

## **APPENDIX**

**Table A1** Changes in total bacteria counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Total bacteria counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	1	4	7	10	13
Tap water	4.73a	5.04a	5.57a	5.16b	5.35b
HW-50°C	3.89b	4.62a	5.33a	6.15a	6.37a
HW-55°C	3.01c	2.67ab	1.10b	-	-
HW-60°C	2.52d	1.33b	4.79a	-	-
F-test / T-test	**	*	**	**	**
C.V. (%)	25.48	61.42	49.14	9.69	10.17

**Table A2** Changes in coliform counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Coliform counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	1	4	7	10	13
Tap water	3.23a	4.10a	3.95a	4.10a	4.56b
HW-50°C	2.23b	2.92b	3.25b	3.26b	6.58a
HW-55°C	0.00c	0.00c	0.00c	-	-
HW-60°C	0.00c	0.00c	0.00c	-	-
F-test / T-test	**	**	**	**	**
C.V. (%)	108.61	107.49	105.52	13.00	20.33

**Table A3** Changes in *Salmonella-Shigella* spp. counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	<i>Salmonella-Shigella</i> spp. counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	1	4	7	10	13
Tap water	3.23a	4.11a	5.36a	5.34a	5.01b
HW-50°C	2.23b	3.90b	3.33b	4.95b	5.83a
HW-55°C	0.00c	0.00d	1.49c	-	-
HW-60°C	0.00c	1.79c	1.43c	-	-
F-test / T-test	**	**	**	**	**
C.V. (%)	108.61	76.85	63.85	3.82	1.20

Within a column, mean not followed by the same letter are significantly different.  
\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A4** Changes in lightness (L\*) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Lightness (L*)				
	Days of storage life				
	1	4	7	10	13
Tap water	52.17a	48.52a	47.11a	47.84a	47.54
HW-50°C	45.09ab	47.77a	47.86a	47.44a	44.57
HW-55°C	39.21b	37.00b	39.41b	40.93b	-
HW-60°C	37.15b	35.89b	37.51b	37.92b	-
F-test / T-test	*	**	**	**	ns
C.V. (%)	16.66	14.99	11.47	11.10	6.45

**Table A5** Changes in a\* value of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	a* value				
	Days of storage life				
	1	4	7	10	13
Tap water	-12.76	-13.74a	-11.51b	-13.37ab	-13.44
HW-50°C	-11.04	-13.71a	-17.83a	-16.16a	-14.25
HW-55°C	-8.46	-10.74ab	-12.19b	-10.29b	-
HW-60°C	-11.26	-8.94b	-10.02b	-10.63b	-
F-test / T-test	ns	*	**	**	ns
C.V. (%)	26.75	23.51	25.14	22.60	10.90

**Table A6** Changes in b\* value of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	b* value				
	Days of storage life				
	1	4	7	10	13
Tap water	21.29	20.98	18.65c	22.33	21.18
HW-50°C	15.69	20.60	32.50a	28.78	25.87
HW-55°C	13.08	18.71	25.12b	23.97	-
HW-60°C	22.49	18.31	24.80b	24.65	-
F-test / T-test	ns	ns	**	ns	ns
C.V. (%)	35.94	23.61	21.53	15.76	17.04

Within a column, mean not followed by the same letter are significantly different.  
 \* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A7** Changes in hue angle ( $h^\circ$ ) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Hue angle ( $h^\circ$ )				
	Days of storage life				
	1	4	7	10	13
Tap water	119.37a	121.77a	121.63a	120.87a	122.40
HW-50°C	119.67a	121.38a	118.70b	119.60b	118.97
HW-55°C	117.40ab	118.83a	115.83c	114.70c	-
HW-60°C	115.53b	114.66b	111.97d	113.37c	-
F-test / T-test	*	**	**	**	ns
C.V. (%)	1.95	2.87	3.31	3.12	2.19

**Table A8** Changes in percentage of oxygen ( $O_2$ ) concentration in package of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Oxygen ( $O_2$ ) concentration in package (%)				
	Days of storage life				
	1	4	7	10	13
Tap water	18.03a	18.83c	19.23c	18.50c	19.10a
HW-50°C	13.23c	15.10d	15.57d	16.15d	14.87b
HW-55°C	15.77b	19.50b	20.73b	20.65b	-
HW-60°C	19.20a	21.53a	21.67a	21.10a	-
F-test / T-test	**	**	**	**	**
C.V. (%)	15.22	13.02	12.75	10.99	14.02

**Table A9** Changes in percentage of carbon dioxide ( $CO_2$ ) concentration in package of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Carbon dioxide ( $CO_2$ ) concentration in package (%)				
	Days of storage life				
	1	4	7	10	13
Tap water	3.30b	2.67b	2.47b	2.25b	1.83b
HW-50°C	5.07a	5.40a	5.80a	4.15a	5.23a
HW-55°C	4.43ab	2.83b	1.57c	1.00c	-
HW-60°C	1.23c	0.43c	0.17d	0.00d	-
F-test / T-test	**	**	**	**	**
C.V. (%)	47.03	65.37	86.80	89.73	52.97

Within a column, mean not followed by the same letter are significantly different.  
\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A10** Changes in respiration rate ( $\text{mg CO}_2\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ ) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Respiration rate ( $\text{mg CO}_2\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ )				
	Days of storage life				
	1	4	7	10	13
Tap water	15.62c	24.13a	56.84b	17.10b	11.81b
HW-50°C	20.06c	34.59b	86.09a	28.49a	32.43a
HW-55°C	30.43b	8.56c	12.68c	0.71d	-
HW-60°C	76.69a	1.67d	2.43d	3.17c	-
F-test / T-test	**	**	**	**	**
C.V. (%)	71.93	78.31	88.60	143.57	51.13

**Table A11** Changes in overall visual quality of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Overall visual quality (9-points score)				
	Days of storage life				
	1	4	7	10	13
Tap water	8.20a	7.75a	5.76	7.16	6.79
HW-50°C	6.94a	7.43a	6.50	6.93	7.20
HW-55°C	6.01ab	3.05b	-	-	-
HW-60°C	4.56b	2.89b	-	-	-
F-test / T-test	*	**	ns	ns	ns
C.V. (%)	31.42	47.16	21.37	23.26	9.87

**Table A12** Changes in visual color of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Visual color (9-points score)				
	Days of storage life				
	1	4	7	10	13
Tap water	8.16	8.01a	6.35	7.95	7.51
HW-50°C	7.78	7.68a	7.00	7.98	7.62
HW-55°C	7.08	4.75b	-	-	-
HW-60°C	6.76	5.01b	-	-	-
F-test / T-test	ns	**	ns	ns	ns
C.V. (%)	22.18	35.53	25.19	9.41	12.96

Within a column, mean not followed by the same letter are significantly different.  
 $*P\leq 0.05$ ,  $**P\leq 0.01$ , ns = non-significance

**Table A13** Changes in odor of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 50, 55 and 60 °C for 3 min, and the treated samples were then stored at 4 °C.

Treatments	Odor (9-points score)				
	Days of storage life				
	1	4	7	10	13
Tap water	8.70a	8.47a	7.42a	8.33a	6.80a
HW-50°C	8.32a	7.02b	5.09b	3.97b	2.92b
HW-55°C	3.37b	3.46c	-	-	-
HW-60°C	2.61b	3.17c	-	-	-
F-test / T-test	**	**	**	**	**
C.V. (%)	51.30	45.57	32.91	42.11	52.06

**Table A14** Changes in total bacteria counts of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Total bacteria counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	6.28	5.41c	7.14b
VH-15 sec	5.93	6.41a	7.13b
VH-30 sec	6.11	6.20b	7.34a
VH-45 sec	5.94	5.52c	7.23ab
F-Test	ns	**	*
C.V. (%)	3.63	7.64	1.52

**Table A15** Changes in coliform counts of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Coliform counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	4.94a	4.43c	6.13b
VH-15 sec	4.43b	4.54bc	5.95c
VH-30 sec	4.23b	5.12a	6.22ab
VH-45 sec	4.21b	4.87ab	6.28a
F-Test	*	*	**
C.V. (%)	7.64	6.52	2.28

Within a column, mean not followed by the same letter are significantly different.  
 \* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A16** Changes in *Salmonella-Shigella* spp. counts of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	<i>Salmonella-Shigella</i> spp. counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	5.03a	4.30d	6.59b
VH-15 sec	4.93ab	5.94a	5.58c
VH-30 sec	4.65b	5.20b	6.61b
VH-45 sec	4.89ab	4.59c	7.08a
F-Test	*	**	*
C.V. (%)	3.70	13.35	10.61

**Table A17** Changes in yeast and mold counts of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Yeast and mold counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	5.53b	5.20c	7.30a
VH-15 sec	5.48b	6.66a	6.18d
VH-30 sec	5.50b	5.73b	7.04b
VH-45 sec	5.35a	5.29c	6.79c
F-Test	*	**	**
C.V. (%)	1.47	10.86	6.73

**Table A18** Changes in lightness (L\*) of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Lightness (L*)		
	Days of storage life		
	0	3	6
Tap water	44.61	42.49ab	43.41
VH-15 sec	44.61	44.54a	42.81
VH-30 sec	35.37	40.58b	43.78
VH-45 sec	43.39	40.35b	43.29
F-Test	ns	**	ns
C.V. (%)	20.35	7.28	6.09

Within a column, mean not followed by the same letter are significantly different.  
\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A19** Changes in a\* value of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	a* value		
	Days of storage life		
	0	3	6
Tap water	-11.20ab	-9.84	-8.19
VH-15 sec	-11.79ab	-10.10	-10.52
VH-30 sec	-9.90a	-9.02	-9.47
VH-45 sec	-13.23b	-8.62	-10.39
F-Test	*	ns	ns
C.V. (%)	24.01	21.35	25.44

**Table A20** Changes in b\* value of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	b* value		
	Days of storage life		
	0	3	6
Tap water	23.83	18.89	17.22
VH-15 sec	25.28	21.52	23.83
VH-30 sec	20.45	20.55	22.73
VH-45 sec	25.64	19.80	24.85
F-Test	ns	ns	ns
C.V. (%)	22.59	20.89	23.06

**Table A21** Changes in hue angle (h°) of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Hue angle (h°)		
	Days of storage life		
	0	3	6
Tap water	115.01b	116.48a	115.30
VH-15 sec	115.00b	115.10ab	115.87
VH-30 sec	115.84ab	113.85b	114.87
VH-45 sec	117.28a	115.16ab	114.80
F-Test	*	*	ns
C.V. (%)	1.69	1.94	1.80

Within a column, mean not followed by the same letter are significantly different.  
 \* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A22** Changes in percentage of oxygen (O<sub>2</sub>) concentration in package of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Oxygen (O <sub>2</sub> ) concentration in package (%)		
	Days of storage life		
	0	3	6
Tap water	18.53b	18.93b	18.87b
VH-15 sec	12.57c	11.80c	13.10c
VH-30 sec	19.73a	19.70a	20.10a
VH-45 sec	18.33b	18.93b	19.07b
F-Test	**	**	**
C.V. (%)	16.95	19.43	16.20

**Table A23** Changes in percentage of carbon dioxide (CO<sub>2</sub>) concentration in package of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Carbon dioxide (CO <sub>2</sub> ) concentration in package (%)		
	Days of storage life		
	0	3	6
Tap water	2.80	7.40d	1.63a
VH-15 sec	2.33	10.77a	1.67a
VH-30 sec	2.57	9.67b	1.47ab
VH-45 sec	2.40	8.47c	1.20b
F-Test	ns	**	*
C.V. (%)	22.53	14.98	16.11

**Table A24** Changes in respiration rate (mg CO<sub>2</sub>·kg<sup>-1</sup>·h<sup>-1</sup>) of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Respiration rate (mg CO <sub>2</sub> ·kg <sup>-1</sup> ·h <sup>-1</sup> )		
	Days of storage life		
	0	3	6
Tap water	40.73a	55.84a	14.50b
VH-15 sec	29.58b	38.11b	29.01a
VH-30 sec	27.32c	41.37b	24.24a
VH-45 sec	22.71d	29.19c	23.71a
F-Test	**	**	**
C.V. (%)	23.60	27.77	28.69

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A25** Changes in overall visual quality of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Overall visual quality (9-points score)		
	Days of storage life		
	0	3	6
Tap water	7.51a	7.24a	7.79a
VH-15 sec	6.78a	7.37a	6.11ab
VH-30 sec	7.64a	5.88b	4.75b
VH-45 sec	4.66b	5.24b	5.18b
F-Test	**	**	*
C.V. (%)	27.97	26.91	27.01

**Table A26** Changes in visual color of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Visual color (9-points score)		
	Days of storage life		
	0	3	6
Tap water	7.27a	7.75a	8.48a
VH-15 sec	7.06a	7.03ab	7.82ab
VH-30 sec	7.47a	6.60ab	7.28ab
VH-45 sec	4.87b	5.84b	6.39b
F-Test	*	*	*
C.V. (%)	29.84	23.30	12.15

**Table A27** Changes in odor of fresh-cut broccoli florets treated with tap water (control) and vapor heat (VH) at 90 °C for 15, 30 and 45 sec, and the treated samples were then stored at 4 °C.

Treatments	Odor (9-points score)		
	Days of storage life		
	0	3	6
Tap water	7.93	7.40a	8.14a
VH-15 sec	8.60	7.43a	6.74ab
VH-30 sec	7.38	4.75b	5.79b
VH-45 sec	6.38	4.39b	6.42ab
F-Test	ns	**	*
C.V. (%)	26.42	36.73	19.79

Within a column, mean not followed by the same letter are significantly different.  
 \* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A28** Changes in total bacteria counts of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Total bacteria counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	6.63a	6.43ab	7.11ab
O <sub>3</sub> -5 min (0.56 ppm)	5.06b	6.59a	7.33a
O <sub>3</sub> -10 min (1.00 ppm)	5.29b	6.44ab	6.94bc
O <sub>3</sub> -15 min(1.50 ppm)	4.58c	6.07b	6.71c
F-test	**	*	**
C.V. (%)	15.03	4.55	3.85

**Table A29** Changes in coliform counts of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Coliform counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	4.67b	5.99ab	6.22
O <sub>3</sub> -5 min (0.56 ppm)	5.00a	5.47b	5.63
O <sub>3</sub> -10 min (1.00 ppm)	4.67b	6.45a	5.72
O <sub>3</sub> -15 min(1.50 ppm)	3.46c	5.92ab	5.64
F-test	**	*	ns
C.V. (%)	13.93	7.55	6.38

**Table A30** Changes in *Salmonella-Shigella* spp. counts of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	<i>Salmonella-Shigella</i> spp. counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	4.34c	7.50a	7.00a
O <sub>3</sub> -5 min (0.56 ppm)	4.95b	6.56b	6.15c
O <sub>3</sub> -10 min (1.00 ppm)	5.51a	6.55b	6.20c
O <sub>3</sub> -15 min(1.50 ppm)	4.72bc	6.39b	6.68b
F-test	**	**	**
C.V. (%)	10.06	6.96	5.96

Within a column, mean not followed by the same letter are significantly different.  
\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A31** Changes in yeast and mold counts of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Yeast and mold counts (log CFU·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	5.88a	5.57a	6.03a
O <sub>3</sub> -5 min (0.56 ppm)	4.74c	4.73c	5.10b
O <sub>3</sub> -10 min (1.00 ppm)	5.26b	5.00b	5.04b
O <sub>3</sub> -15 min(1.50 ppm)	4.08d	4.94b	5.14b
F-test	**	**	**
C.V. (%)	13.83	6.72	8.07

**Table A32** Changes in lightness (L\*) of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Lightness (L*)		
	Days of storage life		
	0	3	6
Tap water	41.85a	42.67a	42.21a
O <sub>3</sub> -5 min (0.56 ppm)	40.05b	39.63b	40.27a
O <sub>3</sub> -10 min (1.00 ppm)	39.03bc	38.83b	39.41a
O <sub>3</sub> -15 min(1.50 ppm)	38.64c	39.55b	39.68a
F-test	**	**	**
C.V. (%)	3.86	4.11	3.71

**Table A33** Changes in a\* value of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	a* value		
	Days of storage life		
	0	3	6
Tap water	-11.72a	-10.97a	-11.86
O <sub>3</sub> -5 min (0.56 ppm)	-12.68ab	-12.34b	-11.39
O <sub>3</sub> -10 min (1.00 ppm)	-13.32b	-12.62b	-11.14
O <sub>3</sub> -15 min(1.50 ppm)	-12.87b	-12.19b	-12.01
F-test	*	**	ns
C.V. (%)	7.67	7.65	6.98

Within a column, mean not followed by the same letter are significantly different.  
\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A34** Changes in b\* value of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	b* value		
	Days of storage life		
	0	3	6
Tap water	20.38b	18.39b	18.76b
O <sub>3</sub> -5 min (0.56 ppm)	23.04a	21.75a	20.35ab
O <sub>3</sub> -10 min (1.00 ppm)	23.25a	22.38a	20.67a
O <sub>3</sub> -15 min(1.50 ppm)	22.60a	22.58a	21.75a
F-test	*	**	**
C.V. (%)	8.65	9.17	8.15

**Table A35** Changes in hue angle (h°) of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Hue angle (h°)		
	Days of storage life		
	0	3	6
Tap water	119.83ab	120.53a	121.77a
O <sub>3</sub> -5 min (0.56 ppm)	118.84b	120.19a	119.18b
O <sub>3</sub> -10 min (1.00 ppm)	120.19a	119.94a	118.79b
O <sub>3</sub> -15 min(1.50 ppm)	119.99ab	119.20b	119.04b
F-test	*	**	**
C.V. (%)	0.91	0.62	1.18

**Table A36** Changes in total chlorophyll content of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Total chlorophyll content (mg 100·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	62.73a	61.03a	56.43a
O <sub>3</sub> -5 min (0.56 ppm)	50.38c	53.73b	46.66b
O <sub>3</sub> -10 min (1.00 ppm)	57.39b	54.49b	49.32b
O <sub>3</sub> -15 min(1.50 ppm)	53.53c	49.30c	46.45b
F-test	**	**	**
C.V. (%)	9.59	9.52	10.32

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A37** Changes in chlorophyll *a* content of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>a</i> content (mg 100·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	47.94a	47.24a	43.92a
O <sub>3</sub> -5 min (0.56 ppm)	38.07c	40.58bc	35.91b
O <sub>3</sub> -10 min (1.00 ppm)	43.26b	41.42b	37.98b
O <sub>3</sub> -15 min(1.50 ppm)	40.24c	37.62c	35.76b
F-test	**	**	**
C.V. (%)	10.03	10.12	10.71

**Table A38** Changes in chlorophyll *b* content of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>b</i> content (mg 100·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	14.79a	13.78a	12.50a
O <sub>3</sub> -5 min (0.56 ppm)	12.31c	13.15a	10.75b
O <sub>3</sub> -10 min (1.00 ppm)	14.13ab	13.08a	11.34b
O <sub>3</sub> -15 min(1.50 ppm)	13.29b	11.68b	10.69b
F-test	**	**	**
C.V. (%)	8.51	8.20	9.28

**Table A39** Changes in carotenoid content of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Carotenoid content (mg 100·g <sup>-1</sup> FW)		
	Days of storage life		
	0	3	6
Tap water	0.026a	0.026a	0.021a
O <sub>3</sub> -5 min (0.56 ppm)	0.012b	0.015bc	0.009b
O <sub>3</sub> -10 min (1.00 ppm)	0.018b	0.017b	0.011b
O <sub>3</sub> -15 min(1.50 ppm)	0.016b	0.011c	0.009b
F-test	**	**	**
C.V. (%)	37.78	38.24	58.33

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A40** Changes in overall visual quality of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Overall visual quality (9-points score)		
	Days of storage life		
	0	3	6
Tap water	8.49	7.63	6.15
O <sub>3</sub> -5 min (0.56 ppm)	8.39	7.63	5.37
O <sub>3</sub> -10 min (1.00 ppm)	8.39	7.63	5.04
O <sub>3</sub> -15 min(1.50 ppm)	8.39	7.63	4.94
F-test	ns	ns	ns
C.V. (%)	7.37	6.03	17.69

**Table A41** Changes in visual color of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Visual color (9-points score)		
	Days of storage life		
	0	3	6
Tap water	8.04	7.40	7.29
O <sub>3</sub> -5 min (0.56 ppm)	8.04	7.54	6.06
O <sub>3</sub> -10 min (1.00 ppm)	8.04	7.71	6.00
O <sub>3</sub> -15 min(1.50 ppm)	8.04	7.43	6.32
F-test	ns	ns	ns
C.V. (%)	8.21	7.98	17.16

**Table A42** Changes in odor of fresh-cut broccoli florets treated with tap water (control) and ozonated water (O<sub>3</sub>) for 5 min (0.56 ppm), 10 min (1.00 ppm) and 15 min (1.50 ppm), and the treated samples were then stored at 4 °C.

Treatments	Odor (9-points score)		
	Days of storage life		
	0	3	6
Tap water	8.27	7.85	6.43a
O <sub>3</sub> -5 min (0.56 ppm)	8.27	7.24	3.27b
O <sub>3</sub> -10 min (1.00 ppm)	8.27	7.24	2.79b
O <sub>3</sub> -15 min(1.50 ppm)	8.27	7.24	3.18b
F-test	ns	ns	**
C.V. (%)	8.83	7.17	41.33

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A43** Changes in total bacteria counts of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Total bacteria counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	3.45a	3.75a	4.68a	4.56a	3.46
500 ppm SC	2.69b	2.87bc	2.55c	3.50b	3.00
750 ppm SC	3.78a	3.21ab	3.72b	3.55b	3.44
1000 ppm SC	3.36a	2.20c	2.88c	3.94ab	2.95
F-test	**	**	**	**	ns
C.V. (%)	13.55	21.97	25.99	15.58	17.23

**Table A44** Changes in *Salmonella-Shigella* spp. counts of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	<i>Salmonella-Shigella</i> spp. counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	3.00	3.69a	3.88a	4.03a	4.19a
500 ppm SC	0.00	2.73b	2.73b	3.59a	3.92a
750 ppm SC	0.00	0.00c	2.54b	2.42b	2.75b
1000 ppm SC	0.00	0.00c	2.52b	2.23b	2.78b
F-test	**	**	**	**	**
C.V. (%)	220.00	106.55	24.26	28.53	21.47

**Table A45** Changes in yeast and mold counts of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Yeast and mold counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	4.27a	4.90a	4.63a	5.15a	4.67a
500 ppm SC	3.78ab	3.38b	3.74b	4.67ab	3.91b
750 ppm SC	3.81ab	3.78b	4.02b	4.22b	3.81b
1000 ppm SC	3.37b	3.68b	3.81b	4.05b	3.80b
F-test	*	**	**	*	**
C.V. (%)	10.97	22.22	10.62	16.37	10.37

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A46** Changes in percentage of weight loss of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Weight loss (%)				
	Days of storage life				
	0	3	6	9	12
Tap water	-	-0.25b	0.03b	-0.03ab	0.17b
500 ppm SC	-	-0.20ab	0.06b	-0.04b	0.16b
750 ppm SC	-	-0.19a	0.06b	0.07a	0.21ab
1000 ppm SC	-	-0.16a	0.19a	0.06ab	0.28a
F-test	-	*	*	*	*
C.V. (%)	-	23.00	79.49	425.00	31.43

**Table A47** Changes in respiration rate ( $\text{mg CO}_2\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ ) of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Respiration rate ( $\text{mg CO}_2\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ )				
	Days of storage life				
	0	3	6	9	12
Tap water	28.53c	43.99	39.47	51.18c	50.91b
500 ppm SC	26.29c	46.06	45.04	58.58b	60.02a
750 ppm SC	38.50a	47.55	40.02	57.46b	58.48ab
1000 ppm SC	34.10b	53.42	49.87	84.71a	42.75c
F-test	**	ns	ns	**	**
C.V. (%)	16.30	11.71	13.56	21.96	14.39

**Table A48** Changes in lightness ( $L^*$ ) of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Lightness ( $L^*$ )				
	Days of storage life				
	0	3	6	9	12
Tap water	43.96a	42.31	40.62	41.47a	41.64
500 ppm SC	41.20b	41.44	40.82	39.92b	41.38
750 ppm SC	42.61ab	41.41	41.30	39.75b	41.87
1000 ppm SC	42.42ab	41.84	40.15	39.89b	40.45
F-test	*	ns	ns	*	ns
C.V. (%)	3.46	3.88	3.36	3.05	3.92

Within a column, mean not followed by the same letter are significantly different.

\* $P\leq 0.05$ , \*\* $P\leq 0.01$ , ns = non-significance

**Table A49** Changes in a\* value of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	a* value				
	Days of storage life				
	0	3	6	9	12
Tap water	-14.85	-9.72	-9.57	-9.83	-8.86
500 ppm SC	-14.12	-9.26	-9.42	-9.03	-9.53
750 ppm SC	-13.21	-9.75	-10.18	-8.92	-10.20
1000 ppm SC	-13.14	-9.50	-8.49	-9.18	-8.85
F-test	ns	ns	ns	ns	ns
C.V. (%)	11.88	17.89	16.03	14.35	13.81

**Table A50** Changes in b\* value of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	b* value				
	Days of storage life				
	0	3	6	9	12
Tap water	21.68a	15.46	15.17ab	16.36	14.36b
500 ppm SC	19.77ab	15.54	15.73ab	15.12	15.69ab
750 ppm SC	19.33ab	16.59	16.65a	14.47	17.29a
1000 ppm SC	17.93b	15.77	14.21b	14.86	14.99ab
F-test	*	ns	*	ns	*
C.V. (%)	12.95	37.79	14.69	13.88	16.34

**Table A51** Changes in hue angle (h°) of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Hue angle (h°)				
	Days of storage life				
	0	3	6	9	12
Tap water	123.93b	122.20a	122.20a	120.96	121.71
500 ppm SC	126.26a	120.87ab	120.93ab	120.82	121.31
750 ppm SC	126.16a	120.49b	121.46ab	121.68	120.74
1000 ppm SC	125.67ab	120.98ab	120.57b	121.93	120.77
F-test	*	*	*	ns	ns
C.V. (%)	1.47	1.48	1.34	1.16	1.47

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A52** Changes in total chlorophyll content of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Total chlorophyll content (mg 100·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	80.29a	68.24a	62.96bc	72.39a	65.87b
500 ppm SC	75.38b	69.95a	66.40b	73.62a	65.06b
750 ppm SC	71.57c	67.24ab	60.74c	68.95b	67.78ab
1000 ppm SC	66.37d	64.94b	73.90a	73.41a	70.63a
F-test	**	*	**	**	**
C.V. (%)	7.67	4.38	8.91	4.16	4.80

**Table A53** Changes in chlorophyll *a* content of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>a</i> content (mg 100·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	62.23d	50.62ab	54.22a	51.36a	50.57b
500 ppm SC	57.98c	52.05a	51.85a	52.13a	50.01b
750 ppm SC	53.54b	49.38bc	46.29b	48.46b	51.83ab
1000 ppm SC	49.96a	47.53c	51.67a	51.80a	53.69a
F-test	**	**	*	**	*
C.V. (%)	8.97	4.74	8.68	4.50	4.44

**Table A54** Changes in chlorophyll *b* content of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>b</i> content (mg 100·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	18.06a	17.62	16.24b	21.03ab	15.30bc
500 ppm SC	18.12a	18.60	17.53ab	21.50a	15.05c
750 ppm SC	18.03a	17.86	20.63a	20.52b	15.96b
1000 ppm SC	16.41b	17.41	18.23ab	21.61a	16.94a
F-test	**	ns	*	*	**
C.V. (%)	5.50	6.70	13.15	3.83	6.20

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A55** Changes in carotenoid content of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Carotenoid content (mg 100·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	0.052a	0.033	0.050a	0.038	0.032
500 ppm SC	0.048ab	0.037	0.043b	0.042	0.032
750 ppm SC	0.043bc	0.032	0.042b	0.037	0.037
1000 ppm SC	0.038c	0.032	0.048a	0.042	0.038
F-test	**	ns	**	ns	ns
C.V. (%)	14.67	14.85	10.87	11.50	16.57

**Table A56** Changes in overall visual quality of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Overall visual quality (9-points score)				
	Days of storage life				
	0	3	6	9	12
Tap water	8.41	7.73	8.11	6.75	6.29
500 ppm SC	8.38	8.36	6.87	7.06	6.71
750 ppm SC	7.92	7.56	7.56	7.23	6.63
1000 ppm SC	7.86	7.54	8.57	8.17	6.36
F-test	ns	ns	ns	ns	ns
C.V. (%)	7.86	8.46	13.88	14.52	17.54

**Table A57** Changes in visual color of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Visual color (9-points score)				
	Days of storage life				
	0	3	6	9	12
Tap water	8.49	7.93	8.30	7.74	7.20
500 ppm SC	8.36	8.39	7.59	8.01	7.61
750 ppm SC	8.16	7.63	7.63	8.57	7.32
1000 ppm SC	7.70	7.41	8.11	8.63	7.37
F-test	ns	ns	ns	ns	ns
C.V. (%)	6.48	6.89	7.84	10.07	10.57

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A58** Changes in odor of fresh-cut broccoli florets treated with tap water (control) and 500, 750 and 1000 ppm of sodium chlorite (SC) solutions for 1 min, and the treated samples were then stored at 4 °C.

Treatments	Odor (9-points score)				
	Days of storage life				
	0	3	6	9	12
Tap water	8.29	7.41	8.14	8.17	7.42a
500 ppm SC	8.68	8.88	8.12	7.21	7.39a
750 ppm SC	8.26	7.43	8.36	6.67	6.57ab
1000 ppm SC	8.83	7.90	8.26	8.55	6.29b
F-test	ns	ns	ns	ns	*
C.V. (%)	6.46	11.14	7.30	15.03	15.61

**Table A59** Changes in total bacteria counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Total bacteria counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	5.38a	5.43a	5.77a	5.77	5.90a
HW, 100 ppm SC	4.68b	5.00b	5.28b	5.88	5.16b
HW, 300 ppm SC	4.78b	5.30a	5.08b	5.60	5.75a
F-test	**	**	**	ns	**
C.V. (%)	6.88	4.39	6.90	5.22	6.80

**Table A60** Changes in coliform counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Coliform counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	4.84a	4.73a	5.44a	5.30ab	5.29a
HW, 100 ppm SC	3.82b	4.31b	5.03b	5.39a	4.65b
HW, 300 ppm SC	4.03b	4.56a	4.60c	5.07b	5.18a
F-test	**	**	**	*	**
C.V. (%)	12.82	5.30	7.97	5.34	8.73

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A61** Changes in *Salmonella-Shigella* spp. counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	<i>Salmonella-Shigella</i> spp. counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	4.75a	4.89a	5.63a	5.59a	5.79a
HW, 100 ppm SC	3.97b	4.51b	5.31b	5.97a	5.38b
HW, 300 ppm SC	3.93b	4.96a	4.84c	5.06b	5.70a
F-test	**	*	**	**	**
C.V. (%)	8.76	6.46	7.44	9.53	4.09

**Table A62** Changes in yeast and mold counts of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Yeast and mold counts (log CFU·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	5.54a	5.67a	5.90a	5.76ab	5.88a
HW, 100 ppm SC	5.17b	5.14b	5.36b	6.04a	5.46b
HW, 300 ppm SC	5.21b	5.49a	5.43b	5.51b	5.87a
F-test	**	**	**	*	**
C.V. (%)	3.76	5.71	4.86	6.41	5.07

**Table A63** Changes in lightness (L\*) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Lightness (L*)				
	Days of storage life				
	0	3	6	9	12
Tap water	41.34	39.54	40.74	39.71	40.48
HW, 100 ppm SC	40.95	40.01	40.74	40.61	40.89
HW, 300 ppm SC	39.54	40.07	39.17	40.08	40.52
F-test	ns	ns	ns	ns	ns
C.V. (%)	2.81	2.06	2.76	1.89	2.04

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A64** Changes in a\* value of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	a* value				
	Days of storage life				
	0	3	6	9	12
Tap water	-12.76	-11.60	-12.19	-12.08	-11.92
HW, 100 ppm SC	-11.92	-12.07	-12.24	-12.38	-12.07
HW, 300 ppm SC	-12.45	-12.16	-11.33	-12.00	-12.34
F-test	ns	ns	ns	ns	ns
C.V. (%)	7.67	4.36	6.71	5.76	5.62

**Table A65** Changes in b\* value of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	b* value				
	Days of storage life				
	0	3	6	9	12
Tap water	21.12	19.63	20.05	19.90	19.18
HW, 100 ppm SC	21.18	20.24	20.13	20.06	19.82
HW, 300 ppm SC	20.96	19.97	18.89	19.78	20.72
F-test	ns	ns	ns	ns	ns
C.V. (%)	8.20	3.41	8.53	6.88	8.04

**Table A66** Changes in hue angle (h°) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Hue angle (h°)				
	Days of storage life				
	0	3	6	9	12
Tap water	121.30	120.56	121.52	121.28	122.03
HW, 100 ppm SC	121.10	120.78	121.38	121.69	121.46
HW, 300 ppm SC	120.77	121.33	121.01	121.36	120.85
F-test	ns	ns	ns	ns	ns
C.V. (%)	0.75	0.58	0.73	0.54	0.72

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A67** Changes in percentage of weight loss of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Weight loss (%)				
	Days of storage life				
	0	3	6	9	12
Tap water	-	-0.014	0.013b	0.036b	0.077b
HW, 100 ppm SC	-	0.029	0.068a	0.118a	0.217a
HW, 300 ppm SC	-	0.002	0.037ab	0.058b	0.086b
F-test	-	ns	*	*	**
C.V. (%)	-	141.54	122.50	78.08	53.08

**Table A68** Changes in percentage of oxygen (O<sub>2</sub>) concentration in package of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Oxygen (O <sub>2</sub> ) concentration in package (%)				
	Days of storage life				
	0	3	6	9	12
Tap water	21.00	25.95	25.78a	24.05	24.79
HW, 100 ppm SC	21.00	25.84	24.71b	25.02	24.55
HW, 300 ppm SC	21.00	25.11	24.44b	24.11	23.91
F-test	-	ns	*	ns	ns
C.V. (%)	-	0.82	0.96	1.23	1.27

**Table A69** Changes in percentage of carbon dioxide (CO<sub>2</sub>) concentration in package of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Carbon dioxide (CO <sub>2</sub> ) concentration in package (%)				
	Days of storage life				
	0	3	6	9	12
Tap water	0.03	0.26	2.36	2.40	2.10
HW, 100 ppm SC	0.03	0.25	2.16	1.97	1.77
HW, 300 ppm SC	0.03	0.34	3.20	2.73	2.93
F-test	-	ns	ns	ns	ns
C.V. (%)	-	8.21	11.28	12.24	12.78

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A70** Changes in respiration rate ( $\text{mg CO}_2\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ ) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Respiration rate ( $\text{mg CO}_2\cdot\text{kg}^{-1}\cdot\text{h}^{-1}$ )				
	Days of storage life				
	0	3	6	9	12
Tap water	35.03a	19.42	29.07b	32.69	31.44
HW, 100 ppm SC	34.23a	20.99	38.60a	37.63	29.36
HW, 300 ppm SC	21.05b	21.50	31.77b	31.91	33.25
F-test	**	ns	*	ns	ns
C.V. (%)	24.29	10.76	15.26	11.62	14.74

**Table A71** Changes in total chlorophyll content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Total chlorophyll content ( $\text{mg } 100\cdot\text{g}^{-1}$ FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	71.65	68.16	68.78b	71.47a	72.28a
HW, 100 ppm SC	76.21	71.31	73.19a	60.31b	65.65b
HW, 300 ppm SC	71.78	72.85	63.29c	61.62b	66.01b
F-test	ns	ns	**	**	**
C.V. (%)	5.04	9.40	7.10	8.44	5.00

**Table A72** Changes in chlorophyll *a* content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>a</i> content ( $\text{mg } 100\cdot\text{g}^{-1}$ FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	56.18	53.35	53.31b	54.77a	55.06a
HW, 100 ppm SC	59.43	55.30	56.75a	46.21b	50.54b
HW, 300 ppm SC	55.83	56.75	49.36c	46.70b	52.10b
F-test	ns	ns	**	**	**
C.V. (%)	4.81	9.00	6.83	8.68	4.66

Within a column, mean not followed by the same letter are significantly different.

\* $P\leq 0.05$ , \*\* $P\leq 0.01$ , ns = non-significance

**Table A73** Changes in chlorophyll *b* content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>b</i> content (mg 100·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	15.47	14.82	15.47a	16.71a	17.22a
HW, 100 ppm SC	16.78	16.01	16.43a	14.10c	15.11b
HW, 300 ppm SC	15.96	16.11	13.93b	14.92b	13.92b
F-test	ns	ns	**	**	**
C.V. (%)	6.04	11.12	8.18	7.87	11.49

**Table A74** Changes in carotenoid content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Carotenoid content (mg 100·g <sup>-1</sup> FW)				
	Days of storage life				
	0	3	6	9	12
Tap water	0.0375	0.0333	0.0348ab	0.0395a	0.0408a
HW, 100 ppm SC	0.0365	0.0373	0.0435a	0.0308b	0.0333c
HW, 300 ppm SC	0.0408	0.0450	0.0328b	0.0305b	0.0373b
F-test	ns	ns	*	**	**
C.V. (%)	22.19	23.64	19.73	16.67	9.70

**Table A75** Changes in overall visual quality of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Overall visual quality (9-points score)				
	Days of storage life				
	0	3	6	9	12
Tap water	8.88	8.43	8.12	6.21	7.13
HW, 100 ppm SC	8.88	8.63	8.17	7.03	7.55
HW, 300 ppm SC	8.88	8.61	8.24	7.27	7.18
F-test	ns	ns	ns	ns	ns
C.V. (%)	1.13	3.04	5.02	10.96	8.09

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A76** Changes in visual color of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Visual color (9-points score)				
	Days of storage life				
	0	3	6	9	12
Tap water	8.75	8.50	8.30	7.14	7.93
HW, 100 ppm SC	8.47	8.54	7.82	6.93	7.45
HW, 300 ppm SC	8.46	8.54	8.25	6.74	8.04
F-test	ns	ns	ns	ns	ns
C.V. (%)	4.56	4.34	6.64	10.23	10.37

**Table A77** Changes in odor of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 100 and 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Odor (9-points score)				
	Days of storage life				
	0	3	6	9	12
Tap water	8.63	8.29	8.55	7.68	7.10
HW, 100 ppm SC	8.63	8.33	6.43	7.33	7.85
HW, 300 ppm SC	8.39	8.35	8.77	7.33	7.18
F-test	ns	ns	ns	ns	ns
C.V. (%)	2.69	1.80	23.99	8.05	8.13

**Table A78** Changes in total ascorbic acid content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Total ascorbic acid content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	177.66	152.57a	145.20	135.38	129.63	122.54b	124.44
HW, 300 ppm SC	172.54	132.89b	139.26	133.63	120.30	142.34a	120.53
T-test	ns	**	ns	ns	ns	**	ns
C.V. (%)	7.36	8.07	4.91	5.85	7.26	9.50	4.48

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A79** Changes in ascorbic acid content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Ascorbic acid content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	139.47	136.83	145.27a	128.01	123.90	114.49b	112.96
HW, 300 ppm SC	142.66	132.44	127.17b	127.05	122.74	134.11a	111.44
T-test	ns	ns	**	ns	ns	**	ns
C.V. (%)	4.44	9.43	9.35	5.79	6.11	9.55	2.99

**Table A80** Changes in dehydroascorbic acid content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Dehydroascorbic acid content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	37.06	17.06a	11.36	8.43	7.30	9.81	14.57
HW, 300 ppm SC	26.66	11.35b	8.82	6.97	4.96	7.03	8.38
T-test	ns	*	ns	ns	ns	ns	ns
C.V. (%)	45.83	35.82	41.63	28.83	46.33	36.82	63.50

**Table A81** Changes in total chlorophyll content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Total chlorophyll content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	71.73	74.98	77.92	82.25	78.38	71.19	88.33
HW, 300 ppm SC	75.00	72.46	73.96	81.90	76.67	86.56	82.13
T-test	ns	ns	ns	ns	ns	**	ns
C.V. (%)	6.68	3.11	9.07	4.01	4.49	11.46	7.05

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A82** Changes in chlorophyll *a* content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>a</i> content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	55.32	57.94a	59.07	62.28	59.28	53.65b	66.00
HW, 300 ppm SC	57.68	55.66b	56.54	62.18	57.64	64.83a	61.40
T-test	ns	*	ns	ns	ns	**	ns
C.V. (%)	6.60	3.12	8.11	3.84	4.58	11.17	7.03

**Table A83** Changes in chlorophyll *b* content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Chlorophyll <i>b</i> content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	14.24	11.51	13.59a	11.98	12.93	13.00	12.20
HW, 300 ppm SC	14.14	11.32	10.98b	11.62	12.00	12.36	12.22
T-test	ns	ns	**	ns	ns	ns	ns
C.V. (%)	11.77	7.53	13.16	7.63	7.94	4.65	5.16

**Table A84** Changes in carotenoid content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Carotenoid content (mg 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	0.030	0.017	0.018	0.027	0.028	0.024	0.037a
HW, 300 ppm SC	0.030	0.013	0.012	0.026	0.025	0.027	0.028b
T-test	ns	ns	ns	ns	ns	ns	*
C.V. (%)	31.72	34.00	50.00	7.04	12.59	19.23	20.30

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A85** Changes in total phenolic content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Total phenolic content (mg of gallic acid (GAE) 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	149.14b	160.67a	163.10	159.45	156.13	141.47b	143.34
HW, 300 ppm SC	157.56a	149.54b	167.24	160.63	145.32	160.24a	138.47
T-test	*	**	ns	ns	ns	**	ns
C.V. (%)	5.89	5.78	5.71	6.08	9.28	9.98	10.28

**Table A86** Changes in flavonoid content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Flavonoid content (mg of quercetin (QE) 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	15.53	17.51a	14.59b	17.23	14.73a	15.73	13.66a
HW, 300 ppm SC	16.12	15.22b	19.00a	16.53	13.82b	16.62	11.23b
T-test	ns	**	**	ns	**	ns	**
C.V. (%)	6.82	10.51	17.56	8.65	7.49	9.96	12.05

**Table A87** Changes in total glucosinolate content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Total glucosinolate content (mg sinigrin 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	0.64	0.58a	0.30	0.52a	0.43b	0.50b	0.81b
HW, 300 ppm SC	0.62	0.26b	0.30	0.36b	0.54a	0.71a	0.90a
T-test	ns	**	ns	**	**	**	**
C.V. (%)	9.25	41.11	20.00	19.65	14.36	19.27	6.82

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A88** Changes in antioxidant capacity (%DPPH inhibition) of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Antioxidant capacity (%DPPH inhibition)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	27.86a	21.33b	24.48	20.79b	18.83	20.71b	22.58b
HW, 300 ppm SC	25.26b	22.54a	24.40	25.15a	19.65	23.04a	25.25a
T-test	**	*	ns	**	ns	**	**
C.V. (%)	8.36	5.65	9.57	10.49	8.06	8.09	8.32

**Table A89** Changes in chlorophyllase activity of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Chlorophyllase activity (Units·mg <sup>-1</sup> protein)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	1.05a	0.85	0.57	0.81	0.60b	0.92	0.98
HW, 300 ppm SC	0.73b	0.70	0.46	0.54	0.88a	1.11	1.10
T-test	**	ns	ns	ns	*	ns	ns
C.V. (%)	22.47	33.33	41.18	41.79	29.73	20.59	14.42

**Table A90** Changes in catalase activity of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Catalase activity (Units·mg <sup>-1</sup> protein)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	0.54	0.78	0.95b	2.98	2.46a	3.72b	3.11b
HW, 300 ppm SC	0.52	0.89	1.17a	2.39	1.91b	4.45a	3.59a
T-test	ns	ns	**	ns	*	*	*
C.V. (%)	15.28	12.05	14.15	26.77	22.48	14.71	11.04

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A91** Changes in peroxidase activity of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Peroxidase activity (Units·mg <sup>-1</sup> protein)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	3.64	2.23b	4.28	9.40a	8.34b	13.37	10.16b
HW, 300 ppm SC	2.90	3.50a	4.51	6.39b	11.14a	13.28	17.07a
T-test	ns	**	ns	**	*	ns	**
C.V. (%)	23.24	27.87	27.56	25.70	25.67	3.60	28.12

**Table A92** Changes in superoxide dismutase activity of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Superoxide dismutase activity (Units·mg <sup>-1</sup> protein)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	12.53	12.02	14.64	18.38a	17.92a	9.33	12.64b
HW, 300 ppm SC	13.98	12.47	13.37	15.65b	10.57b	7.99	14.00a
T-test	ns	ns	ns	**	**	ns	**
C.V. (%)	10.11	10.37	8.07	9.58	27.79	16.74	6.08

**Table A93** Changes in ascorbate peroxidase activity of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Ascorbate peroxidase activity (Units·mg <sup>-1</sup> protein)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	2.80a	1.63b	2.57	3.30	3.49a	2.20b	2.61
HW, 300 ppm SC	2.11b	2.38a	2.70	3.87	2.46b	3.03a	2.47
T-test	**	**	ns	ns	**	**	ns
C.V. (%)	20.33	23.88	12.55	18.66	27.27	20.99	11.42

Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

**Table A94** Changes in hydrogen peroxide content of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Hydrogen peroxide content (mg H <sub>2</sub> O <sub>2</sub> 100·g <sup>-1</sup> FW)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	26.17a	23.52b	26.41b	31.29b	26.51b	40.05	35.58a
HW, 300 ppm SC	11.40b	27.53a	38.59a	34.82a	33.80a	40.51	30.94b
T-test	**	**	**	**	**	ns	**
C.V. (%)	43.59	10.07	20.49	9.01	14.49	6.88	10.52

**Table A95** Changes in glutathione reductase activity of fresh-cut broccoli florets treated with tap water (control) and hot water (HW) at 45 °C for 1 min, and then immersed in 300 ppm of SC solution for 1 min. The treated samples were then stored at 4 °C.

Treatments	Glutathione reductase activity (Units·mg <sup>-1</sup> protein)						
	Days of storage life						
	0	2	4	6	8	10	12
Tap water	0.029b	0.036b	0.036	0.026	0.027	0.053b	0.039b
HW, 300 ppm SC	0.040a	0.042a	0.041	0.027	0.027	0.070a	0.053a
T-test	**	**	ns	ns	ns	**	**
C.V. (%)	18.82	11.54	18.68	5.77	5.56	16.39	18.26

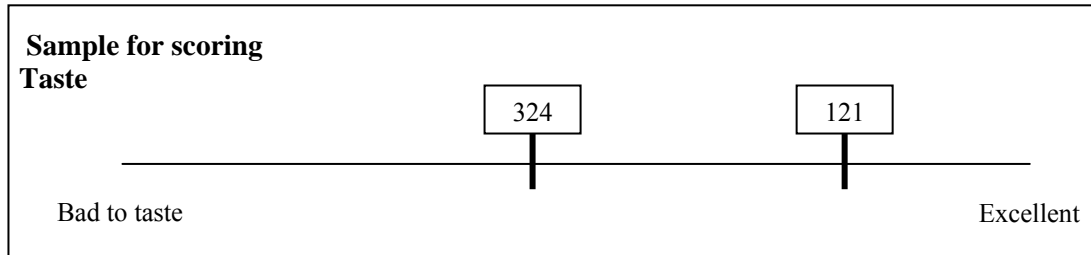
Within a column, mean not followed by the same letter are significantly different.

\* $P \leq 0.05$ , \*\* $P \leq 0.01$ , ns = non-significance

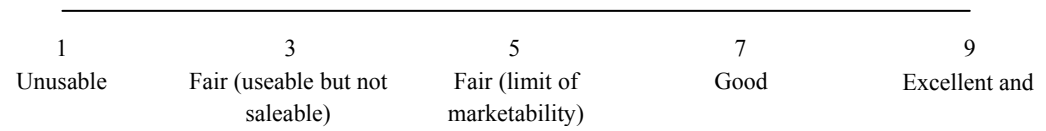
## Sensory evaluation sheet for fresh-cut broccoli florets

Name.....Date.....Time.....

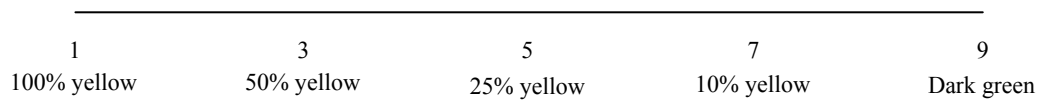
Direction: Please test sample and evaluate of the attribute by place the vertical line | on the horizontal line at the point of the intensity of each attributes.



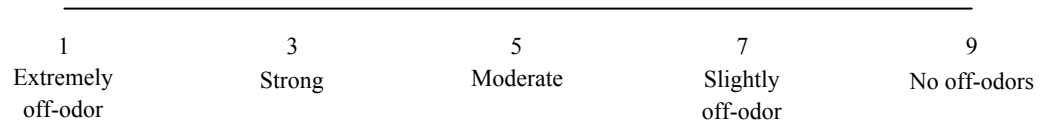
### Overall visual quality



### Visual color



### Odor



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