biology and life sciences forum

MDPI

Supplementary Materials

Bioactive Compounds and Antioxidant Activity of Selected Pumpkin Cultivars: Impact of Cooking Treatments †

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† Presented at the 4th International Electronic Conference on Foods, 15–30 October 2023; Available online: https://foods2023.sciforum.net/.

Table S1. Temperature and time for each cooking treatment.

Cooking treatment	Conditions of processing	
	Temperature	Time
Boiling	100 °C	10 min.
Steaming	100 °C	20 min.
Baking	180 °C	10 min
Microwaving	800 W	5 min

Table S2. Phenolic compounds: flavanol, flavanones, flavonols and flavonones levels in samples of pumpkin exposed to different cooking treatments, expressed in μg/g fw (fresh weight). The values reported are the mean of three replicates along with their corresponding standard deviation.

Cultivar	Phenolic compounds (μg/g fw)						
	Cooking methods	**Flavanol**	**Flavanones**		**Flavonols**		**Flavonones**
		Catechin	Naringenin	Apigenin	Quercetin	Rutin	Luteolin
Cuyano INTA	Raw	11.56 ± 0.20	0.28 ± 0.01	0.17 ± 0.00	1.08 ± 0.04	0.23 ± 0.01	0.77 ± 0.05
	Boiling	4.63 ± 0.38	0.20 ± 0.00	0.04 ± 0.00	1.35 ± 0.05	0.51 ± 0.03	0.34 ± 0.02
	Baking	0.69 ± 0.10	2.02 ± 0.02	0.37 ± 0.01	1.09 ± 0.12	0.34 ± 0.00	0.23 ± 0.01
	Steaming	1.58 ± 0.05	0.10 ± 0.02	0.18 ± 0.01	1.66 ± 0.20	0.34 ± 0.01	0.06 ± 0.01
	Microwaving	2.16 ± 0.11	0.16 ± 0.02	1.46 ± 0.11	0.98 ± 0.01	0.47 ± 0.03	0.57 ± 0.10
Cokena INTA	Raw	10.81 ± 0.36	8.81 ± 0.18	0.77 ± 0.02	1.02 ± 0.16	0.44 ± 0.00	15.04 ± 0.64
	Boiling	11.04 ± 0.23	0.62 ± 0.07	2.16 ± 0.06	0.99 ± 0.04	0.36 ± 0.01	5.16 ± 0.01
	Baking	2.73 ± 0.14	0.48 ± 0.05	1.41 ± 0.18	1.39 ± 0.05	0.36 ± 0.01	1.01 ± 0.06
	Steaming	8.20 ± 0.01	1.48 ± 0.17	1.44 ± 0.09	0.98 ± 0.01	0.64 ± 0.09	1.44 ± 0.12
	Microwaving	8.20 ± 0.01	1.48 ± 0.17	1.44 ± 0.09	0.98 ± 0.01	0.64 ± 0.09	1.44 ± 0.12
Dorado INTA	Raw	1.01 ± 0.17	1.02 ± 0.03	1.19 ± 0.03	1.07 ± 0.00	0.51 ± 0.04	0.28 ± 0.02
	Boiling	3.98 ± 0.21	0.85 ± 0.04	1.07 ± 0.19	< LOD [a]	0.31 ± 0.01	0.49 ± 0.03
	Baking	2.74 ± 0.30	3.76 ± 0.71	0.48 ± 0.02	0.42 ± 0.08	0.52 ± 0.07	2.65 ± 0.35
	Steaming	0.79 ± 0.02	2.32 ± 0.17	1.13 ± 0.06	0.54 ± 0.09	0.35 ± 0.00	2.15 ± 0.00
	Microwaving	2.10 ± 0.12	0.03 ± 0.00	0.42 ± 0.05	0.81 ± 0.11	0.37 ± 0.08	1.12 ± 0.11
Paquito INTA	Raw	0.14 ± 0.02	0.58 ± 0.13	2.27 ± 0.06	0.42 ± 0.00	0.42 ± 0.01	0.95 ± 0.08
	Boiling	12.43 ± 0.05	65.59 ± 0.22	0.14 ± 0.01	0.82 ± 0.01	0.35 ± 0.01	90.83 ± 0.65
	Baking	4.37 ± 0.71	1.05 ± 0.03	1.23 ± 0.19	0.74 ± 0.07	0.57 ± 0.04	0.10 ± 0.02
	Steaming	3.29 ± 0.07	2.15 ± 0.06	0.62 ± 0.00	1.36 ± 0.03	0.46 ± 0.01	1.88 ± 0.05
	Microwaving	15.08 ± 1.32	1.04 ± 0.16	1.06 ± 0.04	1.48 ± 0.01	0.37 ± 0.00	1.18 ± 0.04

[a] LOD: Limits of detection.

Table S3. Phenolic compounds: hydrocinnamic acid levels in samples of pumpkin exposed to different cooking treatments, expressed in μg/g fw (fresh weight). The values reported are the mean of three replicates along with their corresponding standard deviation.

Cultivar	Cooking methods	Phenolic compounds (μg/g fw)						
		Hydrocinnamic acids						
		Caffeic acid	Ferulic acid	Sinapic acid	Cumaric acid	Cinnamic acid	Chlorogenic acid	Rosmarinic acid
Cuyano INTA	Raw	0.23 ± 0.01	0.33 ± 0.02	6.32 ± 0.74	0.22 ± 0.00	0.05 ± 0.00	2.77 ± 0.15	0.00 ± 0.00
	Boiling	0.27 ± 0.01	0.35 ± 0.02	0.35 ± 0.01	0.28 ± 0.02	0.42 ± 0.00	0.19 ± 0.02	22.02 ± 1.15
	Baking	0.19 ± 0.00	1.59 ± 0.10	2.79 ± 0.42	0.22 ± 0.00	0.42 ± 0.01	0.45 ± 0.07	0.00 ± 0.00
	Steaming	0.20 ± 0.01	1.37 ± 0.00	2.21 ± 0.31	0.33 ± 0.00	0.07 ± 0.00	0.52 ± 0.10	0.00± 0.00
	Microwaving	1.53 ± 0,18	0.19 ± 0.02	5.62 ± 0.21	0.31 ± 0.00	0.45 ± 0.02	0.27 ± 0.03	1.09± 0.11
Cokena INTA	Raw	0.14 ± 0.02	0.08 ± 0.00	6.40 ± 0.19	0.15 ± 0.02	0.28 ± 0.05	0.20 ± 0.00	5.07 ± 0.16
	Boiling	0.14 ± 0.01	3.65 ± 0.04	3.10 ± 0.13	0.24 ± 0.00	1.34 ± 0.02	0.09 ± 0.00	10.85 ± 0.85
	Baking	0.16 ± 0.01	0.02 ± 0.00	6.60 ± 0.05	0.15 ± 0.02	0.24 ± 0.02	0.19 ± 0.00	< LOD [a]
	Steaming	0.14 ± 0.02	0.07 ± 0.01	5.91 ± 0.04	5.08 ± 0.04	0.50 ± 0.15	0.27 ± 0.01	6.35± 0.00
	Microwaving	0.14 ± 0.02	0.07 ± 0.01	5.91 ± 0.04	5.08 ± 0.04	0.50 ± 0.15	0.27 ± 0.01	6.35± 0.00
Dorado INTA	Raw	0.26 ± 0.01	3.93 ± 0.00	6.01 ± 0.00	0.19 ± 0.01	0.55 ± 0.08	0.96 ± 0.03	3.80± 0.29
	Boiling	0.16 ± 0.04	0.21 ± 0.01	2.50 ± 0.05	0.19 ± 0.00	0.47 ± 0.00	0.41 ± 0.02	< LOD [a]
	Baking	0.56 ± 0.06	0.68 ± 0.30	1.39 ±0.32	0.33 ± 0.05	0.37 ± 0.06	0.11 ± 0.03	< LOD [a]
	Steaming	0.21 ± 0.00	0.28 ± 0.00	2.70 ± 0.01	0.13 ± 0.00	0.48 ± 0.00	0.29 ± 0.00	< LOD [a]
	Microwaving	0.17 ± 0.03	0.31 ± 0.03	1.68 ± 0.03	0.92 ± 0.14	0.20 ± 0.02	0.47 ± 0.03	< LOD [a]
Paquito INTA	Raw	1.79 ± 0.04	1.94 ± 0.00	3.06 ± 0.01	0.17 ± 0.01	0.43 ± 0.00	0.14 ± 0.01	0.57 ± 0.02
	Boiling	0.53 ± 0.04	0.17 ± 0.01	2.06 ± 0.13	0.27 ± 0.01	0.57 ± 0.08	0.25 ± 0.03	0.13 ± 0.00
	Baking	0.26 ± 0.02	0.21 ± 0.01	0.51 ± 0.00	0.30 ± 0.02	0.51 ± 0.03	0.12 ± 0.01	< LOD [a]
	Steaming	0.17 ± 0.00	0.18 ± 0.01	1.09 ± 0.10	0.17 ± 0.01	0.44 ± 0.01	0.12 ± 0.00	< LOD [a]
	Microwaving	0.08 ± 0.01	0.25 ± 0.01	2.08 ± 0.02	4.16 ± 0.05	0.37 ± 0.00	0.26 ± 0.01	0.19 ± 0.01

[a] LOD: Limits of detection.

Table S4. Phenolic compounds: hydroxybenzoic and phenyl alcohol levels in samples of pumpkin exposed to different cooking treatments, expressed in μg/g fw (fresh weight). The values reported are the mean of three replicates along with their corresponding standard deviation.

Cultivar	Phenolic compounds (μg/g fw)		
	Cooking methods	Hydroxybenzoic acids	Phenyl alcohol
		Vanillic acid	Tyrosol
Cuyano INTA	Raw	< LOQ [b]	0.28 ± 0.01
	Boiling	0.35 ± 0.02	0.20 ± 0.00
	Baking	0.06 ± 0.03	1.16 ± 0.03
	Steaming	< LOQ [b]	0.10 ± 0.02
	Microwaving	5.16 ± 0.13	0.16 ± 0.02
Cokena INTA	Raw	< LOQ [b]	0.09 ± 0.03
	Boiling	6.29 ± 0.05	0.62 ± 0.07
	Baking	1.04 ± 0.01	0.48 ± 0.05
	Steaming	< LOQ [b]	1.06 ± 0.16
	Microwaving	< LOQ [b]	1.06 ± 0.16
Dorado INTA	Raw	0.66 ± 0.00	1.02 ± 0.03
	Boiling	< LOQ [b]	0.85 ± 0.04
	Baking	0.47 ± 0.01	2.27 ± 0.47
	Steaming	4.04 ± 0.04	0.65 ± 0.15
	Microwaving	< LOQ [b]	0.03 ± 0.00
Paquito INTA	Raw	0.02 ± 0.00	0.58 ± 0.13
	Boiling	0.26 ± 0.01	0.82 ± 0.01
	Baking	0.06 ± 0.01	1.05 ± 0.03
	Steaming	< LOQ [b]	0.50 ± 0.03
	Microwaving	< LOQ [b]	1.04 ± 0.16

[b] LOQ: Limits of quantification.

Table S5. Enantiomers D and L (Trp and Tyr) levels in samples of pumpkin exposed to different cooking treatments, expressed in μg/g fw (fresh weight). The values reported are the mean of three replicates along with their corresponding standard deviation.

Cultivars	Cooking treatment	L-Tyr	D-Tyr	D-Trp	L-Trp
Cuyano INTA	Raw	196 ± 8	< LOD [a]	2.02 ± 5.28E-3	15.1 ± 0.1
	Boiling	121 ± 1	< LOD [a]	2.06 ± 3.33E-2	8.88 ± 0.2
	Steaming	216 ± 6	< LOD [a]	1.04 ± 1.77E-2	24.6 ± 6.6E-2
	Baking	224 ± 5	< LOD [a]	2.03 ± 5.38E-2	18.7 ± 7.2E-2
	Microwaving	77.9 ± 2.7	< LOD [a]	< LOQ [b]	5.11 ± 5.3E-2
Cokena INTA	Raw	224 ± 5	< LOD [a]	< LOD [a]	19.1 ± 0.1
	Boiling	177 ± 5	< LOD [a]	1.65 ± 3.41E-2	12.4 ± 4.6E-2
	Steaming	333 ± 2	< LOD [a]	2.54 ± 4.01E-2	30.0 ± 2.8E-2
	Baking	337 ± 5	< LOD [a]	2.00 ± 4.67E-2	< LOQ [b]
	Microwaving	339 ± 5	< LOD [a]	3.58 ± 7.34E-2	26.0 ± 4.4E-2
Dorado INTA	Raw	259 ± 2	< LOD [a]	4.08 ± 3.22E-2	14.0 ± 0.2
	Boiling	119 ± 4	< LOD [a]	0.98 ± 3.81E-2	11.9 ± 5.9E-2
	Steaming	204 ± 1	< LOD [a]	< LOD [a]	22.3 ± 9.9E-2
	Baking	95.5 ± 0.2	< LOD [a]	0.99 ± 2.79E-2	6.21 ± 7.69E-2
	Microwaving	445 ± 4	< LOD [a]	13.7 ± 9.5E-2	45.6 ± 0.2
Paquito INTA	Raw	291 ± 11	< LOD [a]	< LOQ [b]	67.0 ± 1.0
	Boiling	414 ± 2	< LOD [a]	1.07 ± 6.59E-2	49.5 ± 3.7E-2
	Steaming	586 ± 5	< LOD [a]	< LOD [a]	64.1 ± 0.2
	Baking	583 ± 5	< LOD [a]	1.54 ± 2.19E-2	79.2 ± 4.0
	Microwaving	729 ± 29	< LOD [a]	1.21 ± 6.44E-2	86.8 ± 1.7

[a] LOD: Limits of detection; [b] LOQ: Limits of quantification.

Table S6. ANOVA table of Try and Trp variation due to cultivar, cooking treatment, and their interaction.

			L-Tyr		
Source	d.f	Sum of square		F value	p-valor
Cooking treatment	4	229555.46	(11.1%)	877.22	<0.0001
Cultivar	3	1578183.62	(76.2%)	8041.1	<0.0001
Cooking treatment*Cultivar	12	261154.04	(12.6%)	332.66	<0.0001
Error	40	2616.86	(0.1%)		
Total	59	2071509.98	(100%)		
			L-Trp		
Source	d.f	Sum of square		F value	p-valor
Cooking treatment	4	2985.51	(7.8%)	1970.48	<0.0001
Cultivar	3	30643.01	(79.7%)	727.99	<0.0001
Cooking treatment*Cultivar	12	4756.05	(12.4%)	9962.76	<0.0001
Error	40	41.01	(0.1%)	386.58	<0.0001
Total	59	38425.57	(100%)		
			D-Trp		
Source	d.f	Sum of square		F value	p-valor
Cooking treatment	4	508.09	(20.5%)	17039.32	<0.0001
Cultivar	3	104.28	(16.7%)	18502.62	<0.0001
Cooking treatment*Cultivar	12	84.93	(62.8%)	17368.07	<0.0001
Error	40	318.88	(0.01%)	17039.32	<0.0001
Total	59	0.06	(100%)		