

Table S1. Probability (p) values of standard chemical parameters of Shiraz wines produced with *Saccharomyces cerevisiae* (Sc1 or Sc2) only, or in combination with *Hanseniaspora uvarum* (Hu), two lactic acid bacteria strains and two MLF strategies (simultaneous or sequential inoculation). Values are means of three replicate fermentations.

Chemical parameter	Treatment		
	Yeast	LAB strain × MLF strategy	Yeast × LAB strain × MLF strategy
pH	0.0001	0.0001	0.0022
Volatile acidity (g/L)	0.0001	0.0001	0.0001
Total acidity (g/L)	0.0891	0.0001	0.5027
Malic acid (g/L)	0.0001	0.0001	0.0001
Lactic acid (g/L)	0.0001	0.0001	0.0001
Alcohol (% v/v)	0.0001	0.0814	0.5237
Glycerol (g/L)	0.0001	0.0001	0.595
Residual sugar (g/L)	0.0001	0.4552	0.6113

Table S2. Probability (p) values of volatile compounds of Shiraz wines produced with *Saccharomyces cerevisiae* (Sc1 or Sc2) only, or in combination with *Hanseniaspora uvarum* (Hu), two lactic acid bacteria strains (LAB1 or LAB2) and two MLF strategies (simultaneous or sequential inoculation). Values are means of three replicate fermentations.

Compound	Treatments		
	Yeast	LAB strain × MLF strategy	Yeast × LAB strain × MLF strategy
Ethyl acetate	0.0001	0.1646	0.3139
Ethyl lactate	0.0001	0.0001	0.0029
Ethyl butanoate	0.0001	0.0402	0.0017
Ethyl hexanoate	0.0001	0.0179	0.0029
Ethyl decanoate	0.0001	0.0001	0.0001
Ethyl octanoate	0.0001	0.0001	0.0001
Ethyl-3-hydroxybutanoate	No value	0.0003	No value
Isoamyl acetate	0.0001	0.0004	0.0228
Ethyl phenylacetate	0.0001	0.0001	0.0182
2-Phenylethyl acetate	0.0001	0.0001	0.0004
Diethyl succinate	0.0001	0.0001	0.0001
Acetoin	0.0001	0.0001	0.0001
Methanol	0.0001	0.0013	0.0004
Propanol	0.0001	0.001	0.0002
Isobutanol	0.0001	0.0001	0.0001
Butanol	0.0001	0.0025	0.0001
Isoamyl alcohol	0.0001	0.0001	0.0001
Pentanol	0.0001	0.0002	0.0056
3-Methyl-1-pentanol	0.0001	0.0038	0.0001
Hexanol	0.0001	0.0001	0.0001
3-Ethoxy-1-propanol	0.0001	0.0001	0.0001
2-Phenyl ethanol	0.0001	0.0001	0.0001
Acetic acid	0.0001	0.0001	0.0002
Propionic acid	0.0001	0.0285	0.0001
Isobutyric acid	0.0001	0.0008	0.0001
Butyric acid	0.0001	0.0222	0.0001
Isovaleric acid	0.0001	0.0001	0.0001
Valeric acid	0.0001	0.0001	0.0001
Hexanoic acid	0.0001	0.0001	0.0171
Octanoic acid	0.0001	0.0001	0.0001
Decanoic acid	0.0001	0.0001	0.0001

<sup>1</sup>Probability (p) values ≤ 0.05 indicate significant differences between treatments.

Table S3. Sensory data of Shiraz wines produced with *Saccharomyces cerevisiae* (Sc1 or Sc2) only, or in combination with *Hanseniaspora uvarum* (Hu), two lactic acid bacteria strains (LAB1 or LAB2) and two MLF strategies (simultaneous or sequential inoculation). Values are means of three replicate fermentations.

Treatment <sup>1</sup>	Berry	Fruity	Sweet associated	Fresh vegetative	Cooked vegetative	Spicy	Floral	Acid balance	Body	Astringency	Bitterness
Sc1	52.61d <sup>2</sup>	34.33abc	29.29abcde	24.77fg	18.23abcd	29.05bcdefg	14.12ab	53.46a	47.50f	32.60efg	18.08cd
Sc1+LAB1 sim MLF	54.04bcd	33.42bc	26.16cde	33.19abc	17.21abcd	29.26bcdefg	12.30abcd	49.81c	51.52cde	35.39abcde	18.23cd
Sc1+LAB1 seq MLF	58.06abcd	32.21c	27.39abcde	32.30abcd	17.73abcd	33.05ab	11.91abcd	49.41c	51.90bcde	35.77abcde	20.22abcd
Sc1+LAB2 sim MLF	57.99abcd	37.79abc	27.67abcde	24.39g	20.84a	29.47bcdefg	13.55abc	48.15c	55.38ab	36.29abcde	18.52cd
Sc1+LAB2 seq MLF	60.35ab	35.86abc	29.68abcde	32.17abcd	14.65de	32.82ab	11.62abcd	48.03c	53.10abcde	30.72g	22.40ab
Hu+Sc1	56.76abcd	38.42abc	30.42abcd	33.35ab	17.30abcd	28.61cdefg	13.69abc	54.86a	51.88bcde	37.70ab	20.53abcd
Hu+Sc1+LAB1 sim MLF	54.23bcd	31.71c	23.91de	33.38ab	18.94abcd	31.56abcde	15.04a	49.41c	53.05abcde	38.65a	21.18abc
Hu+Sc1+LAB1 seq MLF	58.30abcd	35.49abc	26.79bcde	33.37ab	18.61abcd	31.06abcde	10.84bcd	50.27bc	55.89a	36.97abcd	18.31cd
Hu+Sc1+LAB2 sim MLF	60.43ab	37.64abc	35.00a	30.01bcde	11.50e	25.86g	10.27cd	49.21c	54.64abc	38.24ab	18.68bcd
Hu+ Sc1+LAB2 seq MLF	61.46a	37.70abc	30.31abcd	35.27a	16.59abcd	34.12a	13.30abc	48.17c	56.02a	36.55abcde	18.45cd
Sc2	58.36abcd	33.69abc	25.91cde	27.42defg	17.97abcd	32.71ab	10.39cd	49.27c	50.27ef	35.87abcde	16.89d
Sc2+LAB1 sim MLF	52.55d	33.09bc	22.41e	26.01efg	17.16abcd	32.49abc	9.04d	48.21c	47.41f	33.18defg	20.46abcd
Sc2+LAB1 seq MLF	57.29abcd	35.32abc	25.97cde	29.57bcdef	18.37abcd	31.89abcd	11.21bcd	49.01c	50.53edf	35.06abcdef	20.47abcd
Sc2+LAB2 sim MLF	61.29a	38.41abc	34.63a	28.18cdefg	15.22bcde	25.47g	15.00a	48.57c	51.67bcde	34.36bcdefg	18.59cd
Sc2+LAB2 seq MLF	61.83a	41.12a	34.39ab	26.03efg	14.98cde	30.38abcdef	14.10ab	48.55c	51.50cde	32.84efg	23.53a
Hu+Sc2	57.03abcd	36.63abc	32.71abc	29.24bcdefg	19.46abc	28.41cdefg	11.38bcd	53.02ab	54.36abcd	37.55abc	19.68bcd
Hu+Sc2 +LAB1 sim MLF	53.28cd	31.67c	28.32abcde	29.33bcdefg	19.39abc	28.14defg	11.51abcd	48.79c	53.99abcde	33.53cdefg	19.53bcd
Hu+Sc2 +LAB1 seq MLF	52.46d	35.83abc	28.44abcde	28.38bcdefg	15.49bcde	26.67fg	10.51cd	48.22c	51.74bcde	31.11fg	18.14cd
Hu+Sc2 +LAB2 sim MLF	58.05abcd	35.21abc	31.75abc	29.23bcdefg	16.32abcd	27.58efg	9.00d	48.36c	56.70a	36.60abcde	19.53bcd
Hu+Sc2 +LAB2 seq MLF	59.49abc	40.46ab	32.39abc	26.79efg	19.74ab	29.44bcdefg	11.33bcd	48.65c	54.58abc	34.56bcdefg	18.11cd

<sup>1</sup>*Saccharomyces cerevisiae* (Sc1 or Sc2), *Hanseniaspora uvarum* (Hu) and MLF induced as a simultaneous (sim) MLF or sequential (seq) inoculation. <sup>2</sup>Values in the same column followed by the same letter do not differ significantly ( $p \leq 0.05$ )

