SUPPLEMENTARY DATA
Zieff, D., Du Toit, M., Schneider, R., & Divol, B. (2026). Impact of selected oenological yeasts on chemical profile and colour development in smoke-exposed red wine. *OENO One, 60*(3).
https://doi.org/10.20870/oeno-one.2026.60.3.9920

SUPPLEMENTARY DATA

Table S1. Free volatile phenol concentrations (µg/L) at 48 h in wine fermentations for untreated juice (J), smoke exposed juice (SJ), and total release (TR) of bound + free VPs via glycosidase hydrolysis of smoked juice, individual *S. cerevisiae* inoculations in control grape juice (C), smoke-exposed grape juice (Sc), glycosidase supplemented smoked grape juice (E), and sequential inoculations with *S. cerevisiae* and *L. thermotolerans* (Lt), *W. anomalus* (Wa), *S. bacillaris* (Sb), and a mixed consortium of all three non-*Saccharomyces* strains (M). Mean values and standard deviations are given for triplicate measurements.

	Guaiacol		**4-methylguaiacol**		***o*-cresol**		**phenol**		**4-ethylguaiacol**		**4-ethylphenol**	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
J	0.000 (0.000)		0.000 (0.000)		1.290 (0.321)		0.000 (0.000)		0.000 (0.000)		0.000 (0.000)	
SJ	15.000 (2.440)		6.600 (2.870)		8.180 (1.670)		35.100 (12.000)		3.000 (0.956)		0.483 (0.365)	
TR	70.100 (2.500)		53.500 (3.790)		51.700 (0.818)		285.000 (12.900)		37.500 (1.670)		35.500 (0.592)	
M	23.900 (2.52)	abc	7.980 (2.370)	ab	12.400 (2.480)	a	53.500 (11.400)	ab	5.120 (0.850)	bc	5.000 (1.670)	ab

SUPPLEMENTARY DATA
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C	1.370 (0.245)	d	0.000 (0.000)	c	2.360 (0.394)	b	0.000 (0.000)	c	0.613 (0.151)	d	3.590 (0.821)	b
Sc	27.600 (5.450)	a	12.700 (4.390)	a	16.700 (5.460)	a	69.300 (21.500)	a	9.170 (2.380)	a	8.370 (3.450)	a
E	26.000 (3.560)	a	10.900 (2.000)	ab	14.800 (2.670)	a	62.700 (11.200)	ab	7.920 (1.500)	ab	7.230 (0.407)	ab
Lt	15.400 (2.500)	c	5.690 (0.660)	bc	9.620 (0.737)	ab	37.400 (1.580)	b	3.970 (0.786)	cd	3.770 (1.320)	b
Wa	16.900 (3.020)	bc	6.310 (0.825)	b	10.100 (0.702)	a	41.600 (2.220)	ab	4.390 (0.325)	c	4.910 (0.243)	ab
Sb	24.500 (2.250)	ab	8.040 (1.580)	ab	12.100 (2.37)	a	51.600 (9.610)	ab	5.250 (1.130)	bc	3.380 (0.240)	b

SUPPLEMENTARY DATA
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Table S2. Free Volatile phenol concentrations (µg/L) at the end of alcoholic fermentation for individual *S. cerevisiae* inoculations in control grape juice (C), smoke-exposed grape juice (Sc), glycosidase supplemented smoked grape juice (E), and sequential inoculations with *S. cerevisiae* and *L. thermotolerans* (Lt), *W. anomalus* (Wa), *S. bacillaris* (Sb), and a mixed consortium of all three non-*Saccharomyces* strains (M). Mean values and standard deviations are given for triplicate measurements.

	Guaiacol				**4-methylguaiacol**			
	Charcoal		No charcoal		Charcoal		No charcoal	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	51.900 (3.060)	b	58.600 (1.260)	a	25.600 (3.540)	b	39.800 (3.910)	a
C	2.460 (0.422)	e	4.390 (0.436)	e	1.920 (0.187)	d	2.110 (0.910)	d
Sc	40.400 (0.796)	c	60.200 (0.395)	a	16.100 (0.883)	c	36.000 (2.920)	a
E	36.300 (0.616)	cd	56.900 (2.170)	ab	16.500 (0.597)	c	35.700 (2.800)	a
Lt	33.900 (2.360)	cd	55.100 (2.020)	ab	18.300 (1.890)	c	36.500 (3.340)	a
Wa	39.600 (2.460)	c	54.700 (2.520)	ab	19.800 (0.950)	bc	35.700 (2.660)	a
Sb	32.500 (2.330)	d	58.100 (4.560)	ab	16.400 (0.591)	c	36.200 (0.859)	a

SUPPLEMENTARY DATA
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	***o*-cresol**				**phenol**			
	Charcoal		No charcoal		Charcoal		No charcoal	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	29.800 (4.620)	c	43.400 (4.480)	ab	211.000 (21.400)	bc	256.000 (25.400)	a
C	1.380 (0.315)	e	1.450 (0.442)	e	11.700 (0.459)	f	24.500 (2.420)	f
Sc	22.200 (0.500)	d	47.400 (3.480)	a	171.000 (14.900)	cde	218.000 (4.830)	ab
E	22.800 (1.050)	cd	43.100 (2.530)	ab	174.000 (4.820)	cde	239.000 (19.200)	ab
Lt	20.100 (1.050)	d	39.100 (2.310)	b	141.000 (1.190)	e	200.000 (3.480)	bcd
Wa	22.000 (2.520)	d	40.800 (2.070)	ab	159.000 (20.100)	de	219.000 (19.100)	ab
Sb	21.800 (0.973)	d	43.700 (1.330)	ab	170.000 (9.170)	de	228.000 (4.130)	ab
	4-ethylguaiacol				**4-ethylphenol**			
	Charcoal		No charcoal		Charcoal		No charcoal	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	16.800 (2.250)	d	30.800 (2.070)	a	14.200 (3.310)	cdfg	28.900 (7.200)	cde
C	1.780 (0.876)	f	5.670 (0.100)	f	1.180 (0.098)	a	4.470 (0.417)	ab

SUPPLEMENTARY DATA
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Sc	12.000 (1.480)	e	22.900 (1.700)	c	7.070 (0.893)	abg	21.900 (2.300)	cdef
E	11.500 (1.260)	e	25.700 (1.130)	bc	8.530 (1.140)	abfg	26.500 (5.250)	cde
Lt	14.800 (1.960)	de	29.200 (2.130)	ab	11.400 (1.280)	bcfg	26.200 (1.440)	cde
Wa	13.400 (2.010)	de	29.700 (1.270)	ab	11.400 (1.240)	bcfg	39.100 (3.050)	e
Sb	11.700 (1.090)	e	27.900 (0.755)	ab	8.320 (0.540)	abfg	29.400 (0.726)	de

SUPPLEMENTARY DATA
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Table S3. Concentrations of detected free-terpenoid compounds (µg/L) in wines with no charcoal treatment for individual *S. cerevisiae* inoculations in control grape juice (C), smoke-exposed grape juice (Sc), glycosidase supplemented smoked grape juice (E), and sequential inoculations with *S. cerevisiae* and *L. thermotolerans* (Lt), *W. anomalus* (Wa), *S. bacillaris* (Sb) and a mixed consortium of all three non-*Saccharomyces* strains (M). Means and standard deviations given for triplicate samples.

	Linalool[1]		**Trans- β-Farnesene**		**α-Farnesene**		**β -ionone**		**α-terpineol**	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	2.640 (0.254)		7.400 (0.234)	cd	7.480 (0.438)	def	0.487 (0.011)		7.290 (0.154)	abde
C	2.420 (0.389)		6.450 (0.406)	d	5.420 (0.419)	g	0.481 (0.009)		4.510 (0.286)	ab
Sc	2.800 (0.185)		8.620 (0.309)	ab	10.600 (0.491)	b	0.497 (0.027)		11.100 (0.860)	c
E	2.580 (0.177)		8.030 (0.707)	bc	9.240 (0.105)	c	0.515 (0.057)		10.400 (0.388)	c
Lt	2.640 (0.326)		9.270 (0.225)	a	8.580 (0.463)	cd	0.488 (0.011)		9.100 (0.084)	cd
Wa	2.450 (0.094)		7.240 (0.452)	cd	7.250 (0.436)	ef	0.496 (0.028)		6.110 (0.098)	abe
Sb	3.330 (0.487)		7.670 (0.435)	bc	8.430 (0.253)	cde	0.493 (0.014)		9.260 (0.363)	cd

SUPPLEMENTARY DATA
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	Trans-β-Damascenone		**Geranyl acetate**		**Limonene**		**β-citronellol**	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	0.772 (0.021)	b	5.930 (0.060)	cefgh	0.580 (0.020)	de	11.300 (0.178)	cd
C	0.732 (0.043)	b	3.360 (0.291)	ab	0.262 (0.015)	a	6.750 (0.320)	g
Sc	1.220 (0.135)	a	7.620 (0.292)	d	0.741 (0.017)	c	14.000 (0.076)	a
E	0.835 (0.060)	b	7.110 (0.085)	cd	0.710 (0.005)	bc	13.500 (0.370)	a
Lt	0.734 (0.021)	b	6.870 (0.092)	cde	0.624 (0.021)	d	12.600 (0.101)	b
Wa	0.757 (0.045)	b	5.320 (0.149)	abgh	0.457 (0.035)	ae	10.100 (0.123)	e
Sb	0.830 (0.064)	b	6.540 (0.310)	cdefh	0.636 (0.013)	bd	12.700 (0.214)	b

[1] Kruskal-Wallis Rank Sum Test ($p = 0.59$) therefore no significant differences between yeast treatments, $p < 0.001$ for charcoal *vs*. no charcoal.

SUPPLEMENTARY DATA
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Table S4. Concentrations of detected free-terpenoid compounds (µg/L) in wines with charcoal treatment for individual *S. cerevisiae* inoculations in control grape juice (C), smoke-exposed grape juice (Sc), glycosidase supplemented smoked grape juice (E) and sequential inoculations with *S. cerevisiae* and *L. thermotolerans* (Lt), *W. anomalus* (Wa), *S. bacillaris* (Sb) and a mixed consortium of all three non-*Saccharomyces* strains (M). Means and standard deviations given for triplicate samples.

	Linalool		**Trans- β-Farnesene**		**α-Farnesene**		**β -ionone**		**α-terpineol**	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	1.033 (0.061)		2.213 (0.189)	fg	5.129 (0.269)	g	0.495 (0.010)		6.703 (0.036)	abde
C	1.026 (0.080)		1.153 (0.043)	g	6.815 (0.196)	f	0.489 (0.008)		3.158 (0.094)	a
Sc	1.129 (0.161)		1.582 (0.288)	fg	5.550 (0.385)	g	0.531 (0.075)		10.365 (0.076)	c
E	1.069 (0.089)		1.736 (0.093)	fg	7.118 (0.646)	f	0.485 (0.016)		9.114 (0.122)	cd
Lt	1.109 (0.011)		4.094 (0.712)	e	8.551 (0.255)	cd	0.505 (0.016)		8.665 (0.105)	cde
Wa	1.028 (0.094)		2.346 (0.224)	f	12.998 (0.223)	a	0.499 (0.025)		6.822 (0.038)	abde
Sb	1.239 (0.139)		2.006 (0.174)	fg	11.362 (0.638)	b	0.498 (0.021)		8.173 (0.079)	bde

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	Trans-β-Damascenone		**Geranyl acetate**		**Limonene**		**β-citronellol**	
Treat.	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter	Mean (Sd)	Sig. letter
M	0.272 (0.026)		4.921 (0.036)	abg	0.528 (0.007)	de	10.332 (0.193)	e
C	0.416 (0.053)		2.186 (0.088)	a	0.208 (0.004)	a	5.225 (0.031)	h
Sc	0.432 (0.106)		6.543 (0.059)	cdefh	0.706 (0.005)	c	12.374 (0.334)	b
E	0.411 (0.050)		6.700 (0.053)	cdef	0.652 (0.008)	bc	11.206 (0.192)	cd
Lt	0.414 (0.007)		5.501 (0.083)	abfgh	0.587 (0.005)	d	10.693 (0.160)	de
Wa	0.365 (0.042)		4.457 (0.042)	abg	0.416 (0.004)	ae	8.978 (0.098)	f
Sb	0.400 (0.077)		5.768 (0.022)	befgh	0.617 (0.004)	bd	11.394 (0.283)	c

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Table S5. Two-way ANOVA of wine colour density measurements.

	Df	Sum Sq	Mean Sq	F value	Pr (> F)
Charcoal	1	0.234	0.237	107.982	<0.0001***
Treatment	6	0.184	0.031	13.989	<0.0001***
Charcoal:treat	6	0.020	0.003	1.516	0.209
Residuals	28	0.061	0.002		

Table S6. Colour density (A_{420nm} + A_{520nm}) data of yeast treatments.

Treat	Mean	Std. error	Lower CI	Upper CI	Sig. letter
M	1.160	0.022	1.120	1.210	a
C	1.400	0.027	1.350	1.460	c
Sc	1.250	0.024	1.200	1.300	ab
E	1.300	0.025	1.250	1.35	bc
Lt	1.280	0.025	1.230	1.330	b
Wa	1.150	0.022	1.110	1.200	a
Sb	1.170	0.022	1.120	1.210	a

Table S7. Colour density (A_{420nm} + A_{520nm}) data of charcoal *vs*. no charcoal effect on wines.

Treat	Mean	Std. error	Lower CI	Upper CI	Sig. letter
Charcoal	1.150	0.012	1.130	1.180	a
No Charcoal	1.340	0.014	1.310	1.370	b

Table S8. Colour hue (A_{420nm}/A_{520nm}) comparison of wines treated with charcoal *vs*. no charcoal.

	Charcoal		No Charcoal	
Treat	Mean (Sd)	Sig. letters	Mean (Sd)	Sig. letters
M	1.360 (0.027)	abcd	1.300 (0.018)	cd
C	1.490 (0.085)	a	1.500 (0.103)	ab
Sc	1.460 (0.006)	a	1.350 (0.022)	abcd
E	1.430 (0.033)	ac	1.340 (0.039)	abcd
Lt	1.260 (0.020)	d	1.26 (0.020)	bd
Wa	1.400 (0.015)	abcd	1.280 (0.012)	d
Sb	1.450 (0.007)	ac	1.390 (0.024)	abcd