

Supplementary data

Table S1. Main characteristics of the vineyards included in the study.

	Experimental vineyard			
	Organic vs. Inorganic nitrogen	Inorganic nitrogen doses	Within vineyard variability LEZA	Within vineyard variability TRAIBUENAS
Location	Traibuenas, NA, Spain	Traibuenas, NA, Spain	Leza, BC, Spain	Traibuenas, NA, Spain
Coordinates	42°23'02.3"N 1°37'29.7"W	42°22'58.3"N 1°37'25.9"W	42°33'22'' N 2° 38' 07''W	42°22'20.1"N 1°37'34.2"W
Altitude	343 m	340 m	572m	328 m
Planting distance	3 x 1 m	3 x 1 m	2.4 x 1.2 m	3 x 1 m
Training system	VSP bilateral cordon	VSP bilateral cordon	Free gobelet	VSP bilateral cordon
Variety	Tempranillo	Tempranillo	Tempranillo	Tempranillo
Rootstock	Richter 110	Richter 110	Richter 110	Richter 110
No. field campaing (yrs.)	4 (2011-2014)	4 (2011-2014)	2 (2010-2011)	2 (2015-2016)
Vineyard planting year	1997	1997	1993	1998
Annual mean rainfall (mm)		327.1	352.1	302.4
Annual mean temperature (°C)		14.2	12.7	14.6
Soil type	Typic calcixerept	Typic calcixerept	Typic calcixerept	Typic calcixerept

Table S2. Main characteristics of the compost used.

	2011	2012	2013	2014
Dry matter (DM) (%)	53.8	50.5	56.5	54.7
pH	7.92	7.68	7.51	7.67
Conductivity ($\mu\text{S cm}^{-1}$)	2610	2650	3200	2840
N (Kjeldahl. % DM)	2.55	2.6	2.6	2.45
P (% $\text{P}_2\text{O}_5/\text{DM}$)	1.56	2.7	2.74	2.05
K (% $\text{K}_2\text{O}/\text{DM}$)	1.27	1.4	1.36	1.22
Mg (% MgO/DM)	0.76	0.92	1.25	1.09
Organic carbon (% DM)	25.6	23.9	24.5	24.6
C/N	10.03	9.19	9.42	10.04
$\delta^{15}\text{N}$ (‰)	12.23	11.70	10.22	11.49

SUPPLEMENTARY DATA

Santesteban, L. G., Loidi, M., Urretavizcaya, I., Galar, M., Crespo-Martínez, S., Royo, J. B., & Miranda, C. (2024). Nitrogen isotope ratio ($\delta^{15}\text{N}$): a nearly unexplored indicator that provides useful information in viticulture. *OENO One*, 58(2). <https://oeno-one.eu/article/view/7961>

Table S3. Agronomic features observed in the study comparing organic and inorganic nitrogen source.

Year	Treatment	Yield (kg vine ⁻¹)	BW (g)	TSS (°Brix)	pH	YAN (mg L ⁻¹)	TAnt (mg L ⁻¹)	TP (mg L ⁻¹)
2011	Inorganic	2.01	1.86	24.7	3.55	129.1	644.2	994
	Organic	2.05	1.89	24.6	3.55	129.8	594.6	949
	<i>p-value</i>	<i>0.923</i>	<i>0.635</i>	<i>0.766</i>	<i>0.792</i>	<i>0.938</i>	<i>0.076</i>	<i>0.370</i>
2012	Inorganic	1.23	1.90	25.4	3.66	215.0	601.7	1225
	Organic	1.17	1.99	25.5	3.63	200.0	611.9	1163
	<i>p-value</i>	<i>0.799</i>	<i>0.455</i>	<i>0.761</i>	<i>0.187</i>	<i>0.349</i>	<i>0.762</i>	<i>0.203</i>
2013	Inorganic	3.14	1.90	23.9	3.55	277.6	882.8	1235
	Organic	4.06	1.94	24.2	3.47	204.1	894.1	1321
	<i>p-value</i>	<i>0.051</i>	<i>0.540</i>	<i>0.662</i>	<i>0.015</i>	<i><0.001</i>	<i>0.872</i>	<i>0.323</i>
2014	Inorganic	2.69	1.89	22.3	3.46	218.3	724.7	1212
	Organic	2.82	1.86	22.5	3.46	217.6	743.9	1251
	<i>p-value</i>	<i>0.826</i>	<i>0.771</i>	<i>0.724</i>	<i>0.957</i>	<i>0.957</i>	<i>0.706</i>	<i>0.456</i>

*BW: berry weight; TSS: total soluble solids; YAN: yeast assimilable nitrogen; TAnt: total anthocyanins; TP: total phenolics.

Table S4. Agronomic features observed in the study comparing four doses of inorganic nitrogen.

Year	Treatment	Yield (kg vine ⁻¹)	BW (g)	TSS (°Brix)	pH	YAN (mg L ⁻¹)	TAnt (mg L ⁻¹)	TP (mg L ⁻¹)		
2011	N0	2.31	1.86	24.1	3.50	116.8	c	579	1012	
	N50	2.48	1.87	24.3	3.55	147.6	b	591	962	
	N100	2.51	1.83	23.4	3.51	167.5	ab	567	913	
	N200	2.20	1.77	23.6	3.51	180.0	a	553	893	
	<i>p-value</i>	<i>0.720</i>	<i>0.123</i>	<i>0.537</i>	<i>0.053</i>	<i>0.002</i>		<i>0.886</i>	<i>0.147</i>	
2012	N0	1.69	ab	2.07	25.5	3.65	270.7	c	708	1247
	N50	1.86	a	2.00	24.8	3.63	291.9	bc	620	1201
	N100	1.33	b	1.85	24.7	3.65	311.1	ab	731	1261
	N200	1.44	b	1.79	25.3	3.72	349.2	a	670	1125
	<i>p-value</i>	<i>0.043</i>	<i>0.158</i>	<i>0.601</i>	<i>0.295</i>	<i>0.003</i>		<i>0.544</i>	<i>0.733</i>	
2013	N0	4.12	1.83	24.5	3.53	265.8	c	969	1298	
	N50	3.15	1.79	24.4	3.56	291.2	bc	975	1290	
	N100	4.09	1.77	25.1	3.60	340.6	a	973	1249	
	N200	3.66	1.70	24.3	3.56	318.5	ab	960	1212	
	<i>p-value</i>	<i>0.426</i>	<i>0.537</i>	<i>0.733</i>	<i>0.465</i>	<i>0.020</i>		<i>0.953</i>	<i>0.723</i>	
2014	N0	3.20	1.85	23.3	3.63	246.7	b	841	1399	
	N50	3.27	1.72	22.4	3.63	264.1	ab	795	1218	
	N100	3.08	1.84	22.8	3.62	267.9	ab	787	1308	
	N200	3.04	1.69	22.2	3.64	300.9	a	791	1233	
	<i>p-value</i>	<i>0.740</i>	<i>0.465</i>	<i>0.446</i>	<i>0.927</i>	<i>0.046</i>		<i>0.869</i>	<i>0.400</i>	

*BW: berry weight; TSS: total soluble solids; YAN: yeast assimilable nitrogen; TAnt: total anthocyanins; TP: total phenolics. N0, N50, N100, N200 correspond with the treatments consisting on adding 0, 50, 100 and 200 kg N ha⁻¹. Values followed by different letters indicate different groups in Duncan's post hoc test.

SUPPLEMENTARY DATA

Santesteban, L. G., Loidi, M., Urretavizcaya, I., Galar, M., Crespo-Martínez, S., Royo, J. B., & Miranda, C. (2024). Nitrogen isotope ratio ($\delta^{15}\text{N}$): a nearly unexplored indicator that provides useful information in viticulture. *OENO One*, 58(2). <https://oeno-one.eu/article/view/7961>

Table S5. Agronomic features of the vineyards used to evaluate within field $\delta^{15}\text{N}$ variability.

Vineyard	Year	Value	Yield (kg vine ⁻¹)	BW (g)	TSS (°Brix)	pH	YAN (mg L ⁻¹)	TAnt (mg L ⁻¹)	TP (mg L ⁻¹)
Traibuenas	2014	mean	3.06	1.97	24,07	3.76	200.4	825	1452
		max.	8.23	2.87	26,37	4.04	312.1	1247	1762
		min.	0.70	1.52	20,97	3.51	99.0	576	1177
		sd	1.24	0.25	0.72	0.13	45.7	111	127
	2015	mean	2.97	1.91	23.92	3.96	268.3	1771	1252
		max.	5.92	2.45	26.70	4.30	416.4	2303	1625
		min.	0.40	1.21	20.15	3.65	138.2	1403	1008
		sd	1.13	0.25	1.14	0.14	56.2	199	102
Leza	2010	mean	1.73	1.99	25.13	3.50	118.3	668	937
		max.	5.54	2.33	26.52	3.61	195.7	976	1204
		min.	0.79	1.63	23.38	3.38	80.3	459	719
		sd	0.71	0.15	0.72	0.05	18.6	124	103
	2011	mean	1.32	2.05	24.00	3.55	104.2	563	854
		max.	2.01	2.40	25.44	3.69	153.03	1134	1959
		min.	0.73	1.52	21.85	3.41	73.08	252	728
		sd	0.35	0.21	0.69	0.06	18.15	190	157

*BW: berry weight; TSS: total soluble solids; YAN: yeast assimilable nitrogen; TAnt: total anthocyanins; TP: total phenolics.