

SUPPLEMENTARY MATERIAL

Contribution of non-Saccharomyces yeasts to the diversity of volatile compounds and sensory profile of Pisos from Italia and Negra Criolla grapes varieties

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Tables:

Table S1. Supplementary. Reference compounds and calibration curves used for quantification of Pisco volatiles.

RT (min)	Compound	Slope	Intercept	R ²	Calibration range (µg/L)
6.467	Ethyl butanoate (Eb) ^{**}	0.2085	0.0045	0.974	0.02016 - 2.0160
7.568	Furfural (F) [*]	0.2470	-0.0091	0.990	0.02072 – 2.0720
8.568	3-hexen-1-ol (3-H-ol) ^{**}	0.8067	-0.0215	0.993	0.01680 – 1.6800
9.181	1-hexanol(-H) ^{**}	0.7547	-0.0221	0.944	0.02336 – 2.3360
9.525	Isoamyl acetate (Ia) ^{**}	0.4895	0.0165	0.978	0.02112 – 2.1120
14.696	Ethyl hexanoate (Ehx) ^{**}	0.3516	0.0070	0.984	0.01640 – 1.6400
15.834	Limoneno (Li) [*]	0.1021	-0.0003	0.976	0.01472 – 1.4720
16.103	Bencyl alcohol (Ba) ^{**}	1.1590	-0.0845	0.996	0.02376 – 2.3760
18.711	Linalool (L) ^{**}	0.7808	-0.0140	0.969	0.01736 – 1.7360
19.095	Phenylethyl alcohol (Pa) ^{***}	1.9827	-0.1671	0.967	0.02680 – 2.6800
22.259	α-Terpineol (α-T) [*]	1.1396	-0.0359	0.965	0.02016 – 2.0160
22.372	Ethyl octanoate (Eo) ^{**}	0.3378	-0.0043	0.996	0.03264 – 3.2640
23.382	Nerol (N) [*]	1.3915	-0.0743	0.991	0.02320 – 2.3200
23.485	Citronellol (C) [*]	0.7730	-0.0257	0.976	0.02056 – 2.0560
24.303	Geraniol (G) ^{**}	1.7949	-0.0955	0.967	0.02040 – 2.0400
24.361	2-phenylethyl acetate (2-Pa) [*]	2.6415	-0.3466	0.966	0.05472 – 5.4720
25.80	Ethyl nonanoate (Ep) [*]	0.3644	-0.0046	0.997	0.01800 – 1.8000
29.155	Ethyl decanoate (Ed) ^{***}	0.1048	-0.0015	0.994	0.01832 – 1.8320

34.356	Ethyl laurate (El)*	0.4836	-0.0284	0.955	0.01960 – 1.9600
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*: Fluka; **: Sigma-Aldrich; ***: Merk Schuchardt

Table S2. Supplementary. Intensity values (mean±SD) for characteristics flavour attributes of Pisco Italia.

Treatment	Citric	Aniseed	Floral	Herbaceous	Spicy	Butter	Syrup	Alcohol	Oily	Nuttys	Cooked vegetable
Control	3.3±0.5 ^{bc}	2.7±0.5 ^{cd}	3.5±0.5 ^{bc}	3.0±0.0 ^{cd}	2.6±0.5 ^{de}	n.d	3.5±0.5 ^{bc}	3.2±0.6 ^{ab}	2.0±0.0 ^c	3.3±0.5 ^d	3.4±0.5 ^{cd}
I0M100P0N	3.8±0.4 ^{cd}	2.5±0.3 ^{bc}	3.8±0.5 ^c	2.2±0.3 ^{ab}	1.5±0.2 ^{ab}	n.d	3.8±0.4 ^c	3.3±0.4 ^{ab}	1.9±0.2 ^c	2.2±0.3 ^b	2.8±0.4 ^b
I0M50P50N	2.1±0.3 ^a	3.2±0.4 ^{de}	2.1±0.3 ^a	1.9±0.3 ^a	1.9±0.3 ^{bc}	2.0±0.0 ^b	2.1±0.3 ^a	3.8±0.4 ^b	n.d	1.0±0.0 ^a	3.2±0.4 ^{bcd}
I33M33P33N	2.2±0.4 ^a	1.0±0.0 ^a	2.9±0.3 ^b	2.2±0.4 ^{ab}	3.1±0.3 ^e	1.0±0.0 ^a	3.4±0.5 ^{bc}	3.3±0.5 ^{ab}	1.0±0.0 ^b	2.9±0.3 ^{cd}	1.9±0.3 ^a

I100M0P0N	4.1±0.4 ^d	3.0±0.54 ^e	3.2±0.4 ^{bc}	3.1±0.4 ^d	2.5±0.2 ^{de}	1.9±0.3 ^b	3.0±0.4 ^{bc}	3.3±0.5 ^{ab}	0.5±0.0 ^a	2.7±0.3 ^c	1.9±0.3 ^a
I16M66P16N	2.2±0.4 ^a	2.0±0.0 ^b	3.3±0.5 ^{bc}	3.2±0.4 ^d	1.0±0.0 ^a	1.0±0.0 ^a	3.0±0.42 ^{bc}	3.3±0.5 ^{ab}	n.d	1.9±0.3 ^b	3.1±0.3 ^{bcd}
I50M50P0N	2.2±0.4 ^a	3.1±0.3 ^{de}	2.0±0.5 ^a	3.1±0.3 ^{cd}	2.1±0.3 ^{cd}	n.d	2.9±0.3 ^b	3.7±0.5 ^{ab}	1.0±0.0 ^b	2.1±0.3 ^b	3.1±0.3 ^{bcd}
I50M0P50N	3.2±0.4 ^b	3.3±0.5 ^e	3.0±0.5 ^b	2.6±0.5 ^{bc}	1.9±0.3 ^{bc}	2.1±0.3 ^b	3.4±0.5 ^{bc}	3.1±0.3 ^a	1.0±0.0 ^b	2.8±0.4 ^c	3.0±0.5 ^{bc}
I66M16P16N	2.9±0.3 ^b	3.4±0.5 ^e	2.9±0.3 ^b	3.1±0.3 ^{cd}	1.0±0.0 ^a	2.2±0.4 ^b	3.1±0.3 ^b	3.4±0.5 ^{ab}	n.d	1.9±0.3 ^b	3.7±0.5 ^{cd}
I0M0P100N	2.3±0.4 ^a	3.2±0.4 ^{de}	3.1±0.5 ^b	3.1±0.5 ^{cd}	2.6±0.3 ^{de}	2.7±0.3 ^c	3.5±0.5 ^{bc}	3.4±0.5 ^{ab}	1.0±0.0 ^b	2.1±0.2 ^b	3.4±0.5 ^{bcd}
I16M16P66N	2.1±0.3 ^a	3.1±0.3 ^{de}	3.4±0.5 ^{bc}	2.2±0.4 ^{ab}	1.0±0.0 ^a	n.d	3.4±0.5 ^{bc}	3.6±0.5 ^{ab}	1.0±0.0 ^b	2.1±0.3 ^b	3.1±0.6 ^{bcd}

Values with different letters in the same column are significantly different according to Tukey's test (95%).

n.d: non detected.Codes for the samples are shown in Table 1.

Table S3. Supplementary. Intensity values (mean±SD) for characteristics flavour attributes of Pisco Negra Criolla

Treatment	Fruity	Aniseed	Floral	Herbaceous	Spicy	Butter	Syrup	Alcohol	Olive	Nuttys	Cooked vegetable
Control	3.7±0.7 ^c	2.4±0.5 ^{bc}	2.9±0.6 ^b	3.3±0.5 ^{ab}	3.0±0.0 ^{cde}	2.1±0.3 ^a	4.5±0.5 ^c	4.4±0.7 ^{bc}	2.0±0.0 ^b	4.0±0.5 ^c	3.9±0.7 ^e
N0V100C0A	3.3±0.6 ^{bc}	3.3±0.5 ^d	2.1±0.4 ^a	3.6±0.5 ^b	3.3±0.5 ^e	2.7±0.4 ^{bc}	3.3±0.4 ^{ab}	4.2±0.5 ^{bc}	2.2±0.4 ^b	3.5±0.6 ^{abc}	1.5±0.2 ^a
N0V50V50A	2.1±0.3 ^a	1.9±0.3 ^b	2.2±0.4 ^a	3.3±0.5 ^{ab}	3.2±0.4 ^{de}	3.3±0.5 ^d	3.0±0.0 ^{ab}	3.6±0.5 ^{ab}	3.0±0.0 ^c	3.0±0.5 ^{ab}	3.4±0.5 ^{cde}
N33V33C33A	3.7±0.7 ^c	3.0±0.5 ^{cd}	3.6±0.7 ^{cd}	3.7±0.7 ^b	2.1±0.3 ^{ab}	3.0±0.0 ^{cd}	3.4±0.5 ^{ab}	4.2±0.8 ^{bc}	2.0±0.0 ^b	3.1±0.6 ^{ab}	3.6±0.7 ^{de}
N100V0C0A	3.0±0.5 ^{bc}	2.9±0.5 ^d	2.6±0.5 ^{ab}	3.2±0.5 ^{ab}	2.6±0.5 ^{bcde}	1.8±0.3 ^a	3.2±0.5 ^{ab}	3.6±0.5 ^{abc}	2.6±0.4 ^c	3.0±0.4 ^{ab}	1.9±0.2 ^{ab}
N16V66C16A	3.1±0.6 ^{bc}	3.2±0.4 ^d	2.9±0.6 ^b	3.4±0.5 ^{ab}	2.6±0.5 ^{abcd}	3.0±0.0 ^{cd}	3.7±0.7 ^b	3.8±0.6 ^{abc}	2.0±0.0 ^b	3.5±0.5 ^{bc}	3.1±0.3 ^{cd}
N50V50C0A	2.1±0.3 ^a	1.0±0.0 ^a	3.2±0.4 ^{bc}	3.3±0.5 ^{ab}	3.1±0.6 ^{cde}	2.2±0.4 ^{ab}	2.7±0.5 ^a	3.9±0.3 ^{abc}	3.6±0.5 ^d	3.2±0.4 ^{ab}	2.7±0.5 ^{bc}
N50V0C50A	2.6±0.5 ^{ab}	2.1±0.3 ^b	3.2±0.4 ^{bc}	2.7±0.5 ^a	2.8±0.4 ^{cde}	3.4±0.5 ^d	3.3±0.5 ^{ab}	3.9±0.6 ^{abc}	3.1±0.3 ^c	2.8±0.4 ^a	3.3±0.5 ^{cde}
N66V16C16A	3.2±0.4 ^{bc}	1.0±0.0 ^a	3.9±0.3 ^d	3.6±0.5 ^b	3.2±0.4 ^{de}	3.1±0.3 ^{cd}	3.7±0.7 ^b	3.2±0.4 ^a	1.0±0.0 ^a	3.0±0.5 ^{ab}	3.7±0.7 ^{de}
N0V0C100A	3.1±0.4 ^{bc}	2.4±0.4 ^{bc}	3.5±0.4 ^{bc}	3.6±0.5 ^b	2.6±0.3 ^{abc}	3.1±0.2 ^{cd}	3.3±0.5 ^{ab}	3.9±0.4 ^{abc}	3.0±0.4 ^c	2.8±0.5 ^a	3.4±0.5 ^{cde}
N16V16C66A	2.8±0.4 ^{ab}	2.2±0.4 ^b	3.3±0.5 ^{bcd}	3.5±0.5 ^b	2.0±0.0 ^a	3.1±0.6 ^{cd}	3.4±0.5 ^{ab}	4.6±0.5 ^c	2.2±0.4 ^b	3.3±0.5 ^{ab}	3.6±0.7 ^{de}

Values with different letters in the same column are significantly different according to Tukey's test (95%).
Codes for the samples are shown in Table 2.

FIGURES

Figure S1. Viable cell counts found in the grape musts (first 24 h of fermentation) inoculated with the different NSYS isolated from the grape surface. Grape Italia 1
(*Metschnikowia pulcherrima* - M; *Pichia terricola* - P; *Naganishia vaughanmartinae* - N). Grape Negra Criolla (*Vishniacozyma heimaeyensis* - V); *Vishniacozyma* 2
carnescens - C; *Aureobasidium pullulans* - A). 3
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Figure S2. Total yeast population count (CFU/g of must) in Italia and Negra Criolla grape musts during 12 days of fermentation. The values reported in the graph at 5
each sampling time represent the mixtures of inoculated yeast and control sample (uninoculated). Codes for the samples are shown in Table 1 and Table 2. 6

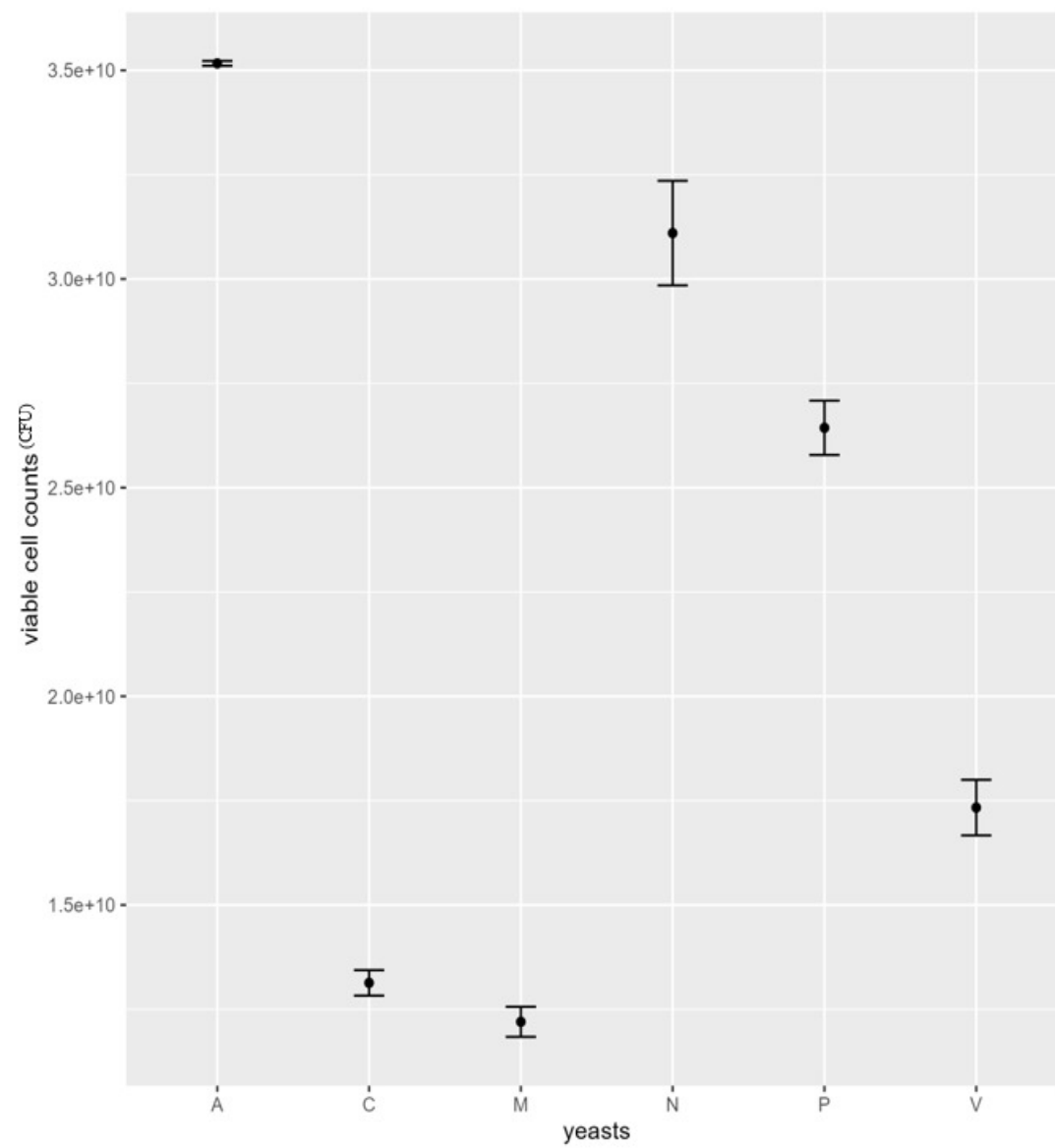


Figure S1

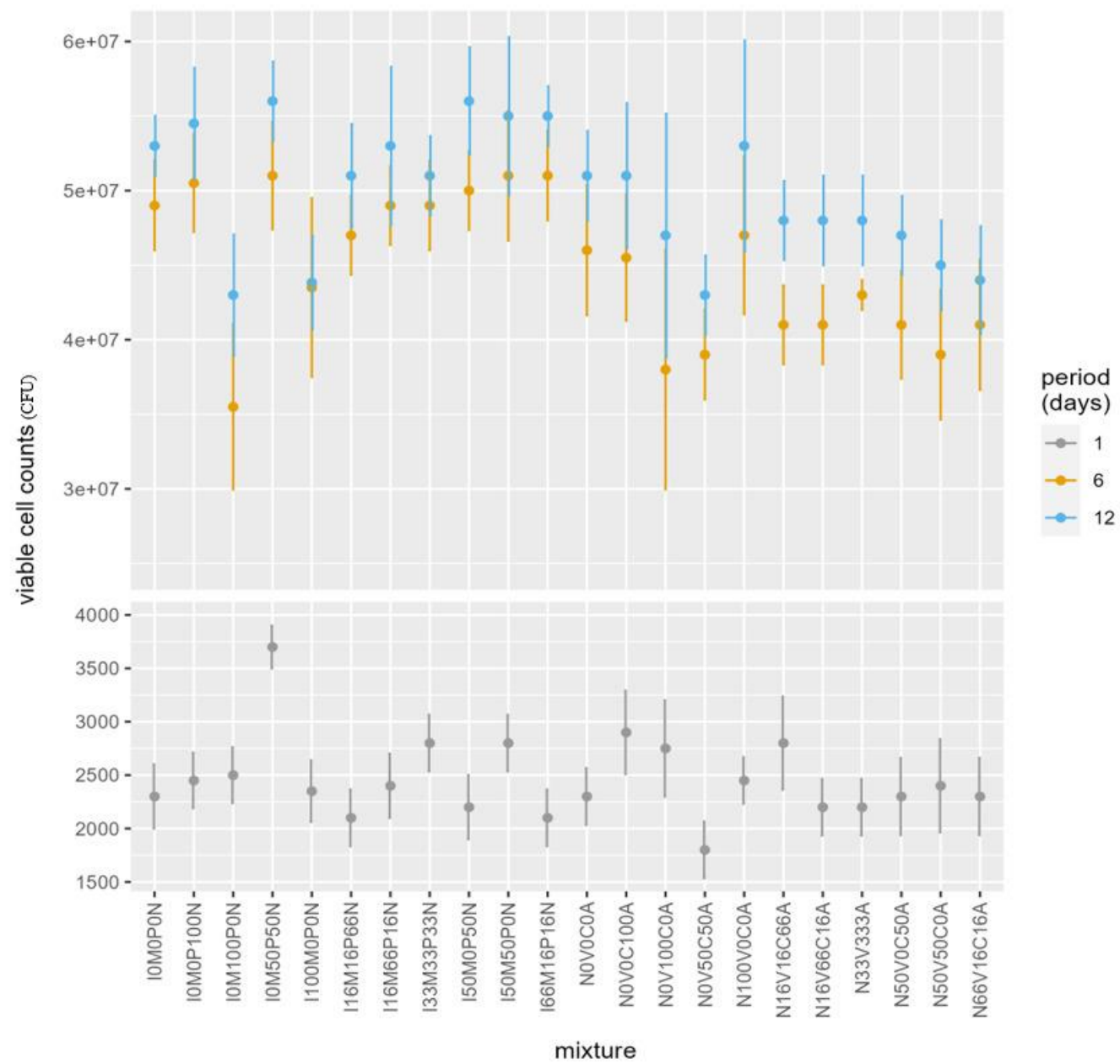


Figure S2