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Effect of pre-treatments on dehydrated Kasuri methi (*Trigonella corniculata* L.)

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Abstract
Kasuri methi (*Trigonella corniculata* L.) is a popular leafy vegetable use as a spices in India. Kasuri methi is mainly grown for green herbage as well as dried herb. To achieve the target of feeding the increasing population as well as meeting the requirements of the raw material for processing industry and export trade, only increase in area and productivity of crops are not enough. Much attention needs to be given on post-harvest management and value addition of these perishable vegetable crops. Keeping this in view, present investigation entitled "Effect of Pre-Treatments on Dehydrated Kasuri Methi (*Trigonella corniculata* L.)" was carried out during the year 2016-17 at Post Harvest Technology Laboratory, College of Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola with the objectives to study the effect of different pre-treatments on physiochemical properties of dehydrated kasuri methi and to find out the suitable pre-treatment for better quality of dehydrated kasuri methi.
The observations in respect to physical and chemical evaluation were recorded periodically at 30 days of intervals from 1st day of storage upto 180 days of storage period of dried kasuri methi. At the end of storage period, pre-treatment i.e. T9 Blanching in water + Stepping in 0.15% NaHCO3+0.15% MgO for 2 minutes were recorded significantly minimum dehydration ratio and moisture content, while significantly maximum rehydration ratio, ascorbic acid, chlorophyll, protein and oleoresin content.

Keywords: Kasuri methi, pre-treatments, blanching, dehydration

Introduction
Kasuri methi (*Trigonella corniculata* L.) is a popular leafy vegetable use as a spice in India. Kasuri methi (*Trigonella corniculata* L.) is herbaceous, bushy, slow growing remains in a rosette conditions during most of its vegetative growth period, which produces bright orange to yellow flowers. It produces sickle shaped pods smaller than the common methi. (Som and Maiti, 1986) [12]. Kasuri methi mainly grown for green herbage as well as dried herb. Dried leaves are used as a spice to add aroma and flavour to the food products.
Green leafy vegetables are extensively used in various cooked and processed form. Green leafy vegetables are gaining importance, mainly because of being good source of vitamins, minerals and dietary. The fenugreek green leaves supply 35 k calories and contain moisture 86.1%, protein 4.4%, fat 0.9%, fibre 1.1%, other carbohydrate 6.0% and ash 1.5%. in addition, the fenugreek leaves are rich in vitamins and contains carotene content 2.34 mg, thiamine 0.04mg, riboflavin 0.31mg, nicotinic acid 0.8mg and vitamin C 52.0mg/100g edible portion. (Duke, 2003) [2].
Pre-treatments are the necessary pre-requisites for successful dehydration process, to minimize drying losses various pretreatment are used. Pre-treatments check the undesirable physico-chemical and other qualitative changes that may occur during drying process and subsequent storage and to extend keeping quality of dried products. Blanching is one of the pre-treatment given to minimize the microbial load and deactivate the enzymatic activity to prevent the browning reaction, also reduced the greenness degradation of the product.

Materials and Methods
The present study was conducted in Post-Harvest Technology Laboratory, College of Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the 2016-2017. The experiment was laid out in nine Pre-treatments *viz*, T_1- Blanching in water for 2 minutes (Control), T_2- Blanching in water + stepping in 0.10% $NaHCO_3$ for 2 minutes, T_3- Blanching in water + stepping in 0.15% $NaHCO_3$ for 2 minutes, T_4- Blanching in water + stepping in

0.10% MgO for 2 minutes, T_5- Blanching in water + stepping in 0.15% MgO for 2 minutes, T_6- Blanching in water + stepping in 0.10% $NaHCO_3$ + 0.10% MgO for 2 minutes, T_7- T_7- Blanching in water + stepping in 0.10% $NaHCO_3$ + 0.15% MgO for 2 minutes, T_8- Blanching in water + stepping in 0.15% $NaHCO_3$ + 0.10% MgO for 2 minutes and T_9- Blanching in water + stepping in 0.15% $NaHCO_3$ + 0.15% MgO for 2 minutes with three replications

Healthy, fresh matured, diseased free kasuri methi leaves obtained from Chilli and Vegetable Research Unit, Dr. PDKV Akola. The leaves were washed in clean tap water to remove the contamination like dirt, mud etc. Then destalking was done with the help of sharp a stainless steel knife. After that water was removed by putting them on blotting paper. The kasuri methi leaves (1000 g / treatment / replication) were subjected as per different treatments. Blanching was carried out in boiling water for 2 minute.

The steeping solution of $NaHCO_3$ (0.10%), NaHCO3 (0.15%), MgO (0.10%), MgO (0.15%),$NaHCo_3$ (0.10%)+MgO(0.10%), $NaHCO_3$ (0.10%) MgO (0.15%), $NaHCO_3$ (0.15%) + MgO (0.10%) and $NaHCO_3$ (0.15%) + MgO (0.15%) were prepared in water as per the treatments. The pieces of 3 to 5 cm length were made without causing any bruising to tender leaves of kasuri methi were dipped in the solutions for the 2 minutes. At the end of treatment period, the kasuri methi leaves were taken out and drained (Tandon and Virmani, 1980) [13].

During the storage observations of the dried sample were recorded for its change in chemical properties at every 30 days interval up to 180 days. The physical and chemical parameters like dehydration ratio, rehydration ratio, moisture, chlorophyll, ascorbic acid and oleoresin from dried kasuri methi leaves were determined according to methods of Ranganna (1979) [9].

Experimental findings

Effect of pre-treatments on dehydration ratio

The data presented in table 1 regarding effect of pre-treatments on dehydration ratio revealed, significant differences among the different pre-treatments. Significantly lowest (6.14) dehydration ratio was observed in pre-treatment T_9, which was followed by pre- treatment T_7 (7.23), whereas pre-treatment T_7 was at par with rest of other pre- treatments. However, significantly highest (8.47) dehydration ratio were recorded in pre-treatment T_1 i.e. control.

Effect of pre-treatments on rehydration ratio

At the 1st day of storage, the data regarding effect of pre-treatments on rehydration ratio was recorded non-significant differences

When the observations taken at 180th day of storage, the pre-treatment T_9 recorded significantly maximum (4.84) rehydration ratio, which was followed by pre-treatment T_8 (4.41) and was at par with the T_7, T_5, T_6, T_4 and T_3 pre-treatments. While, significantly minimum (3.50) rehydration ratio was found in pre-treatment T_1 i.e. control.

During the storage of dried kasuri methi leaves on 180th days of storage, rehydration ratio was recorded in slightly increasing trend due to change in humidity and temperature and therefore moisture content was slightly decreased. The progressive decrease in rehydration ratio was notified in all the dried samples. It might be possibly due to hygroscopic nature of the dried kasuri methi leaves, which absorbed the moisture during storage. Similar results were also reported by Shams-Ud-Din and Shirazi (2008) [10] and Gupta *et al* (2008) [3] in green leafy vegetables.

Higher rehydration ratio indicates higher capacity of dried sample to re absorb water. The re absorption capacity related to the tissue integrity and structure, i.e. lower the disturbances in the tissue structure of the vegetable during drying period; higher will be the capacity of dried tissue to re absorb moisture during rehydration.

Similar results of increased rehydration ratio in the bitter gourd slices blanched in brine solution were reported by Manimegalai *et al*. (1998) [7] in bitter gourd and Hiremath *et al*. (2009) [4] and Kalaskar *et al*. (2012) [6] in dried fenugreek.

Effect of pre-treatments on moisture content

The effect of different pre-treatments on moisture content of dried kasuri methi leaves was recorded and found increasing in trend throughout the storage period.

At the 1st day of storage, data was recorded non-significant differences. However, the pre-treatment T_9 recorded minimum (5.83%) moisture content and maximum (7.08%) moisture was recorded in T_1 pre-treatment.

At 180th day of storage, pre-treatment T_9 recorded significantly minimum (8.19%) moisture content which was followed by pre-treatment T_2 (9.03%) and pre-treatment T_2 was statistically at par with pre-treatments T_7, T_3, T_8 and T_6. However, maximum (10.45%) moisture content in dried kasuri methi leaves was recorded in pre-treatment T_1 i.e. control.

It was observed from the data that moisture content in dried kasuri methi leaves increased with advancement of storage period. The increasing trend might be due to gain of moisture by the dried leaves from the atmosphere. The gain of moisture was highest in control as compared to pre-treatment of blanching in 0.15% $NaHCO_3$+0.15% MgO cabinet drying. The progressive increase in moisture content was notified in all the samples dried by cabinet and sun drying method. It might be possibly due to hygroscopic nature of the leaves, which absorbed the moisture during storage.

Similar kinds of observations were also recorded by Kalaskar *et al.* (2012) [6] in dried fenugreek leaves, Siva Kumar (1991) [11], Jadhav *et al.* (2009) [5] and Mudgal *et al.* (2009) [8].

Effect of pre-treatments on ascorbic acid content

A critical appraisal of the data showed that there were significant different among the pre-treatments except first day of storage. On the 1st day of storage data was noted non-significant. However, pre-treatment T_9 recorded maximum (27.22 mg/100g) ascorbic acid, whereas the minimum (24.50 mg/100g) was recorded in pre-treatment T_1 i.e. control.

On the 180th day of storage pretreatment T_9 recorded significantly maximum (25.57 mg/100g) ascorbic acid content, which was followed by pre-treatment T_4 (24.82 mg/100g) and pre-treatment T_4 were at par with pre-treatment T_8, T_6, and T_3 (24.54 mg/100g, 24.43 mg/100g, 24.38 mg/100g respectively.), whereas significantly minimum (22.19 mg/100g) ascorbic acid content was recorded with the pre-treatment control i.e. T_1.

Some of antioxidants are reducing agents and essential equipment for higher retention of ascorbic acid during dehydration and subsequent storage and thereby help to extent the keeping quality of dried product. The decreased trend of ascorbic acid was found mostly due to its oxidation and as substrate in non-enzymatic browning during the storage, period and also ascorbic acid is very sensitive to heat. It might

be lost due to application of heat during drying.
But in water blanching there was less retention because ascorbic acid is water soluble and oxidation takes place during blanching. The maximum loss of ascorbic acid content observed in control samples. These results are in good agreement with the results reported by Manimegalai *et al.* (1998) [7] and Viresh Hiremath *et al.* (2009) [4] in bitter gourd, Gupta *et al.* (2008) [3] in leafy vegetables and Kalaskar *et al.* (2012) [6] in dried fenugreek leaves.

Effect of pre-treatments on chlorophyll content
The data pertaining to the chlorophyll content of dehydrated kasuri methi leaves presented in table 2 as influenced by different pre-treatments was found significant among them except first day of storage.
The data related to chlorophyll content was found non-significant on 1st day of storage, the maximum (3.80 mg/100mg) chlorophyll content was noticed in pr-treatment T_9, while minimum (3.38 mg/100mg) was recorded in pre-treatment T_1.
On 180th day of storage, chlorophyll content was found significantly maximum (3.28 mg/100 mg) in pre-treatment T_9, which was followed by pre-treatment T_8 (3.10 mg/100 mg) and was at par with pre-treatment T_4 (3.08 mg/100 mg), while significantly minimum (2.69 mg/100 mg) chlorophyll content was observed in pre-treatment T_1 i.e. control.
Total chlorophyll is the main chemical component responsible for the green colour of the vegetables; it was determined in the dehydrated kasuri methi leaves at different stages of storage. In the present study, total chlorophyll content was significantly affected not only by the pre-treatments and drying methods, but also by the storage periods. The pre-treatments have showed distinct effect on the retention of chlorophyll content while pre-treatment helped to maintain higher chlorophyll level than control, Similar results in conformity to these findings were also reported by Bajaj, *et al.* (1993) [1] in case of dehydration of fenugreek leaves.

Effect of pre-treatments on protein content
The effect of different pre-treatments on protein content of dried kasuri methi leaves were found non-significant during 1st day of storage upto 180th day of storage.

Effect of pre-treatments on oleoresin content
During the 1st day of storage of kasuri methi leaves upto the 180th day of storage, the data regarding oleoresin content was found non-significant due to different pre-treatments on dried kasuri methi leaves.

Table 1: Effect of pre-treatments on dehydration and rehydration ratio of kasuri methi

Treatments	Dehydration ratio	Rehydration ratio	
		Storage days	
		1st day	180th day
T_1	8.47	3.61	3.50
T_2	7.41	4.01	3.93
T_3	7.41	4.19	4.13
T_4	7.39	4.20	4.14
T_5	7.50	4.38	4.30
T_6	7.34	4.32	4.24
T_7	7.23	4.47	4.31
T_8	7.48	4.51	4.41
T_9	6.14	4.90	4.84
F' test	Sig.	NS	Sig.
SE (m)±	0.200	0.241	0.043
CD at 5%	0.591	-	0.124

Table 2: Effect of pre-treatments on Physio-chemical properties of kasuri methi

Treatment	Physio-chemical parameters									
	Moisture (%)		Ascorbic acid (mg/100g)		Chlorophyll (mg/100mg)		Oleoresin (%)		Protein (%)	
	1st day	180th day	1st day	180th day	1st day	180th day	1st day	180th day	1st day	180th day
T_1	7.08	10.45	24.50	22.19	3.38	2.69	21.99	21.84	12.04	11.96
T_2	6.08	9.03	25.01	22.94	3.50	2.90	23.07	22.94	12.00	11.92
T_3	6.00	9.06	26.07	24.38	3.52	2.93	23.48	23.36	11.83	11.75
T_4	6.89	10.04	26.95	24.82	3.67	3.08	23.63	23.51	11.78	11.70
T_5	6.71	9.77	25.30	23.50	3.49	2.91	23.29	23.17	12.41	12.33
T_6	6.83	9.39	26.13	24.43	3.55	2.98	23.23	23.11	12.18	12.10
T_7	6.44	9.05	25.19	23.40	3.60	3.02	23.16	23.04	12.22	12.14
T_8	6.88	9.26	26.94	24.54	3.67	3.10	23.29	23.18	12.29	12.21
T_9	5.83	8.19	27.22	25.57	3.80	3.28	23.95	23.84	12.34	12.26
F' test	NS	Sig.	NS	Sig.	NS	Sig.	NS	NS	NS	NS
SE (m)±	0.865	0.070	0.867	0.040	0.099	0.010	0.420	0.420	0.330	0.330
CD at 5%	-	0.200	-	0.120	-	0.029	-	-	-	-

Conclusions
On the basis of findings reported in the present investigation it can be concluded that pre-treatments played an important role in the quality of dehydrated kasuri methi leaves.
At the end of storage period, pre-treatment i.e. T_9 Blanching in water + Stepping in 0.15% $NaHCO_3$+0.15% MgO for 2 minutes were recorded significantly minimum dehydration ratio and moisture content, while significantly maximum rehydration ratio, ascorbic acid, chlorophyll, protein and oleoresin content.
During storage, the physio-chemical parameters like moisture, showed the increasing trend while, rehydration ratio, ascorbic acid, chlorophyll, protein and oleoresin content was shown the decreasing trend with the advancement of storage period.

References

1. Bajaj MP, Aggarwal KS, Minhas, Sidhu JS. Effect of blanching treatment on quality characteristics of dehydrated fenugreek leaves. Fd. Sci. Technol 1993;30(3):196-198.
2. Duke JA. Handbook of legumes of world economics importance. Scientific Publisher (India), Jodhpur 2003, 268-271.
3. Gupta, Sheetal Lakshmi, Jothi Prakash. Effect of different blanching treatments on ascorbic acid retention in green leafy vegetables. Indian J. Natural Products and Resources 2008;7(2):111-126.
4. Hiremath Viresh PG, Harshavardhan SJ, Prashanth, Rashanth SJ. Effect of Pretreatments and drying methods

on quality of dehydrated bitter gourd *(Momordica charantia* L.) Slices. Asian J. Hort 2009;4(2):351-354.
5. Jadhav, Deepak PP, Satur, Thorat BN. Solar cabinet drying of bitter gourd: optimization of pre-treatment and quality evaluation. Inter. J Fd. Engineering 2009;6(4):5-7.
6. Kalaskar AB, Sonkamble AM, Patil PS. studies on drying and dehydration of fenugreek leaves. Inter. J Processing and post harvest technology 2012;31(1):15-17.
7. Manimegalai G, Ramah S. Effect of pre-treatments on the quality characteristics of dehydrated bitter gourd rings. Indian Fd. Packer. 1998;52(2):7-14.
8. Mudgal VD, Vishakha K, Panday. Thin layer drying kinetics of bitter gourd (*Momordica charantia* L). J Fd. Sci. and Technol 2009;46(3):236-239.
9. Ranganna S., Mannual of analysis of fruit and vegetable products Mc-Graw Hill publication 1979.
10. Shams-Ud-Din, Shirazi SM. Studies on the rehydration properties of dried bitter gourd. Bangladesh J Agril. Sci. 2008;27(2):257-263.
11. Siva Kumar S, Kalra R, Nirakar Nath. Dehydration of bittergourd (*Momordica charantia)* rings. J Fd. Sci. Technol 1991;28(1):52-53.
12. Som MG, Maiti TK. "Fenugreek". In: Bose, T.K and Som, M.G. (eds.), Vegetable crops in India. Naya prakash, Culcutta 1986
13. Tandon GL, Virmani RS. Determination of blanching time of vegetables. The Indian J Hort 1980;6(2):11-21.