg/kg		
Total potassium	ICP-AOES	3573.6	mg K/Kg		
Total phosphorus	ICP-AOES	294.66	mg P/Kg		
pH (in water)	Potentiometry	8.1	unit pH		

TOTAL COPPER 64.8 mg / kg

SAMPLE Nr: 19028079 DATE OF RECEIPT : 18/04/2019

Identification: Soil Sample date: 06/03/2019 Sample ID: VIGNA ULIVO – TILLED GROUND

Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	9.43	g/kg		
Total copper	ICP-AOES	64.8	mg/kg		
Total potassium	ICP-AOES	2223.1	mg K/Kg		
Total phosphorus	ICP-AOES	298.18	mg P/Kg		
pH (in water)	Potentiometry	8.2	unit pH		

TOTAL COPPER 58.7 mg / kg

SAMPLE Nr: 19028080 DATE OF RECEIPT : 18/04/2019

Identification: Soil Sample date: 06/03/2019 Sample ID: VIGNA SAN GIUSEPPE – TILLED GROUND

Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	9.46	g/kg		
Total copper	ICP-AOES	58.7	mg/kg		
Total potassium	ICP-AOES	2407.5	mg K/Kg		
Total phosphorus	ICP-AOES	395.76	mg P/Kg		
pH (in water)	Potentiometry	8.2	unit pH		

TOTAL COPPER 52.7 mg / kg

SAMPLE Nr: 19028081 DATE OF RECEIPT : 18/04/2019

Identification: Soil Sample date: 06/03/2019 Sample ID: VIGNA LECCIO – TILLED GROUND

Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	12.79	g/kg		
Total copper	ICP-AOES	52.7	mg/kg		
Total potassium	ICP-AOES	1779.1	mg K/Kg		
Total phosphorus	ICP-AOES	240.99	mg P/Kg		
pH (in water)	Potentiometry	8.3	unit pH		

TOTAL COPPER 56 mg / kg

SAMPLE Nr: 19028082

DATE OF RECEIPT : 18/04/2019

Identification: Soil Sample date: 06/03/2019

Sample ID: VIGNA BOSCO – TILLED GROUND

Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	5.31	g/kg		
Total copper	ICP-AOES	56.0	mg/kg		
Total potassium	ICP-AOES	2373.7	mg K/Kg		
Total phosphorus	ICP-AOES	380.54	mg P/Kg		
pH (in water)	Potentiometry	8.3	unit pH		

TOTAL COPPER 67.7 mg / kg

SAMPLE Nr: 19028083
DATE OF RECEIPT : 18/04/2019
Identification: Soil Sample date: 06/03/2019
Sample ID: VIGNA BASSA – TILLED GROUND
Tipologia del campione: Ground

PARAMETER / METHOD	METHOD	RESULT	U.M.	NOTES	
Organic carbon	Elementary analysis	17.99	g/kg		
Total copper	ICP-AOES	67.7	mg/kg		
Total potassium	ICP-AOES	2890.3	mg K/Kg		
Total phosphorus	ICP-AOES	311.50	mg P/Kg		
pH (in water)	Potentiometry	8.3	unit pH		

ANALYSIS

- LAND UNCULTIVATED FOR DECADES AND IT HAS NEVER BEEN A VINEYARD

- TOTAL COPPER PARAMETER DUE TO THE NATURAL SUPPLY

SAMPLE Nr: 18047427 DATE OF RECEIPT: 02/08/2018

Identification: Soil - Sample date: 01/08/2018 - ADDRESS: MONTALCINO - ID SAMPLE: 3 - SAMPLE TYPE: GROUND - SAMPLE DESCRIPTION: VIGNA NUOVA FONDO

PARAMETER / METHOD	METHOD	RISULT	U.M.	NOTES	
pH (in acqua)	Potentiometry	8.2	unità pH		
Sand (2.0 - 0.02 mm)	Densimetry	48	%		
Silt (0.02 - 0.002 mm)	Densimetry	36	%	SL	
Clay (<0.002 mm)	Densimetry	16	%		
Rame	ICP-AOES	58.6	mg/kg		
Total phosphorus	ICP-AOES	287	mg P/Kg		
Total Potassium	ICP-AOES	3 489	mg K/Kg		
Total Limestone	Volumetry	8.8	%	LgCa	
Limestone active	Permanganatome titration	2.8	%	Nor	
Total Magnesium	ICP-AOES	9 732	mg Mg/Kg		
Conductivity at 20°C	Conductometry	0.3	mS/cm		