

**Extending Shelf Life of Red Chilies (*Capsicum annum*): Exploring Steam, Microwave,
and Pulsed Light Treatments at Different Storage Conditions**

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SUPPLEMENTARY DATA

Table S1: Changes in the aerobic mesophilic population in steam, microwave, and pulsed light treated red chillies during storage at 28°C.

Storage duration (day)	Aerobic mesophile population in log CFU/g for various combinations of treatment and water activity (a_w)							
	Untreated (0.60 a_w)	Untreated (0.35 a_w)	ST treated (0.60 a_w)	ST treated (0.35 a_w)	MW treated (0.60 a_w)	MW treated (0.35 a_w)	PL treated (0.60 a_w)	PL treated (0.35 a_w)
0	4.1±0.1 ^f	3.7±0.4 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
5	3.8±0.3 ^d	3.2±0.2 ^{bc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
10	3.5±0.3 ^c	2.8±0.2 ^a	2.6±0.1 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
15	3.3±0.2 ^a	2.9±0.3 ^{ab}	3.5±0.3 ^c	1.6±0.3 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
20	3.4±0.1 ^b	2.9±0.3 ^{ab}	4.1±0.1 ^d	2.7±0.3 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
21			4.8±0.2 ^c					
22			5.5±0.3 ^f					
23			6.5±0.4 ^g					
25	3.9±0.1 ^e	2.8±0.3 ^{ab}		3.2±0.2 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
30	4.9±0.1 ^g	2.8±0.3 ^{ab}		3.8±0.1 ^e	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
35	5.8±0.3 ^h	2.8±0.2 ^a			1.1±0.0 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
36	6.6±0.2 ⁱ	2.9±0.2 ^{ab}			1.1±0.0 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
40		3.0±0.1 ^b		4.6±0.4 ^f	1.2±0.0 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
50		3.5±0.3 ^c		5.4±0.3 ^g	1.2±0.0 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
59				6.0±0.3 ^h				
60		3.8±0.1 ^{de}			1.1±0.0 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
70		3.6±0.4 ^{cd}			1.1±0.1 ^{bc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
80		4.2±0.2 ^e			1.1±0.2 ^{bc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
90		5.1±0.3 ^f			1.2±0.3 ^{abc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
100		5.6±0.3 ^g			1.2±0.2 ^{abc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
101		6.3±0.3 ^h			1.2±0.2 ^{abc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
110					1.3±0.1 ^{bc}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
120					1.1±0.2 ^{ab}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
130					1.2±0.2 ^{bc}	1.0±0.0 ^a	1.1±0.2 ^{ab}	1.0±0.0 ^a
140					1.1±0.1 ^{ab}	1.0±0.0 ^a	1.1±0.2 ^{ab}	1.0±0.0 ^a
150					1.2±0.2 ^{abc}	1.0±0.0 ^a	1.1±0.2 ^{ab}	1.0±0.0 ^a

160	1.4±0.1 ^c	1.0±0.0 ^a	1.1±0.2 ^{ab}	1.0±0.0 ^a
170	2.7±0.9 ^d			
172	4.7±0.3 ^e			
173	6.1±0.1 ^f			
180		1.1±0.1 ^{ab}	1.2±0.3 ^{abc}	1.0±0.0 ^a
190		1.1±0.1 ^{ab}	1.2±0.4 ^{abc}	1.0±0.0 ^a
200		1.1±0.2 ^{ab}	1.3±0.5 ^{bcd}	1.0±0.0 ^a
210		1.2±0.3 ^{abc}	1.3±0.5 ^{bcd}	1.0±0.0 ^a

Note: ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to i) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S2: Changes in the yeasts and molds population in steam, microwave, and pulsed light treated red chillies during storage at 28°C.

Storage duration (day)	Yeast and molds population in log CFU/g for various combinations of treatment and water activity (a_w)							
	Untreated (0.60 a_w)	Untreated (0.35 a_w)	ST treated (0.60 a_w)	ST treated (0.35 a_w)	MW treated (0.60 a_w)	MW treated (0.35 a_w)	PL treated (0.60 a_w)	PL treated (0.35 a_w)
0	4.5±0.3 ^d	3.6±0.7 ^f	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
5	3.3±0.4 ^a	3.4±0.5 ^{cde}	1.7±0.6 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
10	3.4±0.0 ^b	3.1±0.7 ^c	2.4±0.4 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
15	3.5±0.4 ^{ab}	3.0±0.3 ^{bc}	2.9±0.2 ^d	1.4±0.2 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
20	3.7±0.5 ^{abc}	2.6±0.5 ^a	3.7±0.5 ^e	1.9±0.1 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
21			4.6±0.5 ^f					
22			6.3±0.4 ^g					
23			7.3±0.6 ^h					
25	4.6±0.2 ^{de}	2.7±0.5 ^{ab}		2.5±0.1 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
30	5.8±0.4 ^g	3.1±0.3 ^c		3.3±0.2 ^e	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
35	5.6±0.4 ^f	3.3±0.1 ^c			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
36	6.8±0.4 ^h	3.2±0.2 ^{cd}			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
40		3.3±0.1 ^c		3.9±0.1 ^f	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
50		3.3±0.1 ^c		4.7±0.2 ^g	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
59				6.3±0.4 ^h				
60		3.3±0.1 ^c			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
70		3.2±0.1 ^{cd}			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
80		4.1±0.4 ^g			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
90		4.5±0.4 ^h			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
100		5.3±0.2 ⁱ			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
101		6.1±0.1 ^j			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
110					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
120					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
130					1.1±0.1 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
140					1.1±0.1 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
150					1.7±0.4 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a

160	2.7±0.1 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.1±0.1 ^a
170	3.9±0.8 ^d			
172	5.6±0.5 ^e			
173	6.8±0.6 ^f			
180		1.1±0.1 ^a	1.0±0.0 ^a	1.1±0.2 ^a
190		1.1±0.1 ^a	1.0±0.0 ^a	1.2±0.4 ^{ab}
200		1.1±0.2 ^a	1.0±0.0 ^a	1.1±0.2 ^a
210		1.2±0.3 ^{ab}	1.0±0.0 ^a	1.2±0.3 ^{ab}

Note: ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to j) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S3: Changes in the aerobic mesophilic population in steam, microwave, and pulsed light treated red chillies during storage at 4°C.

Storage duration (day)	Aerobic mesophile population in log CFU/g for various combinations of treatment and water activity (a_w)							
	Untreated (0.60 a_w)	Untreated (0.35 a_w)	ST treated (0.60 a_w)	ST treated (0.35 a_w)	MW treated (0.60 a_w)	MW treated (0.35 a_w)	PL treated (0.60 a_w)	PL treated (0.35 a_w)
0	4.1±0.1 ^d	3.7±0.4 ^f	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
5	3.7±0.3 ^{ab}	3.8±0.2 ^{fg}	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
10	3.8±0.2 ^{bc}	3.5±0.2 ^e	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
15	3.9±0.1 ^{bc}	3.0±0.1 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
20	3.8±0.1 ^{ab}	3.1±0.0 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
25	3.8±0.1 ^{ab}	3.0±0.1 ^c	1.4±0.2 ^b	1.7±0.2 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
30	3.8±0.0 ^b	2.9±0.2 ^{bc}	1.9±0.1 ^c	2.7±0.3 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
40	3.6±0.2 ^a	2.5±0.2 ^a	2.4±0.3 ^d	3.2±0.1 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
50	4.0±0.1 ^c	2.7±0.3 ^{ab}	3.1±0.4 ^{de}	4.2±0.3 ^e	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
60	4.9±0.1 ^e	2.9±0.2 ^{bc}	4.2±0.5 ^e	4.8±0.1 ^f	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
65			5.0±0.5 ^f	5.6±0.1 ^g				
67			5.6±0.4 ^g	6.3±0.2 ^h				
68			6.4±0.3 ^h					
70	5.9±0.3 ^f	3.0±0.0 ^c			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
71	6.2±0.1 ^g	3.4±0.4 ^c						
80		3.9±0.1 ^g			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
90		4.1±0.4 ^h			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
100		4.8±0.3 ⁱ			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
110		5.0±0.1 ^j			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
120		5.4±0.2 ^k			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
125		5.8±0.2 ^l						
126		6.3±0.3 ^m						
130					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
140					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
150					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
160					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a

170	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
180	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
190	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
200	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
210	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a

Note: ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to f) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S4: Changes in the yeasts and molds population in steam, microwave, and pulsed light treated red chillies during storage at 4°C.

Storage duration (day)	Yeast and molds population in log CFU/g for various combinations of treatment and water activity (a _w)							
	Untreated (0.60 a _w)	Untreated (0.35 a _w)	ST treated (0.60 a _w)	ST treated (0.35 a _w)	MW treated (0.60 a _w)	MW treated (0.35 a _w)	PL treated (0.60 a _w)	PL treated (0.35 a _w)
0	4.5±0.3 ^d	3.6±0.7 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
5	4.1±0.1 ^c	3.6±0.7 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
10	3.9±0.1	3.7±0.7 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
15	3.7±0.2 ^a	3.7±0.7 ^d	1.3±0.1 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
20	3.7±0.2 ^a	3.6±0.6 ^c	1.8±0.1 ^c	1.5±0.1 ^b	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
25	3.7±0.3 ^{ab}	3.1±0.6 ^{bc}	2.3±0.3 ^d	2.2±0.2 ^c	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
30	3.9±0.2 ^{bc}	2.7±0.4 ^{ab}	3.1±0.1 ^e	2.8±0.3 ^d	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
40	4.1±0.1 ^c	2.5±0.2 ^a	3.8±0.2 ^f	3.3±0.3 ^e	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
50	4.1±0.1 ^c	2.5±0.2 ^a	4.5±0.4 ^g	4.1±0.1 ^f	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
60	4.4±0.3 ^{cd}	2.5±0.2 ^a	5.3±0.5 ^h	4.7±0.1 ^g	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
65			6.0±0.2 ⁱ	5.4±0.2 ^h				
67			7.1±0.2 ^j	6.2±0.1 ⁱ				
68			7.6±0.4 ^k					
70	5.3±0.2 ^e	2.7±0.3 ^{ab}			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
71	6.1±0.3 ^f	2.8±0.3 ^{ab}						
80		3.1±0.3 ^{bc}			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
90		3.6±0.4 ^c			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
100		4.0±0.2 ^c			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
110		4.7±0.2 ^f			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
120		5.1±0.1 ^g			1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
125		5.6±0.3 ^h						
126		6.6±0.5 ⁱ						
130					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
140					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
150					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a
160					1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.1±0.2 ^{ab}

170	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.1±0.2 ^{ab}
180	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.1±0.2 ^{ab}
190	1.0±0.0 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.1±0.2 ^{ab}
200	1.1±0.1 ^a	1.0±0.0 ^a	1.0±0.0 ^a	1.1±0.2 ^{ab}
210	1.1±0.2 ^{ab}	1.2±0.0 ^b	1.0±0.0 ^a	1.2±0.3 ^{bc}

Note: ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to f) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S5: Changes in polyphenol oxidase (PPO) activity in steam, microwave, and pulsed light treated red chillies during storage at 28°C.

Storage duration (day)	PPO activity (%) for various combinations of treatment and water activity (a_w)							
	Untreated (0.60 a_w)	Untreated (0.35 a_w)	ST treated (0.60 a_w)	ST treated (0.35 a_w)	MW treated (0.60 a_w)	MW treated (0.35 a_w)	PL treated (0.60 a_w)	PL treated (0.35 a_w)
0	58.0±1.1 ^a	28.4±1.3 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
5	59.3±1.2 ^b	29.7±1.7 ^b	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
10	60.3±1.3 ^c	30.1±2.0 ^c	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
15	61.7±1.1 ^d	29.1±1.8 ^{ab}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
20	62.7±2.3 ^e	30.7±1.0 ^d	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
21			0.0±0.0 ^a					
22			0.0±0.0 ^a					
23			0.0±0.0 ^a					
25	64.3±1.4 ^f	31.4±1.9 ^{bc}		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
30	68.0±1.8 ^g	33.4±1.6 ^c		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
35	71.7±1.9 ^h	34.4±1.6 ^d			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
36	74.0±1.8 ⁱ	35.7±1.4 ^e			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
40		37.0±1.5 ^f		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
50		38.4±1.9 ^h		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
59				0.0±0.0 ^a				
60		39.4±2.0 ⁱ			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
70		40.7±1.4 ^j			0.0±0.0 ^a	0.0±0.0 ^a	0.4±0.7 ^b	0.0±0.0 ^a
80		42.1±1.9 ^k			0.0±0.0 ^a	0.0±0.0 ^a	1.8±0.6 ^c	0.0±0.0 ^a
90		43.0±0.6 ^l			0.0±0.0 ^a	0.0±0.0 ^a	2.6±0.1 ^d	0.0±0.0 ^a
100		44.0±0.3 ^m			0.0±0.0 ^a	0.0±0.0 ^a	3.7±0.1 ^e	0.0±0.0 ^a
101		46.1±0.9 ⁿ			0.0±0.0 ^a	0.0±0.0 ^a	4.4±0.6 ^f	0.0±0.0 ^a
110					0.0±0.0 ^a	0.0±0.0 ^a	6.4±0.6 ^g	0.0±0.0 ^a
120					0.0±0.0 ^a	0.0±0.0 ^a	8.1±0.2 ^h	0.0±0.0 ^a
130					0.0±0.0 ^a	0.0±0.0 ^a	8.2±3.4 ⁱ	0.0±0.0 ^a
140					0.0±0.0 ^a	0.0±0.0 ^a	10.4±2.7 ^j	0.0±0.0 ^a
150					0.0±0.0 ^a	0.0±0.0 ^a	12.6±2.3 ^k	0.0±0.0 ^a

160	0.0±0.0 ^a	0.0±0.0 ^a	13.7±2.5 ^l	2.7±1.2 ^b
	0.0±0.0 ^a		16.1±3.3 ^m	
170				3.9±0.9 ^c
172	0.0±0.0 ^a			
173	0.0±0.0 ^a			
180		0.0±0.0 ^a	18.2±2.5 ⁿ	5.6±2.0 ^d
190		0.0±0.0 ^a	20.2±2.2 ^o	6.5±1.7 ^e
200		0.0±0.0 ^a	23.0±2.9 ^p	7.6±1.7 ^f
210		0.0±0.0 ^a	24.9±3.3 ^q	9.0±1.1 ^g

Note: PPO: polyphenol oxidase; ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to n) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S6: Changes in peroxidase (POD) activity in steam, microwave, and pulsed light treated red chillies during storage at 28°C.

Storage duration (day)	POD activity (%) for various combinations of treatment and water activity (a_w)							
	Untreated (0.60 a_w)	Untreated (0.35 a_w)	ST treated (0.60 a_w)	ST treated (0.35 a_w)	MW treated (0.60 a_w)	MW treated (0.35 a_w)	PL treated (0.60 a_w)	PL treated (0.35 a_w)
0	70.3±1.1 ^a	39.8±1.1 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
5	71.7±1.0 ^b	40.4±1.7 ^b	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
10	72.7±1.4 ^c	41.1±1.2 ^c	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
15	73.6±2.2 ^d	41.8±1.8 ^d	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
20	76.0±2.5 ^e	42.1±2.0 ^e	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
21			0.0±0.0 ^a					
22			0.0±0.0 ^a					
23			0.0±0.0 ^a					
25	78.0±2.9 ^f	42.8±1.7 ^{de}		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
30	80.1±3.5 ^g	43.4±1.3 ^f		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
35	83.3±3.2 ^h	44.1±1.9 ^g			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
36	85.3±3.2 ⁱ	45.1±1.9 ^h			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
40		46.1±1.1 ^{hi}		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
50		47.0±1.1 ^{ij}		0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
59				0.0±0.0 ^a				
60		47.8±1.8 ^j			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
70		48.4±1.9 ^{jk}			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
80		49.5±1.9 ^k			0.0±0.0 ^a	0.0±0.0 ^a	2.3±1.0	0.0±0.0 ^a
90		50.5±1.8 ^l			0.0±0.0 ^a	0.0±0.0 ^a	2.9±0.8	0.0±0.0 ^a
100		51.9±1.7 ^{lm}			0.0±0.0 ^a	0.0±0.0 ^a	4.1±1.4	0.0±0.0 ^a
101		53.8±1.5 ⁿ			0.0±0.0 ^a	0.0±0.0 ^a	5.6±1.1	0.0±0.0 ^a
110					0.0±0.0 ^a	0.0±0.0 ^a	6.8±1.1	0.0±0.0 ^a
120					0.0±0.0 ^a	0.0±0.0 ^a	8.3±1.7	0.0±0.0 ^a
130					0.0±0.0 ^a	0.0±0.0 ^a	7.7±1.8	0.0±0.0 ^a
140					0.0±0.0 ^a	0.0±0.0 ^a	9.9±2.3	0.0±0.0 ^a
150					0.0±0.0 ^a	0.0±0.0 ^a	11.6±3.3	2.1±0.3

160	0.0±0.0 ^a	0.0±0.0 ^a	13.1±3.4	2.9±0.5
170	0.0±0.0 ^a		14.3±3.2	4.0±1.4
172	0.0±0.0 ^a			
173	0.0±0.0 ^a			
180		0.0±0.0 ^a	16.1±2.7	5.3±1.5
190		0.0±0.0 ^a	17.8±1.9	5.7±0.7
200		0.0±0.0 ^a	19.1±2.9	7.2±0.6
210		0.0±0.0 ^a	20.9±2.3	8.3±0.6

Note: POD: peroxidase; ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to n) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S7: Changes in polyphenol oxidase (PPO) activity in steam, microwave, and pulsed light treated red chillies during storage at 4°C.

Storage duration (day)	PPO activity (%) for various combinations of treatment and water activity (a_w)							
	Untreated (0.60 a_w)	Untreated (0.35 a_w)	ST treated (0.60 a_w)	ST treated (0.35 a_w)	MW treated (0.60 a_w)	MW treated (0.35 a_w)	PL treated (0.60 a_w)	PL treated (0.35 a_w)
0	58.1±0.9 ^{bc}	28.3±2.3 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
5	62.1±1.9 ^{de}	31.9±1.2 ^{de}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
10	61.8±1.6 ^d	31.2±1.0 ^{cd}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
15	59.9±1.5 ^{ab}	31.2±1.5 ^{cd}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
20	57.7±1.9 ^b	30.5±2.4 ^c	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
25	52.9±1.7 ^a	30.7±1.0 ^c	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
30	60.9±1.6 ^{cd}	29.9±0.4 ^{ab}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
40	64.0±1.4 ^c	31.8±1.8 ^d	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
50	64.7±1.6 ^{ef}	32.5±1.9 ^e	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
60	65.4±1.6 ^g	31.7±1.8 ^{cd}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
65			0.0±0.0 ^a	0.0±0.0 ^a				
67			0.0±0.0 ^a	0.0±0.0 ^a				
68			0.0±0.0 ^a					
70	66.7±2.7 ^h	33.3±1.0 ^f			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
71	67.4±0.9 ⁱ							
80		33.6±2.5 ^g			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
90		33.3±2.8 ^h			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
100		35.9±0.6 ⁱ			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
110		31.5±2.0 ^{cd}			0.0±0.0 ^a	0.0±0.0 ^a	1.1±0.4 ^b	0.0±0.0
120		30.6±1.3 ^c			0.0±0.0 ^a	0.0±0.0 ^a	2.1±1.0 ^c	0.0±0.0
125		31.2±1.8 ^d						
126		32.6±1.5 ^e						
130					0.0±0.0 ^a	0.0±0.0 ^a	3.4±0.2 ^d	0.0±0.0 ^a
140					0.0±0.0 ^a	0.0±0.0 ^a	5.1±1.9 ^e	0.0±0.0 ^a
150					0.0±0.0 ^a	0.0±0.0 ^a	5.2±2.3 ^{ef}	0.0±0.0 ^a
160					0.0±0.0 ^a	0.0±0.0 ^a	5.1±2.5 ^{ef}	0.0±0.0 ^a

170	0.0±0.0 ^a	0.0±0.0 ^a	7.2±1.4 ^g	0.0±0.0 ^a
180	0.0±0.0 ^a	0.0±0.0 ^a	7.5±1.2 ^h	0.0±0.0 ^a
190	0.0±0.0 ^a	0.0±0.0 ^a	7.4±1.3 ⁱ	1.4±0.4 ^b
200	0.0±0.0 ^a	0.0±0.0 ^a	7.4±0.8 ^j	2.7±0.5 ^c
210	0.0±0.0 ^a	0.0±0.0 ^a	7.7±1.7 ^k	3.7±0.7 ^d

Note: PPO: polyphenol oxidase; ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to i) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.

Table S8: Changes in peroxidase (POD) activity in steam, microwave, and pulsed light treated red chillies during storage at 4°C.

Storage duration (day)	POD activity (%) for various combinations of treatment and water activity (a _w)							
	Untreated (0.60 a _w)	Untreated (0.35 a _w)	ST treated (0.60 a _w)	ST treated (0.35 a _w)	MW treated (0.60 a _w)	MW treated (0.35 a _w)	PL treated (0.60 a _w)	PL treated (0.35 a _w)
0	70.3±1.1 ^a	39.8±1.1 ^b	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
5	72.7±2.7 ^b	39.4±1.1 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
10	74.6±1.0 ^c	39.8±1.2 ^b	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
15	72.3±2.2 ^d	40.6±1.2 ^c	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
20	75.3±1.4 ^e	40.8±1.9 ^c	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
25	75.1±3.8 ^f	41.4±1.1 ^d	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
30	77.2±3.2 ^g	40.9±1.3 ^{cd}	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
40	80.7±2.1 ^h	41.3±1.7 ^e	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
50	81.2±1.1 ⁱ	42.6±1.3 ^f	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
60	83.5±1.6 ^j	42.8±1.1 ^g	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
65			0.0±0.0 ^a	0.0±0.0 ^a				
67			0.0±0.0 ^a	0.0±0.0 ^a				
68			0.0±0.0 ^a					
70	84.5±1.4 ^k	42.7±1.6 ^{fg}			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
71	85.5±2.3 ^l							
80		42.8±1.1 ^h			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
90		43.3±1.9 ⁱ			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
100		43.6±1.9 ^j			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
110		43.9±2.6 ^k			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
120		45.2±1.6 ^l			0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a	0.0±0.0 ^a
125		47.8±1.5 ^m						
126		50.5±1.4 ⁿ						
130					0.0±0.0 ^a	0.0±0.0 ^a	1.0±0.2 ^b	0.0±0.0 ^a
140					0.0±0.0 ^a	0.0±0.0 ^a	1.8±0.8 ^c	0.0±0.0 ^a
150					0.0±0.0 ^a	0.0±0.0 ^a	2.8±0.6 ^d	0.0±0.0 ^a
160					0.0±0.0 ^a	0.0±0.0 ^a	3.3±0.4 ^e	0.0±0.0 ^a

170	0.0±0.0 ^a	0.0±0.0 ^a	4.3±0.5 ^f	0.0±0.0 ^a
180	0.0±0.0 ^a	0.0±0.0 ^a	4.5±1.3 ^{fg}	0.0±0.0 ^a
190	0.0±0.0 ^a	0.0±0.0 ^a	5.6±0.6 ^g	0.0±0.0 ^a
200	0.0±0.0 ^a	0.0±0.0 ^a	6.9±0.8 ^h	1.8±0.6 ^b
210	0.0±0.0 ^a	0.0±0.0 ^a	8.8±0.2 ⁱ	3.3±1.1 ^c

Note: POD: peroxidase; ST treated: steam treated; MW treated: microwave treated; PL treated: pulsed light treated

CI, 95% confidence interval of the mean values. Dissimilar small alphabets (a to n) recognize that the mean values belong to different statistical subsets across the column at $p < 0.05$.