

**Table 1.** CIEL\*a\*b\* parameters of skin extracts during maceration with tannins from different origin and CSL biosurfactant for Aglianico and Cabernet sauvignon winegrapes.

Colour index	Grape cultivar	Treatment	6 h	24 h	48 h	72 h	96 h	168 h	Sign <sup>b</sup>
L*	Aglianico	control	59.96 ± 2.84 $\alpha$	39.28 ± 1.74 a, $\beta$	33.39 ± 0.94 a, $\gamma$	31.35 ± 1.92 ab, $\gamma$	32.92 ± 1.77 a, $\gamma$	33.39 ± 1.39 ab, $\gamma$	***
		grape seeds	57.01 ± 2.92 $\alpha$	36.91 ± 1.33 ab, $\beta$	33.06 ± 0.72 ab, $\beta\gamma$	31.53 ± 0.87 ab, $\beta$	32.41 ± 0.44 a, $\beta\gamma$	35.28 ± 1.18 ab, $\beta\gamma$	***
		grape skins	55.00 ± 3.94 $\alpha$	36.05 ± 1.21 ab, $\beta$	31.92 ± 0.08 ab, $\beta\gamma$	30.33 ± 0.63 ab, $\gamma$	31.21 ± 1.24 a, $\gamma$	33.41 ± 2.50 ab, $\beta\gamma$	**
		acacia	55.56 ± 2.57 $\alpha$	37.58 ± 0.33 ab, $\beta$	33.12 ± 0.66 ab, $\gamma\delta$	32.04 ± 0.55 a, $\delta$	33.14 ± 0.78 a, $\gamma\delta$	36.05 ± 0.64 a, $\beta\gamma$	***
		quebracho	52.07 ± 2.57 $\alpha$	34.98 ± 0.84 b, $\beta\gamma$	30.87 ± 0.69 b, $\delta$	29.27 ± 0.33 b, $\epsilon$	30.38 ± 0.31 a, $\delta$	33.31 ± 0.73 b, $\beta$	**
		biosurfactant	55.48 ± 2.79 $\alpha$	37.22 ± 1.60 ab, $\beta$	31.61 ± 1.43 ab, $\beta\gamma$	30.20 ± 1.85 ab, $\gamma$	30.77 ± 1.73 a, $\gamma$	29.80 ± 3.01 ab, $\gamma$	***
		Sign <sup>a</sup>	ns	*	*	*	*	*	*
	Cabernet sauvignon	control	65.26 ± 2.61 a, $\alpha$	41.54 ± 2.02 a, $\beta$	35.17 ± 1.90 $\gamma$	33.64 ± 2.08 $\gamma$	36.04 ± 2.18 a, $\beta\gamma$	37.00 ± 1.13 a, $\beta\gamma$	***
		grape seeds	61.94 ± 1.65 abc, $\alpha$	37.81 ± 2.39 ab, $\beta$	33.07 ± 1.11 $\beta$	35.50 ± 3.13 $\beta$	34.97 ± 1.58 ab, $\beta$	35.96 ± 1.47 ab, $\beta$	**
		grape skins	64.35 ± 2.13 ab, $\alpha$	36.46 ± 1.76 b, $\beta$	29.97 ± 1.60 $\gamma$	35.21 ± 0.95 $\beta$	32.64 ± 1.41 abc, $\beta\gamma$	33.66 ± 2.30 ab, $\beta\gamma$	***
		acacia	60.86 ± 0.85 abc, $\alpha$	37.80 ± 0.92 ab, $\beta$	31.46 ± 1.49 $\gamma$	32.85 ± 2.15 $\gamma$	32.80 ± 0.59 abc, $\gamma$	33.16 ± 0.61 ab, $\gamma$	***
		quebracho	58.67 ± 1.66 c, $\alpha$	34.99 ± 1.29 b, $\beta$	31.58 ± 1.77 $\beta\gamma$	32.21 ± 1.71 $\beta\gamma$	30.64 ± 0.83 bc, $\gamma$	31.43 ± 0.44 bc, $\beta\gamma$	***
		biosurfactant	59.84 ± 0.70 bc, $\alpha$	35.26 ± 0.98 b, $\beta$	28.84 ± 4.94 $\beta$	30.26 ± 4.86 $\beta$	28.97 ± 3.25 c, $\beta$	27.94 ± 2.94 c, $\beta$	***
		Sign <sup>a</sup>	**	**	ns	ns	**	**	**
a*	Aglianico	control	54.14 ± 2.51 $\gamma$	63.86 ± 0.95 $\alpha$	61.62 ± 0.48 $\alpha\beta$	60.19 ± 1.33 $\beta$	61.19 ± 0.46 $\alpha\beta$	61.01 ± 0.26 ab, $\alpha\beta$	***
		grape seeds	55.00 ± 1.16 $\gamma$	62.00 ± 1.34 $\alpha\beta$	61.53 ± 0.61 $\alpha\beta$	60.59 ± 0.96 $\beta$	61.00 ± 0.49 $\beta$	63.66 ± 0.76 ab, $\alpha$	***
		grape skins	56.46 ± 1.45 $\beta$	62.12 ± 0.73 $\alpha$	60.74 ± 0.08 $\alpha\beta$	59.90 ± 0.75 $\alpha\beta$	60.04 ± 1.30 $\alpha\beta$	62.16 ± 2.62 ab, $\alpha\beta$	*
		acacia	55.70 ± 1.34 $\gamma$	62.58 ± 0.10 $\alpha\beta$	61.40 ± 0.58 $\beta$	61.03 ± 0.47 $\beta$	61.42 ± 0.64 $\beta$	64.11 ± 0.41 a, $\alpha$	***
		quebracho	58.40 ± 1.58 $\gamma$	62.11 ± 0.64 $\alpha\beta$	60.33 ± 0.64 $\beta\gamma$	59.38 ± 0.33 $\gamma$	59.94 ± 0.30 $\beta\gamma$	63.16 ± 0.76 ab, $\alpha$	***
		biosurfactant	57.31 ± 1.22 $\beta$	63.00 ± 1.50 $\alpha$	60.18 ± 1.37 $\alpha\beta$	59.17 ± 0.10 $\alpha\beta$	59.38 ± 1.59 $\alpha\beta$	57.52 ± 2.77 b, $\beta$	*
		Sign <sup>a</sup>	ns	ns	ns	ns	ns	**	**
	Cabernet sauvignon	control	48.58 ± 3.22 $\gamma$	63.25 ± 0.87 a, $\alpha$	60.99 ± 1.14 a, $\alpha$	58.57 ± 1.10 $\alpha\beta$	58.86 ± 1.39 a, $\alpha\beta$	55.25 ± 2.50 a, $\beta$	***
		grape seeds	49.89 ± 1.52 $\beta$	59.06 ± 2.47 ab, $\alpha$	57.58 ± 0.95 ab, $\alpha$	61.03 ± 2.83 $\alpha$	57.87 ± 0.76 a, $\alpha$	54.69 ± 0.08 a, $\beta$	**
		grape skins	48.88 ± 2.73 $\beta$	57.71 ± 2.12 b, $\alpha\beta$	54.64 ± 0.75 b, $\beta$	60.90 ± 0.19 $\alpha$	55.54 ± 0.49 ab, $\beta$	53.24 ± 1.24 a, $\beta$	***
		acacia	51.15 ± 0.11 $\gamma$	60.99 ± 1.51 ab, $\alpha$	57.54 ± 1.73 ab, $\alpha\beta$	59.89 ± 2.48 $\alpha$	57.53 ± 1.17 a, $\alpha\beta$	54.23 ± 1.46 a, $\beta\gamma$	***
		quebracho	51.61 ± 2.17 $\gamma$	58.11 ± 0.37 b, $\alpha$	58.06 ± 1.76 ab, $\alpha$	59.12 ± 1.36 $\alpha$	55.59 ± 0.19 ab, $\alpha\beta$	53.30 ± 1.29 a, $\beta\gamma$	***
		biosurfactant	51.22 ± 0.60	58.33 ± 1.98 b	54.87 ± 5.42 a b	56.32 ± 5.34	53.04 ± 3.29 b	48.13 ± 2.52 b	ns
		Sign <sup>a</sup>	ns	*	*	ns	**	**	**
b*	Aglianico	control	6.07 ± 0.80 b, $\gamma$	21.00 ± 2.14 $\beta$	27.39 ± 2.41 ab, $\alpha$	28.54 ± 1.84 b, $\alpha$	27.30 ± 2.22 ab, $\alpha$	26.37 ± 2.51 bc, $\alpha\beta$	***
		grape seeds	12.93 ± 1.27 a, $\gamma$	24.94 ± 0.10 $\beta$	30.66 ± 0.97 ab, $\alpha$	31.73 ± 1.16 a, $\alpha$	30.78 ± 1.26 ab, $\alpha$	30.59 ± 1.48 ab, $\alpha$	***
		grape skins	10.99 ± 1.26 a, $\gamma$	24.69 ± 0.70 $\beta$	30.98 ± 0.40 a, $\alpha$	32.15 ± 0.63 a, $\alpha$	30.81 ± 0.63 ab, $\alpha$	30.53 ± 1.39 ab, $\alpha$	***
		acacia	10.91 ± 1.05 a, $\gamma$	22.55 ± 1.17 $\beta$	28.92 ± 0.55 b, $\alpha$	30.07 ± 0.56 ab, $\alpha$	29.52 ± 0.43 b, $\alpha$	29.87 ± 0.62 abc, $\alpha$	***
		quebracho	11.27 ± 1.03 a, $\gamma$	24.99 ± 0.50 $\beta$	31.02 ± 0.28 a, $\alpha$	32.33 ± 0.10 a, $\alpha$	31.32 ± 0.34 a, $\alpha$	31.84 ± 0.11 a, $\alpha$	***
		biosurfactant	7.43 ± 1.28 b, $\gamma$	23.59 ± 0.97 $\beta$	28.74 ± 1.33 ab, $\alpha$	29.59 ± 1.49 ab, $\alpha$	28.35 ± 1.51 ab, $\alpha$	26.05 ± 2.06 c, $\alpha\beta$	**
		Sign <sup>a</sup>	***	ns	*	**	*	**	**
	Cabernet sauvignon	control	3.46 ± 0.77 d, $\beta$	18.11 ± 2.74 b, $\alpha$	22.88 ± 2.96 $\alpha$	21.55 ± 2.70 b, $\alpha$	18.37 ± 2.82 b, $\alpha$	16.38 ± 2.38 b, $\alpha$	***
		grape seeds	10.54 ± 0.37 a, $\gamma$	21.86 ± 0.98 ab, $\beta$	23.80 ± 0.58 $\alpha$	24.83 ± 0.64 ab, $\alpha$	21.65 ± 0.41 ab, $\beta$	20.38 ± 0.41 ab, $\beta$	***
		grape skins	6.82 ± 0.24 c, $\gamma$	20.10 ± 2.01 ab, $\alpha\beta$	22.48 ± 1.17 $\alpha\beta$	23.67 ± 1.62 ab, $\alpha$	20.27 ± 1.55 ab, $\alpha\beta$	19.36 ± 0.27 ab, $\beta$	***
		acacia	9.20 ± 0.42 ab, $\delta$	23.40 ± 0.89 a, $\beta\gamma$	25.95 ± 1.12 $\alpha\beta$	27.24 ± 1.00 a, $\alpha$	23.64 ± 1.06 a, $\beta\gamma$	21.54 ± 1.37 a, $\gamma$	***
		quebracho	8.93 ± 0.71 b, $\delta$	21.54 ± 1.41 ab, $\gamma$	25.64 ± 0.94 $\alpha\beta$	25.88 ± 1.20 a, $\alpha$	22.63 ± 1.39 ab, $\beta\gamma$	20.97 ± 1.23 ab, $\gamma$	***
		biosurfactant	5.47 ± 0.34 c, $\epsilon$	20.20 ± 0.88 ab, $\beta\gamma$	24.96 ± 1.59 $\alpha$	23.64 ± 1.47 ab, $\alpha\beta$	20.15 ± 1.69 ab, $\gamma$	16.52 ± 1.07 b, $\delta$	***
		Sign <sup>a</sup>	***	*	ns	*	*	*	*

All data are expressed as average value ± standard deviation (n=3). Sign: \*, \*\*, \*\*\*, and ns indicate significance at  $p < 0.05$ , 0.01, 0.001, and not significant, respectively, for the differences among treatments for each maceration time (<sup>a</sup>) and among different maceration times for each treatment (<sup>b</sup>) according to ANOVA, Welch's ANOVA, or Kruskal-Wallis tests. Different Latin letters within the same column indicate significant differences (<sup>a</sup>) and different Greek letters within the same row indicate significant differences (<sup>b</sup>) according to Tukey HSD, Games-Howell, and Conover's tests ( $p < 0.05$ ) for ANOVA, Welch's ANOVA, and Kruskal-Wallis tests, respectively. L\*: lightness, a\*: red/green colour coordinate, b\*: yellow/blue colour coordinate.

**Table S2.**  $\Delta E^*$  colour parameter of skin extracts at 168 h of maceration without and with addition of tannins from different origin and CSL biosurfactant for Aglianico and Cabernet sauvignon winegrapes.

<b>Grape cultivar</b>		<b>control</b>	<b>grape seeds</b>	<b>grape skins</b>	<b>acacia</b>	<b>quebracho</b>	<b>biosurfactant</b>
Aglianico	control	0					
	grape seeds	5.33	0				
	grape skins	4.31	2.39	0			
	acacia	5.37	1.15	3.34	0		
	quebracho	5.88	2.39	1.65	3.51	0	
	biosurfactant	5.02	9.40	7.40	9.85	8.82	0
Cabernet sauvignon	control	0					
	grape seeds	4.18	0				
	grape skins	4.91	2.90	0			
	acacia	6.52	3.07	2.45	0		
	quebracho	7.48	4.77	2.75	2.04	0	
	biosurfactant	11.53	11.05	8.18	9.46	7.66	0