

## Analytical Methods

### Electronic supplementary information

#### **Lab-on-valve combined to kinetic-matching approach for fast evaluation of total antioxidant capacity in wines**

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**Table S1.** Dispersion coefficients (*D*) obtained for different points of sample peak profile (Fig. 2).

	Volume / $\mu\text{l}$	A <sup>c</sup>	B <sup>d</sup>	C <sup>e</sup>	D <sup>e</sup>
<b><i>D</i> sample<sup>a</sup></b>	1	84.3	37.9	47.5	197.4
	2	31.4	28.0	29.4	81.3
	5	12.0	10.3	11.3	16.1
<b><i>D</i> reagent<sup>b</sup></b>	1	1.06	1.07	1.06	1.00
	2	1.09	1.13	1.11	1.02
	5	1.06	1.28	1.26	1.05

<sup>a</sup> Dispersion coefficient of sample plug was assessed using BTB solution as sample and borax solution (0.01 M) as carrier.

<sup>b</sup> Dispersion coefficient of reagent was assessed using borax as sample and BTB as carrier/reagent. For both experiments: carrier flow rate  $1.25 \mu\text{l s}^{-1}$ , sample aspiration flow rate  $2 \mu\text{l s}^{-1}$ .

<sup>c</sup> Dispersion coefficient values obtained at 50% of maximum peak height before the peak maximum.

<sup>d</sup> Dispersion coefficient values determined at peak maximum.

<sup>e</sup> Dispersion coefficient values determined at 85 (C) and 25 (D) % of maximum peak height after peak maximum.

**Table S2.** Relative standard deviation (RSD) values of the analytical signal obtained for different points of sample peak profile, using different injection volumes.

	Volume / $\mu\text{l}$	A <sup>c</sup>	B <sup>d</sup>	C <sup>e</sup>	D <sup>e</sup>
<b>Sample<sup>a</sup></b>	1	19.3	4.3	5.8	10.4
	2	4.2	1.1	2.3	11.3
	5	1.7	0.9	1.2	2.5
<b>Reagent<sup>b</sup></b>	1	3.9	2.8	8.1	20.8
	2	6.0	2.0	2.2	17.8
	5	4.1	2.4	3.1	1.1

<sup>a</sup> RSD of analytical signals registered using BTB solution as sample and borax solution (0.01 M) as carrier (n = 4).

<sup>b</sup> RSD of analytical signals registered using borax as sample and BTB as carrier/reagent (n = 4). For both experiments: carrier flow rate 1.25  $\mu\text{l s}^{-1}$ , sample aspiration flow rate 2  $\mu\text{l s}^{-1}$ .

<sup>c</sup> RSD values obtained at 50% of maximum peak height before the peak maximum.

<sup>d</sup> RSD values determined at peak maximum.

<sup>e</sup> RSD values determined at 85 (C) and 25 (D) % of maximum peak height after peak maximum.

**Table S3.** ABTS/Trolox ratio<sup>a</sup> obtained for different points of sample peak profile (Fig. 2, A-D).

<b>Volume /<math>\mu</math>l</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
1	27.8-222	12.4-99.2	15.8-126	68.6-549
2	10.1-80.8	8.7-69.6	9.3-74.4	27.9-223
5	4.0-32.0	2.8-22.4	3.1-24.8	5.4-43.2

<sup>a</sup> Ratio values were calculated considering the upper (200  $\mu$ M) and the lower (25  $\mu$ M) limit of the calibration curve established for Trolox, using a 70  $\mu$ M ABTS carrier solution.

**Table S4.** Total antioxidant capacity<sup>a</sup> of red wine samples obtained by LOV-kinetic matching approach and by microplate endpoint procedure.

Sample	LOV-Kinetic matching approach			Microplate
	10 s	30 s	60 s	300 min
A	26.7 ± 4.0	27.2 ± 3.2	27.3 ± 3.1	29.4 ± 0.6
B	19.4 ± 3.2	20.3 ± 2.1	21.0 ± 2.0	23.9 ± 0.9
C	27.7 ± 3.2	29.5 ± 3.4	31.2 ± 2.9	29.9 ± 0.8
D	29.6 ± 4.1	32.6 ± 3.0	34.4 ± 3.0	31.6 ± 0.6
E	25.3 ± 3.6	29.0 ± 2.9	31.4 ± 3.4	29.7 ± 0.5
F	21.9 ± 6.6	23.3 ± 0.9	24.4 ± 1.2	28.0 ± 1.3

<sup>a</sup> Antioxidant capacity values are expressed as TEAC, mM (mean value ± standard deviation, *n* = 4).

**Table S5.** Values for determination throughput, sample volume, ABTS consumption and effluent produced per determination in the LOV-ABTS system compared to previously proposed flow systems.

	This work	Ref. #10	Ref. #11	Ref. #12	Ref. #13	Ref. #14	Ref. #15	Ref. #16
ABTS consumption (nmol)	6.8	112	n. a.	184	356	1800	25.2	3.5
Effluent volume (ml)	0.098	1.6	n. a.	1.15	1.87	6.90	6.30	n. a.
Sample volume ( $\mu$ l)	1.0	20	5	30	100	100	20-62	100
Determination frequency ( $h^{-1}$ )	36	30	22	120	32	12	9-20	42
Type of flow system	LOV/SIA	FIA	FIA	FIA	FIA	MSFIA	SIA	SIA
Samples	Red wine	Juices, lemon tea and beer	Plasma, wine, mouthrinse	Standard antioxidant compounds	Wine, coffee, tea	Red and white wine, herbal and tea infusions, juices, beer	Fruit juices, tea, milk, yoghurt, beer	Red and white wine

n. a.: not available.