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Effect of Blanching and KMS Treatments on Drying Parameter of Solar and Tray Dried Organically vs Conventionally Grown Broccoli

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ABSTRACT

This study was carried out to dry organically vs conventionally grown broccoli using sulfuring, blanching and no treatment (control). The treated samples were dried in the mechanical tray drier (at 60ºC) and in solar drier until constant weight was achieved. The drying of broccoli revealed that the samples treated with KMS and dried in mechanical drier took minimum time for drying and were low in moisture content. Blanched samples took more drying time and were high in moisture content. Mechanically dried vegetables took less time for drying and had lower moisture content as compared to solar dried samples. The average ascorbic content of KMS treated samples of organic broccoli was maximum i.e. 35.60 mg/100g and that of control and blanched organic broccoli samples was 31.20 and 30.40 mg/100g, respectively. The dehydrated organic and conventionally grown broccoli varied significantly ($P \leq 0.05$) with each other in terms of rehydration ratio, coefficient of rehydration and bulk density. The finding of the study concluded that dehydration of broccoli can help to minimize their post-harvest losses as broccoli is highly perishable due to high moisture content.

Key Words: Blanching, Broccoli, Dehydrated. Organic, Solar Dried, Tray Dried.

INTRODUCTION

Broccoli (*Brassica oleracea var italica*) belong to the family *Cruciferae* is a native of Italy, but can be successfully grown in our country. Broccoli is a "cool weather crop" and grows best in temperature ranging between 18°C and 23°C. The cluster of the flower, also referred to as a "head", appears in the center of the plant, and is green (Mukherjee and Mishra, 2012). Broccoli is very low in calories. However, it is rich in dietary fibers, minerals, vitamins and anti-oxidants that have proven health benefits. Presence of appreciable amount of beta-carotene makes broccoli a valuable vegetable. Further, low fat and high protein content of broccoli is highly suitable for cardiovascular diseases. Also, broccoli is rich in health promoting phytochemicals, such as glucosinolates, which are a large group of sulphur and nitrogen containing secondary metabolites (Le *et al,* 2020).

Broccoli has a shorter shelf-life (highly perishable) due to high moisture content. If proper post-harvest management not done, can lead to rapid senescence and undesirable quality loss, expressed as surface dehydration, loss of green color and stem firmness, opening of florets, development of undesirable odors, and soft rots (Wang *et al*, 2021). Therefore, new approaches were developed to extend the shelf-life of broccoli in order to control the senescence and quality decay by various means, like modified atmosphere packaging, UV-C treatments heat treatments like hot water and appropriate refrigerated storage. These treatments have been observed to effectively reduce yellowing of stored fresh broccoli while some other scientists used dehydration technique for preservation of broccoli.

Food dehydration refers to the complete removal of water from foods under controlled conditions. During dehydration some important changes take place, as structural and physicochemical modifications that affect the final product quality and also result in lower shipping and container cost. Dehydrated foods have increased shelf life, inexpensive than the fresh ones or canned ones, and also leads to the production of convenience items. Thus, dehydration techniques were used to maintain quality criteria like color, nutritional composition, shape or texture. Therefore, there was need to standardize the techniques for drying of broccoli and to

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Table 1. Effect of treatments, drying sources and time on per cent water loss and dried weight (g) of broccoli.

Attributes/Treatment				Time (hours)							
				0	2	4	6	8	10	12	14
Organic Broccoli	DW	MD	C	1000	620	470	270	126	136	-	-
			K	1000	690	450	240	148	132	-	-
			B	1000	698	454	252	150	138	-	-
	WL	MD	C	0.00	38.00	53.00	73.00	87.40	86.40	-	-
			K	0.00	31.00	55.00	76.00	85.60	86.80	-	-
			B	0.00	30.20	54.60	74.80	85.00	86.20	-	-
Inorganic Broccoli	DW	MD	C	1000	630	472	276	140	124	-	-
			K	1000	710	510	310	148	120	-	-
			B	1000	712	504	310	150	130	-	-
	WL	MD	C	0.00	37.00	52.80	72.40	86.00	87.60	-	-
			K	0.00	29.00	49.00	69.00	85.20	88.00	-	-
			B	0.00	28.00	49.60	69.00	85.00	87.00	-	-
Organic Broccoli	DW	SD	C	1000	840	680	610	476	160	120	116
			K	1000	880	760	640	470	170	176	114
			B	1000	904	808	648	418	220	138	120
	WL	SD	C	0.00	16.00	32.00	39.00	52.40	84.00	88.00	88.40
			K	0.00	12.00	24.00	35.20	53.00	78.00	86.20	88.60
			B	0.00	9.60	19.20	35.20	58.20	78.00	86.20	88.00
Inorganic Broccoli	DW	SD	C	1000	822	700	500	230	190	136	114
			K	1000	856	648	472	252	140	132	110
			B	1000	856	712	568	318	180	138	116
	WL	SD	C	0.00	17.80	30.00	50.00	67.00	82.00	86.40	88.60
			K	0.00	14.40	35.20	52.00	74.80	86.00	86.80	88.60
			B	0.00	14.40	28.80	43.20	68.20	84.00	86.20	88.40

WL=Water Loss (%) ; DW=Dried Weight (g); MD= Mechanical Drier; SD= Solar Drier
C= Control; K= KMS treated; B=Blanched

study the effect of drying techniques on rehydration and chemical characteristics of broccoli.

MATERIALS AND METHODS

Dehydration of Broccoli

For dehydration, broccoli samples grown organically and conventionally were taken and divided into three lots. One lot was subjected to no treatment (Control). The second lot was subjected to sulphuring by dipping in 2 per cent solution of potassium metabisulphite for 5 minutes. The third lot was subjected to water blanching for 1-2 minutes. The treated samples were dried in the mechanical tray drier (at 60ºC) and kept in solar drier until constant weight was achieved. The dried/dehydrated samples were packed in polythene bags for physico-chemical. The physical parameters drying time, drying rate , rehydration characterstics, rhydration ratio, coefficient of rehydration, rehydration percentage, percent yield and bulk density were analysed as per method given in Rangana (2017). The chemical parameters moisture, total soluble solids acidity, ascorbic acid and Sugars were determined by method reported in Ranganna, (2017).

RESULTS AND DISCUSSION

Effect of drying on physical parameter of broccoli

Dried weight and water loss

It was found that irrespective of organic or inorganic broccoli, the sample dried in solar drier took more time i.e. up to 14 hours to attain equilibrium when compared with sample dried in mechanical drier where the time required for attaining equilibrium was only 10 hours (Table 1). The dried weight of mechanically dried control, sulphured and blanched organic broccoli after 10 hours of drying was 136, 132 and 138 g/ kg and the corresponding values for inorganic broccoli samples were 124,120 and 130 g/kg, respectively.

The dried weights of solar dried control, sulphured and blanched organic and inorganic broccoli samples after 14 hours of drying were 116,114, 120 and 114,110 and 116 g /kg, respectively with per cent weight loss of 88.40, 88.60, 88.00 and 88.60, 88.60, 88.40, respectively.

Among the various treatments i.e. control, sulphured and blanched, maximum dried weight was observed in blanched organic and inorganic broccoli samples followed by control and KMS treated samples. As far as the physical appearance of dehydrated samples was concerned, the sample dried in mechanical drier had better appearance than that of samples dried in solar drier (Plate-1). Similar results have been also reported by Kar and Gupta (2003).

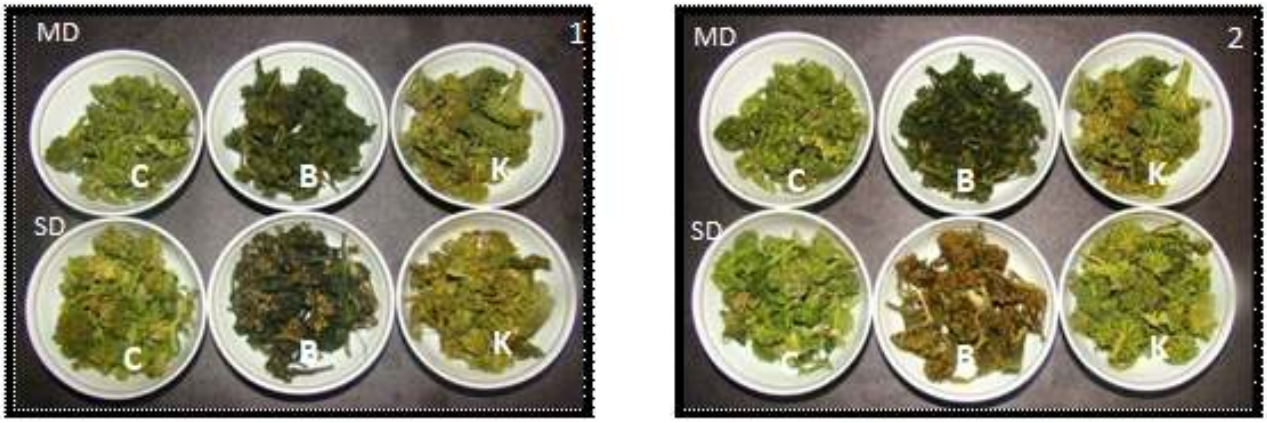

Plate 1 Physical appearance of dehydrated broccoli (1) Organic (2) Inorganic
C-Control, B- Blanched, K- KMS treated

Product yield of Broccoli

Data in (Table 2) represented the per cent product yield of broccoli both organic and inorganic and dried in mechanical and solar driers. To achieve satisfactory drying, blanched organic and inorganic broccoli sample dried in mechanical drier required 10 and 10.10 hours, respectively with equilibrium yield of 13.80 and 12.80 per cent, respectively. The corresponding values for KMS treated and control organic and inorganic broccoli samples were 9.30, 9.10 and 9.35, 9.12 hours, respectively with equilibrium yields of 13.20, 13.60 and 11.40, 11.60 per cent, respectively.

Table 2. Effect of treatments and drying source on product yield (%) of dried broccoli.

Treatment		Organic		Inorganic	
		Product Yield (%)	Time of Drying (h)	Product Yield (%)	Time of Drying (h)
MD	C	13.60	9.10	11.60	9.12
	K	13.20	9.30	11.40	9.35
	B	13.80	10.00	12.00	10.10
SD	C	12.60	13.15	11.40	13.20
	K	12.40	13.45	11.00	13.50
	B	13.60	13.55	11.60	14.00

MD= Mechanical Drier; SD= Solar Drier; C= Control; K= KMS treated; B=Blanched

Further, scrutiny of the data revealed that irrespective of the treatments, the per cent product yield of organic broccoli was more when compared with inorganic broccoli. Similar studies on dehydration of *kachnar* and *lesora* were conducted by Awasthi and Verma (2019) with almost similar results where the per cent yield decreased with decrease in drying time.

Rehydration characteristics of broccoli

The effect of various treatments and drying source on the water absorption characteristics of organic and inorganic broccoli are presented in Figure (1 & 2). Among the various treatments samples treated with KMS showed maximum water absorption. Irrespective of various treatments, the sample dried in mechanical drier exhibited more water absorption in comparison to those dried in solar drier. Among the various sources of broccoli i.e. organic and inorganic, the dehydrated samples of broccoli grown with organic inputs showed slightly better water absorption. The organic broccoli samples dehydrated after giving KMS treatment and dried in mechanical and solar driers exhibited 4.03 and 3.63 ml/g water absorption. The corresponding values for blanched dehydrated samples were 3.53 and 3.45 ml/g on dry weight basis. In case of inorganic broccoli, almost similar trends were observed where KMS treated samples dried in both the drying sources had maximum water absorption and the values were 3.88 and 3.65 ml/g respectively on dry weight basis. Further it was observed that as the time given for water absorption increased, the water absorption also increased. But it decreased in solar dried samples when compared with mechanically dried samples. Similar results have been observed by Kar and Gupta (2003), Awasthi and Verma (2019) and Lal (2004).

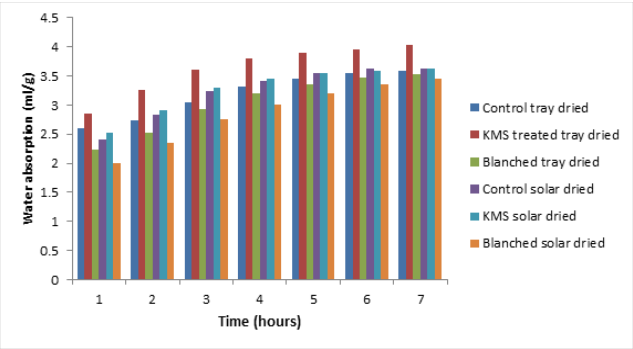

Fig. 1 Effects of treatments and drying source on the water absorption (ml/g) behaviour of dehydrated organic broccoli

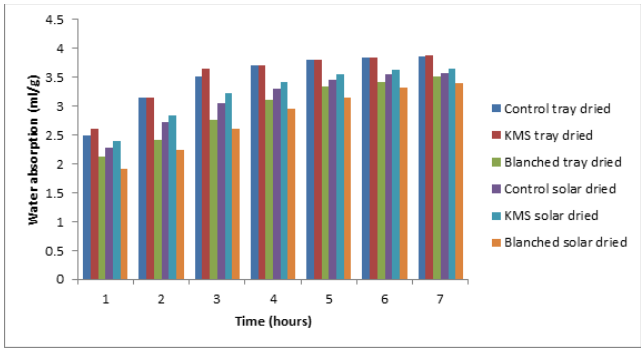

Fig. 2 Effects of treatments and drying source on the water absorption (ml/g) behaviour of dehydrated inorganic broccoli

The data (Table 3) depicted the rehydration characteristics of dehydrated broccoli as affected by treatments and source of drying i.e. mechanical and solar drier. A perusal of data revealed that among the various treatments, KMS treated dehydrated organic broccoli samples exhibited maximum rehydration ratio i.e. 5.20 and 5.10 for mechanically and solar dried samples, respectively. The corresponding values for inorganic broccoli samples were 5.62 and 5.20 for mechanically and solar dried samples, respectively. Irrespective of the treatments and source of drying i.e. solar or mechanical, the average rehydration ratio of organic broccoli was 4.53 and that of inorganic broccoli was 4.71. Further in terms of rehydration ratio, the source of broccoli i.e. organic and inorganic varied significantly ($P \leq 0.05$) with each other. Similarly, among the drying sources and various treatments there was a significant difference among the samples in rehydration ratio.

The coefficient of rehydration was also maximum in KMS treated organic and inorganic broccoli samples. Among the various sources of drying i.e. mechanically or solar dried, KMS treated organic broccoli samples had maximum coefficient of rehydration i.e. 0.76 in samples dried in both solar as well as mechanical drier whereas, the corresponding values for inorganic broccoli were 0.67 and 0.66 in mechanical and solar dried samples, respectively. Among the various treatments, KMS treated samples had maximum coefficient of rehydration followed by blanched and untreated i.e. control samples. Irrespective of the treatments and drying sources, the mean coefficient of rehydration of organically grown samples was higher i.e. 0.65 when compared with conventionally grown samples where the mean

coefficient of rehydration was 0.58. A perusal of the data revealed that the organic and inorganic broccoli samples varied significantly (P≤0.05). Also, there was a significant difference among sources of drying in terms of coefficient of rehydration. Among the various treatment, KMS treated samples varied significantly with blanched and control sample but there was a non significant difference among control and blanched samples.

Table 3.Effect of treatments and drying source on rehydration characteristics of dehydrated broccoli.

Treatment/ drier	Organic			Inorganic			
	Mechanical	Solar	Mean	Mechanical	Solar	Mean	Overall mean
Rehydration ratio							
Control	4.00	4.22	4.11	4.43	4.00	4.22	4.16
KMS	5.20	5.10	5.15	5.62	5.20	5.40	5.28
Blanched	4.23	4.41	4.32	4.63	4.38	4.50	4.41
Mean	4.47	4.58	4.53	4.89	4.52	4.71	4.68
Coefficient of rehydration							
Control	0.57	0.62	0.59	0.53	0.56	0.54	0.57
KMS	0.76	0.76	0.75	0.67	0.66	0.67	0.71
Blanched	0.60	0.63	0.61	0.55	0.57	0.56	0.59
Mean	0.64	0.66	0.65	0.58	0.59	0.58	0.62
Rehydration percentage (%)							
Control	77.63	74.60	76.11	79.62	77.53	78.52	77.31
KMS	82.05	81.34	81.70	80.33	78.52	79.52	80.61
Blanched	78.47	78.77	78.62	80.28	79.27	79.77	79.20
Mean	79.38	78.23	78.81	80.04	78.50	79.28	79.04
Bulk density (kg/m³)							
Control	0.75	0.81	0.78	0.71	0.80	0.76	0.77
KMS	0.77	0.80	0.78	0.82	0.80	0.81	0.79
Blanched	0.73	0.77	0.75	0.84	0.78	0.80	0.77
Mean	0.75	0.79	0.77	0.78	0.79	0.79	0.78

LSD (P≤0.05)	Rehydration ratio	Coefficient of rehydration	Rehydration percentage	Bulk densit
Source (S)	0.08	0.02	0.60	0.01
Drying Source (DS)	0.08	0.02	0.60	0.01
Treatments (T)	0.10	0.02	0.73	0.01

Similar trends were observed in case of rehydration percentage. The KMS treated organic broccoli samples dried in mechanical drier had maximum rehydration of 82.05 per cent followed by in sample blanched (78.47%) and control (77.63%) whereas, the corresponding values for inorganic broccoli samples were 80.33, 80.28 and 79.62 per cent, respectively. The organic broccoli treated with KMS, blanched and untreated i.e. control dried in solar drier also depicted similar trends where the KMS treated samples exhibited maximum rate of rehydration i.e. 81.34 followed by blanched samples i.e. 78.77 and control samples i.e. 74.60 per cent. The rehydration percentage of organically grown broccoli was significantly higher. Irrespective of the sources of broccoli, various treatments also varied significantly where the KMS treated samples had significantly higher rehydration percentage followed by in blanched samples. The source of drying i.e. mechanical and solar also had a significant ($P \leq 0.05$) effect on rehydration percentage of broccoli samples.

Regarding the bulk density, KMS treated organic and inorganic samples dried in mechanical drier had maximum bulk density i.e. 0.77 and 0.82 kg/m^3. The corresponding values for solar dried samples were 0.80 and 0.80 kg/m^3, respectively. Among the various treatments, KMS treated samples varied significantly in terms of bulk density with other treatment i.e. control and blanched but there was a non significant difference among control and blanched treatments in both organic and inorganic broccoli samples. The solar dried samples of broccoli both organic and inorganic had significantly ($P \leq 0.05$) higher bulk density when compared with mechanically dried samples.

Chemical characteristics of dehydrated broccoli

Data pertaining to chemical characteristics of dehydrated broccoli as affected by various treatments and drying source is presented in Table 4. The moisture content of organic broccoli dehydrated after giving blanching treatment was significantly higher ($P \leq 0.05$) in both type broccoli samples whereas, the KMS treated dehydrated samples had significantly lower values for moisture content in same type of broccoli. Among the various broccoli samples the average moisture content of samples of inorganic broccoli was significantly higher i.e. 7.15 per cent when compared with dehydrated organic samples where the moisture was 6.84 per cent. Irrespective of source of broccoli and various treatments, the moisture content of sample dried in solar drier was significantly higher with an average moisture content of 7.25 per cent when compared with samples dried in mechanical drier where the average moisture content recorded was 6.75 per cent. This could be attributed to the reason that the sample dried in tray drier had resulted in complete drying due to continuous and similar temperature to which the samples were exposed. Similar result have been reported by Awasthi and Verma (2019) and Kar and Gupta (2003).

The average TSS content of dehydrated organic broccoli was significantly higher and was 16.17 ^{0} B than the conventionally grown broccoli where the TSS was 16.07 ^{0} B. The average TSS content of KMS treated samples of organically and inorganically grown broccoli were significantly higher i.e. 16.29 and 16.13 ^{0} B, followed by blanched and control samples where the average values for same broccoli samples were 16.17, 16.05 and 16.06, 16.06 ^{0} B, respectively. Irrespective of sources of broccoli and treatments given to broccoli, the sample dried in mechanical drier had slightly more total soluble solids with an average value of 16.14 ^{0} B when compared with those dried in solar drier with 16.11 ^{0} B. It was observed that the difference in TSS due to source of drying was non- significant. The similar results reported by Devi *et al* (2023).

Similarly, the acidity content of KMS treated samples was significantly higher than control and blanched both type broccoli samples. The average values of acidity for KMS treated samples irrespective of source of broccoli and drying source were 0.53 and 0.35 per cent whereas, the values for control and blanched samples were 0.52, 0.29 and 0.44, 0.26 per cent, respectively. Among the samples of broccoli whether grown with organic or inorganic inputs, the acidity content of dehydrated organic broccoli was significantly higher i.e. 0.49 per cent in comparison to inorganic broccoli i.e. 0.30 per cent. Scrutiny of the data revealed that the sample dried in solar drier had less acidity content when compared with samples dried in mechanical drier. It may be due to loss of acidity during prolonged drying of samples in solar drier. The results are in accordance with those reported by Awasthi and Verma (2019).

Table: 4 Effect of treatments and drying source on chemical characteristics of dehydrated broccoli

Treatment	Organic Broccoli			Inorganic Broccoli			Overall mean
	Mechanical	Solar	Mean	Mechanical	Solar	Mean	
Moisture (%)							
Control	6.22	7.35	6.79	7.07	7.14	7.11	6.79
KMS	6.13	712	6.63	6.85	7.06	6.95	6.79
Blanched	6.74	7.46	7.11	7.38	7.37	7.38	7.84
Mean	6.36	7.31	6.84	7.10	7.19	7.15	6.99
TSS (°B)							
Control	16.05	16.07	16.06	16.03	16.07	16.06	16.05
KMS	16.35	16.23	16.29	16.16	16.11	16.13	16.21
Blanched	16.18	16.18	16.17	16.11	16.00	16.05	16.21
Mean	16.19	16.16	16.17	16.09	16.06	16.07	16.13
Acidity (%)							
Control	0.50	0.54	0.52	0.29	0.29	0.29	0.40
KMS	0.54	0.51	0.53	0.35	0.35	0.35	0.44
Blanched	0.48	0.41	0.44	0.26	0.25	0.26	0.35
Mean	0.51	0.49	0.49	0.29	0.30	0.30	0.40

LSD (P≤0.05)	Moisture	TSS	Acidity
Source (S)	0.09	0.04	0.05
Drying Source (DS)	0.09	0.04	0.05
Treatments (T)	0.09	0.04	0.06

Data of Table 5 depicts ascorbic acid, total and reducing sugar content of dehydrated broccoli as affected by source of drying and different treatments given to samples prior to drying. There was a significantly higher retention of ascorbic acid content in KMS treated samples followed by control and blanched samples. The average ascorbic content of KMS treated samples of organic broccoli was 35.60 mg/100g and that of control and blanched organic broccoli samples was 31.20 and 30.40 mg/100g, respectively. Almost similar trends were observed in case inorganic broccoli, where the KMS treated sample had an average ascorbic acid content of 30.40 mg/100g in comparison to control and blanched sample with 21.60 and 21.30 mg/100g ascorbic acid. As is evident from the data there was maximum retention of ascorbic acid in samples dried in mechanical drier with average ascorbic acid content of 34.66 and 26.87 mg/100g in dehydrated organic and inorganic broccoli. The ascorbic acid content of samples dried in solar drier was significantly (P≤0.05) lower with values of 30.13 and 22.00 mg/100g in organic and inorganic broccoli, respectively. The ascorbic acid content of sulphured sample was more than blanched and even control samples and this may be attributed to the retardation of non enzymatic browning by sulphur which destroys

ascorbic acid. Another reason for this could be ascorbic acid loss in blanching due to its heat sensitive nature. There was a significantly higher ascorbic acid content in dehydrated organic broccoli in comparison to inorganic broccoli and the average corresponding values were 32.40 and 24.43 mg/100g, respectively. This could be due the reason that organic broccoli samples initially had higher ascorbic acid content. The results are in conformity with those reported by Awasthi 2007 who also concluded that KMS treatment with mechanical drying is better option for dehydration.

Table 5.Effect of treatments and drying source on ascorbic acid and sugar contents of dehydrated broccoli.

Treatments/Drier	Organic			Inorganic			Overall
	Mechanical	Solar	Mean	Mechanical	Solar	Mean	Mean
Ascorbic acid (mg/100g)							
Control	33.60	28.80	31.20	32.00	20.00	21.60	26.40
KMS	39.20	32.20	35.60	23.20	28.00	30.40	33.00
Blanched	31.20	29.60	30.40	25.40	17.20	21.30	25.90
Mean	34.66	30.13	32.40	26.87	22.00	24.43	28.42
Total sugars (%)							
Control	2.01	1.99	2.00	1.98	1.94	1.96	1.98
KMS	2.05	2.01	2.03	1.95	1.95	1.95	1.99
Blanched	2.00	1.99	1.99	1.96	1.94	1.95	1.97
Mean	2.02	1.99	2.01	1.96	1.94	1.95	1.98
Reducing sugars (%)							
Control	1.91	1.77	1.84	1.83	1.81	1.82	1.83
KMS	1.84	1.75	1.80	1.78	1.67	1.72	1.76
Blanched	1.82	1.81	1.81	1.71	1.54	1.63	1.72
Mean	1.86	1.77	1.82	1.78	1.68	1.72	1.77

LSD (P≤0.05)	Ascorbic acid	Total sugars	Reducing sugars
Source (S)	1.25	0.01	0.02
Drying Source (DS)	1.25	0.01	0.02
Treatments (T)	1.54	0.01	0.02

The total sugar content of blanched samples was significantly minimum in both i.e. organic and inorganic broccoli dried with mechanical and solar driers. The average total sugar content of blanched organic and inorganic broccoli was 1.99 and 1.95 per cent, respectively. The corresponding values for control samples were 2.00 and 1.96 whereas, for KMS treated samples were 2.03 and 1.95 per cent which were significantly higher than any other treatment. Among the two resource of broccoli, the organic broccoli had significantly higher total sugars 2.01 per cent when compared with inorganic broccoli where the

corresponding value was 1.95 per cent. The source of drying also had a significant difference in terms of total sugars. The sample dried in mechanical drier had maximum amount of total sugar with average values of 2.02 and 1.96 per cent in organic and inorganic broccoli in comparison to solar dried sample where the corresponding values were 1.99 and 1.94 per cent, respectively. The data revealed that blanching had minimum amount of total sugar than sulphured samples which may be due leaching of sugar in blanching water thereby causing loss of sugar.

The difference in total sugar of dehydrated sample of organic and inorganic broccoli could be attributed to the initial higher values of total sugar in organic broccoli. Result are in consonance with those reported by Awasthi and Verma (2019) who also found that KMS treated samples had better total sugar retention than blanched ones.

The reducing sugars also exhibited similar trends as total sugars. The organically grown broccoli had significantly higher reducing sugar (1.82%) in comparison to inorganic broccoli (1.72%). Irrespective of drying sources, organic and inorganic dehydrated broccoli samples treated with KMS had better reducing sugar values than blanched. On the contrary, the untreated i.e. control samples had significantly higher reducing sugars. The blanched samples had minimum retention of reducing sugars which may be attributed to the loss of reducing sugar during blanching. Similar results have been reported by Awasthi and Verma (2019).

CONCLUSION

The KMS treated broccoli dried in mechanical drier took minimum time for drying and were low in moisture content. Blanched samples took more drying time and were high in moisture content. The KMS treated broccoli had higher retention of ascorbic acid content followed by control and blanched samples. The average ascorbic content of KMS treated samples of organic broccoli was maximum i.e. 35.60 mg/100g and that of control and blanched organic broccoli samples was 31.20 and 30.40 mg/100g, respectively. The dehydrated organic and conventionally grown broccoli varied significantly ($P \leq 0.05$) with each other in terms of rehydration ratio, coefficient of rehydration and bulk density. Dehydration of broccoli can help to minimize their post-harvest losses as this vegetable is highly perishable due to high moisture content.

REFERENCES

Awasthi M and Verma R (2019). Exploration of bauhinia variegata (kachnar) and cordia dichotoma (lesora) for their mineral content. *Asian J Dairy Food Res* **38**: 265-266.

Brennan P S and Shewfelt R L. 2007. Effect of cooling delay at harvest on broccoli quality during postharvest storage. *J Food Qual* **12**: 13-22.

Devi Y P, Lembisana R K, Rajkumari S and Devi Y J (2023). Effect of Different Dehydration Methods on Organoleptic Attributes and Quality of Pineapple Candy. *J Krishi Vigyan* **11**(2): 61-64.

Kar A and Gupta D K (2003). Air drying of osmosed button mushrooms. *J Food Sci Technol* **40:** 23-27.

Lal G, Meena M L and Dhaka R S (2004). Shelf life and physiochemical composition of dehydrated slices of *Kachari* (*Cucumis callosus*) as affected by different treatments. *J Food Sci Technol* **41**: 661-665.

Le T N, Chiu C H and Hsieh P C (2020). Bioactive compounds and bioactivities of *Brassica oleracea* L. var. *Italica* Sprouts and microgreens: an updated overview from a nutraceutical perspective. *Plants* **9**: 946.

Lemoine M L, Civello M, Martinez G and Chaves A (2007). Influence of a postharvest UV-C treatment on refrigerated storage of minimally processed broccoli. *J Sci Food Agric* **87**: 1132-39.

Mukherjee V and Mishra P K (2012). Broccoli-An underexploited neutraceutical. *Sci Res Report* **2**: 291-294.

Wang J, Mao S, Yuan Y, Zhang N, Wu Q, Liang M, Wang S, Huang K and Wu Q (2021). Effect of storage conditions and cooking methods on chlorophyll, glucosinolate, and sulforaphane content in broccoli florets. *Horticulturae* **7**: 519.

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