EBD Treated Soil & Irrigation Water in Agriculture
Summary of Lab Results

Presented by:

FREYTECH INC.

1. INTRODUCTION TO FREYTECH EBD TECHNOLOGY

Environmental Balance Device (EBD) development entailed numerous trials over the course of the last 13 years. After considerable study in natural science focusing on agriculture and bioremediation, our team concluded that the elevated concentrations of Reactive Oxygen Species (ROS) which is an unstable and oxidizing form of oxygen present in higher concentrations in polluted ecosystems / farms, are detrimental to microbial populations. Our team perfected the combination and integration of materials which balance nature’s energy fields, causing ROS to revert to stable, healthy oxygen while also enhancing the resonance of the matter contained within the EBD treated farm perimeter. Improved oxygen quality combined with optimized resonance, induces the native microbes to secrete specialized and powerful degradative enzymes through biosynthesis.

By stabilizing ROS causing it to revert back to healthy oxygen, native microbial colonies are thereby able to function optimally, metabolizing contaminants, physically improving soil granular and crumb structure, increasing cation exchange capacity in the soil, enhancing plant health, and increasing crop productivity. EBD also sequesters CO2 and nitrogen from the atmosphere and stores it in the soil thereby improving soil quality and nutritive values while also helping to reduce global warming. EBD has also been shown to effectively treat numerous agricultural diseases and cause reductions in insect /pest infestation.

EBD greatly enhances this natural process on an on-going 24/7 basis. EBD does not use any chemicals, fuel, electricity, or other consumables.

EBD systems provide these benefits in an environmentally sustainable and long-term way. EBD systems are significantly more cost effective than conventional crop treatment methods which rely on polluting pesticides, insecticides and other chemical products and it has the added benefit that it improves the physical, biological, and nutritive values of the soil and in most cases, also increases crop yield.

2. BACKGROUND OF THE VINEYARD TEST

Given the impressive results obtained using EBD technology in numerous agricultural applications, the client **FINCA ALBA EN LOS ANDES** of Argentina decided to test to see what improvements could be achieved by implementing EBD systems in its organic vineyards.

3. TEST

The equipment used for the installation consisted of the following:

12 EBD Stake units for “Vineyard 6 Cab Franc”

1 EBD Water pack

12 EBD Stake units for “Vineyard 9 Malbec”

1 EBD Water Pack

EBD Stake Unit

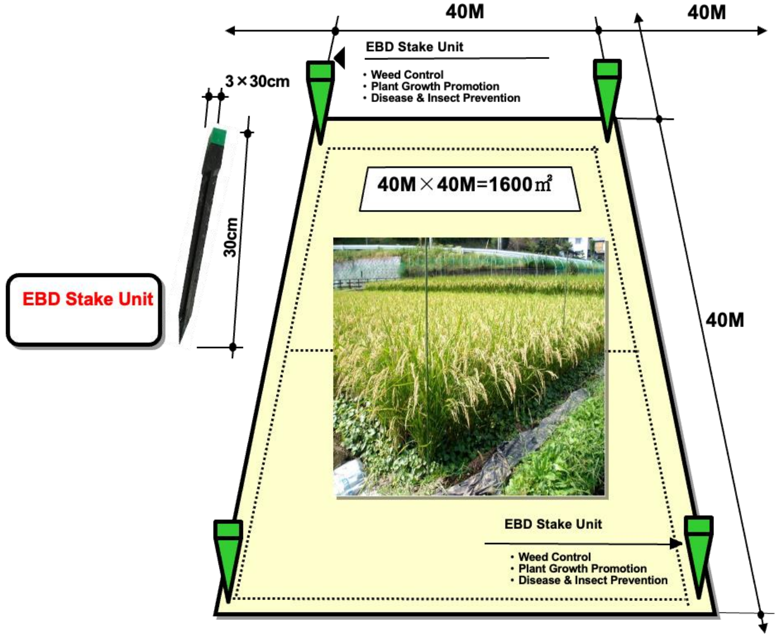
EBD Water Pack

The EDB Stakes were buried in the ground along the outer perimeter of 2 separate vineyard plots on March 23, 2022. Each plot measures approximately 1 ha. (Cabernet Franc Barracks 6 and Malbec Barracks 9).

On March 22, 2022, prior to the placement of the EBD Stakes in the ground, the “AgroPraxes Company” of Mendoza, Argentina measured electric conductivity (EC) in the soil as well as the vineyard

vigor index (NDVI). In addition, the 24 separate installation points where the EDB Stakes were installed at equidistant intervals were georeferenced.
https://www.google.com/maps/d/edit?mid=16HYrDrC0JyRZKEspylsgnWbyvI8VYz9t&usp=sharing

EBD stake placement below ground



EBD Water Pack installation on the drip irrigation piping.

4. LABORATORY SAMPLING & TESTING PROCESSES WITH EXPLANATION.

In order to properly document the soil characteristics prior to the installation of the EBD System on March 21, 2022, the Agroconciencia SA company collected soil samples at two (2) different depths within the two demonstration areas, to analyze and record **Salinity, Fertility and Texture.** This was done to establish the baselines before installing EBD Stakes.

All sampling and analysis are being carried out every six months in order to verify and record the effectiveness of the EBD system.

LAB REPORT SUMMARY

SOIL ANALISIS

	SAMPLING DATE	Vineyard 6 Cab Franc (0-40 cm depth)			Vineyard 6 Cab Franc (40-80 cm depth)			Vineyard 9 Malbec (0-40 cm depth)			Vineyard 9 Malbec (40-80 cm depth)		
		22/03/22	20/09/22		22/03/22	20/09/22		22/03/22	20/09/22		22/03/22	20/09/22	
Physical Fertility	Textural classification	Sandy Soil	Sandy Soil		Sandy Soil	Sandy Soil		Sandy Soil	Sandy Soil		Sandy Soil	Sandy Soil	
	Clay	8.00%	3.30%		8.00%	5.60%		7.00%	6.30%		8.00%	6.30%	
	Loamy	16.00%	18.40%		24.00%	17.30%		18.00%	14.30%		20.00%	17.90%	
	Sand	76.00%	78.30%		68.00%	77.10%		75.00%	79.40%		72.00%	75.80%	
Fertility	Available phosphorus	<0,98	4.08	mg/Kg	<0,98	4.08	mg/Kg	<0,98	4.1	mg/Kg	<0,98	2	mg/Kg
	Organic material	0.93	0.85	% p/p	0.59	0.37	% p/p	0.95	0.8	% p/p	0.61	0.67	% p/p
	Total nitrogen	560	718.13	mg/Kg	384	814.89	mg/Kg	620	671.6	mg/Kg	433	697	mg/Kg
	Active limestone	<0,5		$\%CaCO_3$	0.953		$\%CaCO_3$	<0,5		$\%CaCO_3$	0.798		$\%CaCO_3$
	Available potassium	0.33		meq/100 gr	0.3		meq/100 gr	0.29		meq/100 gr	0.25		meq/100 gr
Microelements	Copper	6.42	9.1	mg/Kg	1.77	3.6	mg/Kg	6.24	4.8	mg/Kg	2.09	3.4	mg/Kg
	Iron	<4	13	mg/Kg	8.74	11.5	mg/Kg	5.51	12.6	mg/Kg	6.69	15.6	mg/Kg
	Manganese	3.8	32.6	mg/Kg	1.9	19.4	mg/Kg	3.28	13.2	mg/Kg	2.75	52.1	mg/Kg
	Zinc	1.39	0.783	mg/Kg	0.49	0.7	mg/Kg	1.9	0.9	mg/Kg	1	0.9	mg/Kg
	Boron	0.67	0.8	mg/Kg	0.56	<0,5	mg/Kg	0.9	1.2	mg/Kg	0.67	<0,5	mg/Kg
Exchangeable complex	Exchangeable aluminum	<0,01	<0,01	meq/100 gr	<0,01	<0,01	meq/100 gr	<0,01	<0,01	meq/100 gr	<0,01	<0,01	meq/100 gr
	C.I.C.	8.53	6.27	meq/100 gr	9.17	5.51	meq/100 gr	8.01	6.32	meq/100 gr	9.51	5.9	meq/100 gr
	Exchangeable calcium	7.49	13.7	meq/100 gr	8.2515	18.1	meq/100 gr	6.7588	13.4	meq/100 gr	8.358	14	meq/100 gr
	Exchangeable magnesium	0.77	0.49	meq/100 gr	0.67	2.61	meq/100 gr	0.95	1.96	meq/100 gr	0.87	0.65	meq/100 gr
	Exchangeable potassium	0.26	0.52	meq/100 gr	0.24	0.57	meq/100 gr	0.25	0.21	meq/100 gr	0.21	0.52	meq/100 gr
	Exchangeable sodium	<0,05	0.62	meq/100 gr	<0,05	0.62	meq/100 gr	0.06	0.71	meq/100 gr	0.07	0.71	meq/100 gr
Saturated Paste Extract	EPS Electric Conductivity	0.55	1.03	dS/m a 20°C	0.52	0.76	dS/m a 20°C	1	2.08	dS/m at 20°C	0.88	1.18	dS/m at 20°C
	EPS pH	8.33	8.1	unidades de pH	8.28	8	unidades de pH	8.1	7.7	pH units	8.1	7.9	pH units
	EPS sulphates	98.7		mg/L	112		mg/L	340		mg/L	281		mg/L
	EPS chlorides	<10		mg/L	<10		mg/L	12.4		mg/L	13.3		mg/L
	EPS calcium	68.7		mg/L	61.7		mg/L	135		mg/L	108		mg/L
	EPS magnesium	10		mg/L	7.65		mg/L	21.1		mg/L	16.4		mg/L
	EPS potassium	8.11		mg/L	5.26		mg/L	6.99		mg/L	3.73		mg/L
	EPS sodium	41.7		mg/L	39.9		mg/L	70.8		mg/L	72.5		mg/L
Ratio Relationship	C/N Ratio	9.6	6.89		8.89	2.67		8.93	6.9		8.2	5.5	
	SAR	1.24			1.27			1.49			1.71		

WATER ANALISIS

Item		NO EBD Normal Irrigation Water Date 22-11-2022 Result	Unit	WITH EBD Irrigation water Fecha 22-11-2022 Result	Unit	DIFFERENCES Before & After EBD	Decreaase (-) increase (++)
Water analysis	**Current Electric Conductivity (25 °C**	856	µmhos/cm	847	µmhos/cm	-9.00	-
	Total Salt	600	mg/L	596	mg/L	-4.00	-
	Saline residue / waste	548	mg/L	542	mg/L	-6.00	-
	SAR (Sodium Adsorption Ratio)	0.4		0.51		-0.11	-
	RASP (RAS Nijensohn Potential)	0.4		0.51		-0.11	-
	pH	7.02		6.98		-0.04	-
	Alkalinity coefficient K=	90	Good	96	Good	-6.00	-
Cations	**Ca^{+2}**	6.5	meq/L	6.4	meq/L	-0.10	-
		130	mg/L	128	mg/L	-2.00	
	Mg^{+3}	1.4	meq/L	1.2	meq/L	-0.20	-
		17.02	mg/L	14.59	mg/L	-2.43	
	Na^{+}	0.8	meq/L	1	meq/L	0.20	-
		18.4	mg/L	23	mg/L	4.60	
	K^{+}	0.05	meq/L	0.08	meq/L	0.03	-
		1.96	mg/L	3.13	mg/L	1.17	
Anions	**$C03-^{2}$**	0	meq/L	0	meq/L	0.00	-
		0	mg/L	0	mg/L	0.00	
	$CO3H^{-}$	1.4	meq/L	1.2	meq/L	-0.20	-
		85.4	mg/L	73.2	mg/L	-12.20	
	Cl^{-}	0.6	meq/L	0.5	meq/L	-0.10	-
		21.3	mg/L	17.75	mg/L	-3.55	
	$SO4^{-2}$	6.8	meq/L	7.0	meq/L	0.20	-
		326.4	mg/L	336	mg/L	9.60	
	Mineral Nitrogen (N)	2.52	mg/L	1.68	mg/L	-0.84	-
	N-(NO3)	1.4	mg/L	0.84	mg/L	-0.56	-
	NITRATES-(NO3)	6.2	mg/L	3.72	mg/L	-2.48	-
	N - (NH4)	1.12	mg/L	0.84	mg/L	-0.28	-
	Ammonium (NH4)	1.43	mg/L	1.08	mg/L	-0.35	-
Hardness in French units	**Total hardness**	39.5	°French units	38	°French units	-1.50	-
	Temporary Hardness	7	°French units	6	°French units	-1.00	-
	Permanent Hardness	32.5	°French units	32	°French units	-0.50	-
Hardness in French units	**Total hardness**	395	ppm	380	ppm	-15.00	-
	Temporary Hardness	70	ppm	60	ppm	-10.00	-
	Permanent Hardness	325	ppm	320	ppm	-5.00	-
International classification according to Riverside	**SALT HAZARD**	C3	High average	C3	Medium average		
	SODIUM HAZARD	S1	Low	S1	Low		

Table: Differences in the Water

Cations (meq/L)	NO EBD	WITH EBD	Difference
Ca+2	6.50	6.40	**-0.10**
Mg+3	1.40	1.20	**-0.20**
Na+	0.80	1.00	**0.20**
K+	0.05	0.08	**0.03**

Anions (meq/L)	NO EBD	WITH EBD	Difference
$C03\text{-}^{2}$	0.00	0.00	**0.00**
$CO3H^{-}$	1.40	1.20	**-0.20**
Cl^{-}	0.60	0.50	**-0.10**
$SO4^{-}$	6.80	7.00	**0.20**

Water Analysis	NO EBD	WITH EBD	Difference
C.E. µS.cm	856	847	**-9.00**
Total salts	600	596	**-4.00**
Saline Residue	548	542	**-6.00**
SAR	0.40	0.51	**-0.11**
pH	7.02	6.98	**-0.04**
Alkalinity coefficient	90	96	**-6.00**

Nitrates mg/L	NO EBD	WITH EBD	Difference
Mineral nitrogen (N)	2.52	1.68	**-0.84**
NITRATES-(NO3)	6.20	3.72	**-2.48**
Ammonium (NH4)	1.43	1.08	**-0.35**

Hardness (ppm)	NO EBD	WITH EBD	Difference
Total hardness	395	380	**-15.00**
Temporary hardness	70	60	**-10.00**
Permanent hardness	325	320	**-5.00**

SUMMARY

All of the water parameters that have been analyzed have very important reduction values.

Analysis - EBD 0 - 40cm depth

ANALYSIS PRIOR TO EBD (0-40 cm depth)		ID	Vineyard 6 Cab Franc(0-40 cm depth)			DIFFERENCES	Decrease(-)	Vineyard 9 Malbec (0-40 cm depth)			DIFFERENCES	Decrement(-)	ANALYSIS PARAMETERS
	SAMPLING DATE	Elements	22/03/22	20/09/22		Before & After EBD	Increase(++)	22/03/22	20/09/22		Before and After EBD	increment(++)	Evolution With and Without EBD
Physical Fertility	Textural Classification		Franco-arenosa	Areno-Franco				Franco - Arenoso	Areno-Franca				Textural Clasification
	Clay	1	8.00%	3.30%		-4.70%	-	7.00%	6.30%		-0.70%	-	Clay
	Loamy	2	16.00%	18.40%		2.40%	++	18.00%	14.30%		-3.70%	-	Loamy
	Sand	3	76.00%	78.30%		2.30%	++	75.00%	79.40%		4.40%	++	Sand
Fertility	Available phosphorus	4	0.98	4.08	mg/Kg	3.1	++	0.98	4.1	mg/Kg	3.12	++	Available phosphorus
	Organic material	5	0.93	0.85	% p/p	-0.08	-	0.95	0.80	% p/p	-0.15	-	Organic material
	Total nitrogen	6	560	718.13	mg/Kg	158.13	++++	620	671.6	mg/Kg	51.60	++++	Total nitrogen
	Active limestone	7	<0,5		$\%CaCO_3$	SD		<0,5		$\%CaCO_3$			Active limestone
	Available potassium	8	0.33		meq/100 gr	SD	++	0.29		meq/100 gr		++	Available potassium
Microelements	Copper	9	6.42	9.1	mg/Kg	2.68	++	6.24	4.8	mg/Kg	-1.44	-	Copper
	Iron	10	4	13	mg/Kg	9	+++	5.51	12.6	mg/Kg	7.09	+++	Iron
	Manganese	11	3.8	32.6	mg/Kg	28.8	+++	3.28	13.2	mg/Kg	9.92	+++	Manganese
	Zinc	12	1.39	0.78	mg/Kg	-0.607	-	1.9	0.9	mg/Kg	-1	-	Zinc
	Boron	13	0.67	0.8	mg/Kg	0.13	+++	0.9	1.2	mg/Kg	0.3	+++	Boron
Exchangeable complex	Exchangeable aluminum	15	0.01	0.01	meq/100 gr	0.00	**	0.01	0.01	meq/100 gr	0.00	**	Exchangeable aluminum
	C.I.C.	16	8.53	6.27	meq/100 gr	-2.26	---	8.01	6.32	meq/100 gr	-1.69	---	C.I.C.
	Exchangeable calcium	17	7.49	13.7	meq/100 gr	6.21	+++	6.76	13.4	meq/100 gr	6.64	+++	Exchangeable calcium
	Exchangeable magnesium	18	0.77	0.49	meq/100 gr	-0.28	-	0.95	1.96	meq/100 gr	1.01	++	Exchangeable magnesium
	Exchangeable potassium	19	0.26	0.52	meq/100 gr	0.26	++	0.25	0.21	meq/100 gr	-0.04	-	Exchangeable potassium
	Exchangeable sodium	20	0.05	0.62	meq/100 gr	0.57	++	0.06	0.71	meq/100 gr	0.65	++	Exchangeable sodium
Saturated Paste Extract	EPS Electric conductivity	21	0.55	1.03	dS/m a 20°C	0.48	++	1.00	2.08	dS/m a 20°C	1.08	++	CElectrical Conductivity in EPS
	EPS pH	22	8.33	8.1	pH units	-0.23	---	8.1	7.7	unidades de pH	-0.4	---	EPS pH
	EPS sulphates	23	98.7		mg/L	SD		340		mg/L			EPS sulphates
	EPS chlorides	24	10		mg/L	SD		12.4		mg/L			EPS chlorides
	EPS calcium	25	68.7		mg/L	SD		135		mg/L			EPS calcium
	EPS magnesium	26	10		mg/L	SD		21.1		mg/L			EPS magnesium
	EPS potassium	27	8.11		mg/L	SD		6.99		mg/L			EPS potassium
	EPS sodium	28	41.7		mg/L	SD		70.8		mg/L			EPS sodium
Ratio Relationship	C/N Ratio	29	9.6	6.89		-2.71	---	8.93	6.9		-2.03	---	C/N Ratio
	SAR	30	1.24			SD		1.49					SAR

EXPLANATION OF DATA CONTAINED IN THE TABLES

1, 2, 3) The process of reducing clay and silt while increasing sand with coarser fractions, has to do with the oxygenation and oxidation of elements. The plant system can thereby further extend its root system and generate new absorbent hairs, for better nutrition and gas exchange (H, O2, CO2). This is what occurred in Vineyards 6 and 9. In Vineyard 6, the 2.40% increase in loamy does not affect the ratio.

4) The available phosphorus at this depth, has to do with oxidation reduction in soil compaction processes and lower levels of compaction, causes the element to be released into the soluble phase. The release and increase in phosphorus which took place in 6 months from the time the EBD system was installed, is the same for both EBD treated plots (Vineyards 6 & 9). Given the pH value, the phosphorus levels analyzed following the Olsen Methodology provided the following results: 4.1 ppm and 4.08 ppm in vineyards 6 & 9 respectively which improved in 6 months. Both results corresponding to the phosphorus in the soil are very positive.

a) This element is responsible for the formation of simple sugars in both quantity and quality. It is stored in the leaves, and when the plant reaches its physiological state of maturation, potassium converts these simple sugars into high molecular weight sugars, which in the end provides fruit flavor and better fructose-sucrose content (Brix Degrees).

b) When the soil undergoes compaction, a reduction of phosphorus takes place (given that there is no solubility) resulting in poor harvests, poor flowering and stunted roots and branches etc.

5) The organic matter is very low, and this is due to its extensive mineralization, to transfer nutrients to the soluble phase of the soil. Vineyards 6 and 9 show the corresponding movement.

6) Total Nitrogen, as a mineralized reserve, arises from organic matter and CO_2 sequestration. Its increase is a great reserve to generate plant growth in foliar architecture and ramifications in the NPK complex.

8) Potassium level - although we do not have data to compare it to, it does show normal values in the soil, which reflects considerable synergy with Point # 6 above.

9, 11) Copper and Manganese levels: There are increases in 6 months compared to the baseline. These elements play an important role in plant enzymatic processes.

10) Iron (Fe) is a basic and important element, as a precursor to Chlorophyll and when present in normal concentrations, makes it possible for total Nitrogen to be expressed in the plantation in the best phytosanitary state. Acting in association (Point 6) together with Potassium (K), it controls the rate of cellular respiration and helps the plant better resist numerous pests and diseases.

12) Zinc (Zn) plays an important role in pollination, pollen quality, pollen viability as well as the quality of the fruits or crops which largely depend on it. The level decreased and it is due specifically to its mobility within the plant and/or soil.

13) Boron (B) helps the plant avoid fruit cracking, poor fruit structure, injury and fruit burning. Increases in Boron in Vineyards 6 and 9 was detected given that it is active, either because the plant is taking it or is kept in reserve in the soil.

15) Aluminum (Al) the precursor of acidity is stable in the soil.

16) CEC (Cation Exchange Capacity) is the sum of the cations, which give us the real nutrition scenario, in other words, it shows what is in the lump of soil sample when mixed with water in a glass container and analyzed in a lab. Such analysis reveals how many elements a plant can really take. The lab results from

both Vineyard plots show a reduction in the CEC because it is supplying nutritional elements to the soluble phase.

17) Calcium (Ca) increases or decreases like many elements, depending on the role it fulfills. Its function is to protect the tissues and walls of the fruits, to give them their consistency in the interaction with the other elements. The lab results from both vineyard plots show significant and stable increases.

18, 20) Magnesium (Mg) and Sodium (Na) in high concentrations behave as dispersing salts for clay soils. Magnesium and Calcium are responsible for maintaining a functional relationship, so that the soil can give nutrients without any problems. Sodium (Na) itself is a precursor of sodicity that is very harmful to the development of plants,
apart from also damaging the soil structure.

a) Here we see sodium increase, because it starts from the profile (0-40cm depth) and sinks to the lower soil layers, to be deposited as salt.
b) These levels do not affect the soil, there is no salinity from salts (Potassium, Calcium and Magnesium), nor due to sodium (sodicity) either.

22) The pH decrease is a positive thing and is due to what has already been commented in (Points 15, 18 & 20)

21, 22, & 23) Although the E.C. analysis is included and there are no results corresponding to the other elements, it can be noted that there is a high content of these elements in soluble form ready to leave or leaving the soil exchangeable complex and leaving it clean. EBD is effective in controlling salinity and increasing the nutritional reserve for plants as well as providing a change in the textural classification to control compaction and increase the volumes of enriched oxygen which promotes microbiota life in the soil.

Analysis - EBD 40 - 80cm depth

ANALYSIS PRIOR TO EBD (0-40 cm depth)		ID	Vineyard 6 Cab Franc (0-40 cm depth)			DIFFERENCES	Decrease(-)	Vineyard 9 Malbec (0-40 cm depth)			DIFFERENCES	Decrease(-)	ANALYSIS PARAMETERS
	SAMPLING DATE	Elements	22/03/22	20/09/22		Before & After EBD	Increase(++)	22/03/22	20/09/22		Before & After EBD	Increase (++)	Evolution Before & After EBD
Physical Fertility	Textural Classification		Sandy Soil	Sandy Soil				Sandy Soil	Sandy Soil				Textural classification
	Clay	1	8.00%	5.60%		-2.40%	-	8.00%	6.30%		-1.70%	-	Clay
	Loamy	2	24.00%	17.30%		-6.70%	-	20.00%	17.90%		-2.10%	-	Loamy
	Sand	3	68.00%	77.10%		9.10%	++	72.00%	75.80%		3.80%	++	Sand
Fertility	Available phosphorus	4	0.98	4.08	mg/Kg	3.1	++	0.98	2.00	mg/Kg	1.02	++	Available phosphorus
	Organic material	5	0.59	0.37	% p/p	-0.22	-	0.61	0.67	% p/p	0.06	++	Organic material
	Total nitrogen	6	384	814.89	mg/Kg	430.89	++++	433	697	mg/Kg	264.00	++++	Total nitrogen
	Active limestone	7	0.953		$\%CaCO_3$	SD		0.798	SD	$\%CaCO_3$			Active limestone
	Available potassium	8	0.30		meq/100 gr	SD		0.250	SD	meq/100 gr			Available potassium
Microelements	Copper	9	1.77	3.6	mg/Kg	1.83	++	2.09	3.4	mg/Kg	1.31	++	Copper
	Iron	10	8.74	11.5	mg/Kg	2.76	+++	6.69	15.6	mg/Kg	8.91	+++	Iron
	Manganese	11	1.9	19.4	mg/Kg	17.5	++	2.75	52.1	mg/Kg	49.35	+++	Manganese
	Zinc	12	0.49	0.7	mg/Kg	0.21	++	1	0.9	mg/Kg	-0.1	-	Zinc
	Boron	13	0.56	0.50	mg/Kg	-0.06	**	0.67	0.5	mg/Kg	-0.17	-	Boron
Exchange complex	Exchange aluminum	15	0.01	0.01	meq/100 gr	0.00	**	0.01	0.01	meq/100 gr	0.00	**	Exchangeable aluminum
	C.I.C.	16	9.17	5.51	meq/100 gr	-3.66	---	9.51	5.9	meq/100 gr	-3.61	---	C.I.C.
	Exchange calcium	17	8.2515	18.1	meq/100 gr	9.85	++	8.358	14.00	meq/100 gr	5.642	++	Exchangeable calcium
	Exchange magnesium	18	0.67	2.61	meq/100 gr	1.94	++	0.87	0.65	meq/100 gr	-0.22	-	Exchangeable magnesium
	Exchange potassium	19	0.24	0.57	meq/100 gr	0.33	++	0.21	0.52	meq/100 gr	0.31	++	Exchangeable potassium
	Exchange sodium	20	0.05	0.62	meq/100 gr	0.57	++	0.07	0.71	meq/100 gr	0.64	++	Exchangeable sodium
Saturated Paste Extract	EPS Electric conductivity	21	0.52	0.76	dS/m a 20°C	0.24	++	0.88	1.18	dS/m a 20°C	0.3	-	EPS Electrical conductivity
	EPS pH	22	8.28	8.00	unidades de pH	-0.28	---	8.1	7.9	unidades de pH	-0.2	---	EPS pH
	EPS sulphates	23	112		mg/L	SD		281		mg/L			EPS sulphates
	EPS chlorides	24	<10		mg/L	SD		13.3		mg/L			EPS chlorides
	EPS calcium	25	61.7		mg/L	SD		108		mg/L			EPS calcium
	EPS magnesium	26	7.65		mg/L	SD		16.4		mg/L			EPS magnesium
	EPS potassium	27	5.26		mg/L	SD		3.73		mg/L			EPS potassium
	EPS sodium	28	39.9		mg/L	SD		72.5		mg/L			EPS sodium
Ratio Relationship	C/N Ratio	29	8.89	2.67		-6.22	---	8.2	5.5		-2.7	---	C/N Ratio
	SAR	30	1.27			SD		1.71					RAS

EXPLANATION OF DATA CONTAINED IN THE TABLES

1,2,3) The process of reducing clay and silt while increasing sand with coarser fractions, has to do with the oxygenation and oxidation of elements. The plant system can further extend its root system and generate new absorbent hairs, for better nutrition and gas exchange (H, O2, CO2). This applies to both Vineyards 6 and 9.

4) The available phosphorus at this depth, has to do with oxidation reduction in soil compaction processes and lower levels of compaction, causes the element to be released into the soluble phase. The release and increase in phosphorus which took place in 6 months from the time the EBD system was installed, is the same for both EBD treated Vineyards 6 & 9. Given the pH value, the phosphorus levels analyzed following the Olsen Methodology provided the following results: 4.08 ppm in vineyards 6 & 9 respectively which improved in 6 months. Both results of phosphorus in the soil are very positive.

a) This element is responsible for the formation of simple sugars in both quantity and quality. It is stored in the leaves, and when the plant reaches its physiological state of maturation, potassium converts these simple sugars into high molecular weight sugars, which in the end provides fruit flavor and better fructose-sucrose content (Brix Degrees).

b) When the soil undergoes compaction, a reduction of phosphorus takes place (given that there is no solubility) resulting in poor harvests, poor flowering and stunted roots and branches etc.

5) The organic matter is very low, and this is due to its extensive mineralization, to transfer nutrients to the soluble phase of the soil. Vineyards 6 and 9 show the corresponding movement.

6) Total Nitrogen, as a mineralized reserve, arises from organic matter and CO2 sequestration. Its increase is a great reserve to generate plant growth in foliar architecture and ramifications in the NPK complex.

8) Potassium level - although we do not have data to compare it to, it does show normal values in the soil, which reflects considerable synergy with Point 6 above.

9 & 11) Copper and Manganese levels: There are increases in 6 months compared to the baseline. These elements play an important role in plant enzymatic processes.

10) Iron (Fe) is a basic and important element, as a precursor to Chlorophyll and when present in normal concentrations, makes it possible for total Nitrogen to be expressed in the plantation in the best phytosanitary state. Acting in association (Point 6) together with Potassium (K), it controls the rate of cellular respiration and helps the plant resist numerous pests and diseases.

12) Zinc (Zn) plays an important role in pollination, pollen quality, pollen viability as well as the quality of the fruits or crops which largely depend on it. The level decreased and it is due specifically to its mobility within the plant and/or soil.

13) Boron (B) helps the plant avoid fruit cracking, poor fruit structure, injury and fruit burning. Increases in Boron in Vineyards 6 and 9 was detected given that it is active, either because the plant is taking it or is kept in reserve in the soil.

15) Aluminum (Al) the precursor of acidity, is stable in the soil.

16) CEC (Cation Exchange Capacity) is the sum of the cations, which give us the real nutrition scenario, in other words, it shows what is in the sample lump of soil when mixed with water in a glass container and analyzed in a lab. Such analysis reveals how many elements a plant can really take. The lab results from both vineyard plots show a reduction in the CEC because it is supplying nutritional elements to the soluble phase.

17) Calcium (Ca) increases or decreases like many elements, depending on the role it fulfills. Its function is to protect the tissues and walls of the fruits, to give them their consistency in the interaction with the other elements. The lab results from both vineyard plots show significant and stable increases.

18,20) Magnesium (Mg) and Sodium (Na) In high concentrations behave as dispersing salts for clay soils. Magnesium and Calcium are responsible for maintaining a functional relationship, so that the soil can give nutrients without any problems. Sodium (Na) itself is a precursor of sodicity that is very harmful to the development of plants, apart from also damaging the soil structure.

a) Here we see sodium increase, because it starts from the profile (0-40cm depth) and sinks to the internal lower layers of the soil, to be deposited as salt.
b) These levels do not affect the soil, there is no salinity from salts (Potassium, Calcium and Magnesium), nor due to sodium (sodicity) either.

22) The PH decrease is a positive thing and is due to what has already been commented on (Points 15,18 & 20).

21, 22 & 23) Although the E.C. analysis is included and there are no results corresponding to the other elements, it can be noted that there is a high content of these elements in soluble form ready to leave or leaving the soil exchangeable complex and leaving it clean. EBD is effective in controlling salinity and increasing the nutritional reserve for plants as well as providing a change in the textural classification to control compaction and increase the volumes of enriched oxygen, propitious for microbiota life in the soil.

5. CONCLUSIONS

EBD is effective as state-of-the-art technology to solve soil and crop problems, improving / strengthening nutrition and increasing production / yield.