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EFFECT OF DIFFERENT BLANCHING METHODS ON PHYSICAL AND COLOUR CHARACTERISTICS OF *MORINGA OLEIFERA* L. DRY LEAF POWDER

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Abstract: The experiment entitled "Effect of different blanching methods on physical and colour characteristics of *Moringa oleifera* L. dry leaf powder" was carried out at the Department of Postharvest Technology, ACHF, NAU, Navsari, Gujarat. There were three treatments *viz.* T_1 – Microwave blanching, T_2 – Hot water blanching and T_3 – No blanching. After blanching tray drying (60°C for 10 hrs) was done to prepare dry powder of *M. oleifera* leaf. Different blanching methods had different effects on various aspects of *M. oleifera* dry leaf powder. Recovery (13.8%), Overall shrinkage (23 %) and Ash content (10.51%) were found highest while moisture content (8.39%) found lowest under T_1. Rehydration ratio (4.79) was found highest under T_2. Colour properties*i.e.* L, a and b value of colour were found highest under T_1.

Keywords: *Moringa*, microwave blanching, hot water blanching and tray drying.

I. INTRODUCTION

*Moringa oleifera*L. is the most widely cultivated species of Moringaceae family. It is native to the sub-Himalayan tracts of India, Pakistan, Bangladesh and Afghanistan. *Moringa oleifera* L. known as *Moringa* is native to north India but is now found throughout the tropics. This rapidly-growing tree is also known as the horseradish tree, drumstick tree, benzolive tree, kelor, marango, mlonge, moonga, mulangay, saijhan, sajna or ben oil tree. It was utilized by the ancient Romans, Greeks and Egyptians; it is now widely cultivated and has become naturalized in many locations in the tropics. *M. oleifera*leaves are more competent in nutritional values. *Moringa* leaves contain fiber, fat proteins and minerals like Ca, Mg, P, K, Cu, Fe, and S. Vitamins like vitamin-A (Beta-carotene), vitamin B-choline, vitamin B1-thiamine, riboflavin, nicotinic acid and ascorbic acid are present. *Moringa* leaves have been reported to contain more vitamin A than carrots, more vitamin C than oranges, more calcium than milk, more iron than spinach, more potassium than bananas. Its vitamin C content is seven times more than oranges, it has thirteen times more vitamin than spinach and when it comes to amino acid 2,000 times more than green tea and 242 times more than apples.*Moringa* leaves treat asthma, hyperglycaemia, dyslipidaemia, flu, heart burn, syphilis, malaria, pneumonia, diarrhoea, headaches, scurvy, skin diseases, bronchitis, eye and ear infections. Also reduces, blood pressure and cholesterol and acts as an anticancer, antimicrobial, antioxidant, antidiabetic, anti-atherosclerotic agents and neuroprotectant [4].Leafy vegetables are sometimes processed by blanching which is an important pre-processing heat –treatment of vegetable destined for dehydration. After blanching, vegetables are quickly chilled by spraying with cold water. Blanching which is an important pre-processing heat –treatment of vegetable destined for dehydration inevitably causes separation and losses of water soluble nutrients (minerals, water soluble vitamins and sugars). Blanching is a unit operation prior to drying *Moringa oleifera* L. are heated for the purpose of inactivating enzymes; modifying texture;

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preserving colour, flavour, and nutritional value; and removing trapped air. Hot water and steam are the most commonly used heating media for blanching in industry. The different methods of blanching could have an effect on the various properties of *Moringa* leaves and the overall acceptability by consumers [8].Blanching consist of mild heat treatment of the vegetables in different heating system (steam, hot water and microwave) to varying time periods. It is influenced by various factors such as balancing media, temperature, time, physical and physiological characteristic of vegetables, average size of the pieces and uniformity of heat distribution and penetration. These factors are highly specific for different leafy vegetables as the surface area exposed per unit mass varies from one to another. Blanching at 88°C stops all life process, inactivates enzymes, fixes green colour and removes certain harsh flavours common in vegetables. Blanching in hot water or steam is commonly carried out to a wide range of fruitsand vegetables allowing stabilization and commercialization of product [6].The objective of this experimentis to study the effects of different blanching methods (T_1 – Microwave blanching, T_2 – Hot water blanching and T_3 – No blanching) on various properties of *M. oleifera*leaf powder *i.e.* moisture content, ash content, rehydration rate, recovery % as well as L, a and b value of colour.

II. MATERIALS AND METHODS

A. Source of M. oleiferaleaves

*M. oleifera*leaves were collected from farmer's field located near Navsari. Branches with healthy green leaves were selected. Washing of leaves were done with tap water then separation of healthy leaves was done. Sorting was done by removing pale coloured and misshaped leaves.

B. *Blanching*

Two blanching treatment were selected namely hot water blanching and microwave blanching which compared with non-blanched leaves.

In hot water blanching, 1.5 kg leaves were kept under 100℃ water for 5 seconds in even batches of 250 g then immediately cooled with tap water and spread over cloth for removal of excess water. While in microwave blanching, 1.5 kg leaves were kept under microwave oven at 950 watts for 30 seconds in even batches of 250 g and then spread over surface for removal of heat.

C. Drying

All leaves i.e. hot water blanched, microwave blanched and non-blanched were evenly spread in trays and kept under tray dryer at 60℃ for 10 hours.

D. Preparation of powder

After drying of leaves, dried leaves were grind by using electric grinder. For separation of impurities and course particles sieving was done which provide fine textured final product. After sieving, M. oleifera leaf dry powder was packed in polyethylene sealed bags.

E. *Recovery (%)*

Recovery percentage was calculated by below given formula.

$$\text{Recovery (\%)} = \frac{\text{weight of fresh samples}}{\text{weight of dried product}} \text{ X } 100$$

F. Overall shrinkage (%)

Overall shrinkage was calculated by below given formula.

$$\text{Overall shrinkage (\%)} = \frac{\text{weight of fresh prepared material}}{\text{weight of dried product}} \text{ X } 100$$

G. Moisture content (%)

Moisture content wasmeasured with the help of moisture analyser (Mettler Toledo make moisture analyser, Model HB43-S Halogen). 2 g of sample from each treatment was placed under instrument for certain period of time which eventually gave result.

H. Ash content (%)

5 g sample of each treatment was placed under Muffle furnace at 650℃ temperature for 4 hours, then final weight was recorded. Ash content was calculated by below given formula.

$$\text{Ash content (\%)} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Final weight}} \text{ X } 100$$

I. Rehydration ratio

Dry powder was soaked in water in 1:20 ratio. Here we took 3 gm dry powder from each treatment and soaked in 60 ml of water for 20 minutes. After that straining of excess water was done with help of muslin

cloth or filter paper and final weight of moisturised powder was recorded. Rehydration ratio was calculated by below given formula.

$$\text{Rehydration ratio} = \frac{\text{Initial weight}}{\text{Final weight}}$$

J. Colour (L a b Value)

L, a and b value of colour were recorded with help of tintometer. L value indicates light, a value indicates hue while b value indicates chrome.

III. RESULTS AND DISCUSSION

All the important attributes like recovery, overall shrinkage, moisture content, ash content and rehydration ratio were show variation under different blanching methods. Table 1 indicate that recovery, overall shrinkage and ash content were highest under microwave blanching while moisture content was lowest under the same treatment and rehydration ratiowere found highest under hot water blanching in compare to non-blanched and microwave blanched leaves. The maximum recovery (13.80 %) was observed in leaves blanched by microwave. It mightbe due to no use of water for blanching hence, no leaching of soluble solids in water. Overall shrinkage (23 %) was highest under microwave blanching. This may be due to the fact that drying at higher temperature increases the contractile stress in the cellular structure that cause shrinkage in the tissues [7].The minimum moisture content (6.78%) was observed under microwave blanching. The moisture content of the sample decreased with increase in power level for a particular thickness. This may be due to the moisture evaporation due to volumetric heating by the microwaves [1].The highest ash content (10.51%) was found in microwave blanched leaves. This could be attributed to the reduction in moisture contents during blanching by microwave that resulted in corresponding increases in dry matter contents due to concentration of soluble solids [3]. Under hot water blanching the highest rehydration ratio (4.54) was recorded. Blanched samples have higher rehydration ratios compared to the unblanched sample. This might be due to the thermal destruction of cells during drying process [2].

Table 1: Effect of different blanching methods on various attributes of *Moringa* dry leaf powder

Treatment	Recovery (%)	Overall shrinkage (%)	Moisture content (%)	Ash content (%)	Rehydration rate (%)
T_1 – Microwave blanching	13.8	23.00	6.78	10.51	4.54
T_2 – Hot water blanching	11	18.33	8.39	9.31	4.79
T_3 – No blanching	9.8	16.33	7.57	9.09	4.70

Different blanching methods also affect L, a and b value of colour of Moringa dry leaf powder. According to Fig. 1 and Fig. 2.The highest value for L (53.11) and b (31.80) of colour were found in microwave blanched leaves. L value represents the lightness of powder while, b value represents the greenness of powder. Whereas a value (-7.34) which represents yellowness was found minimum in microwave blanched leaves powder. Retention of better food colour after thermal processing may be used to predict the extent of quality deterioration of food resulting from exposure to heat [5]. Studies have shown that at higher temperatures, a greater increase in greenness could be observed, followed by a rapid loss at longer treatment times. This phenomenon was less pronounced at lower treatment temperatures [9].

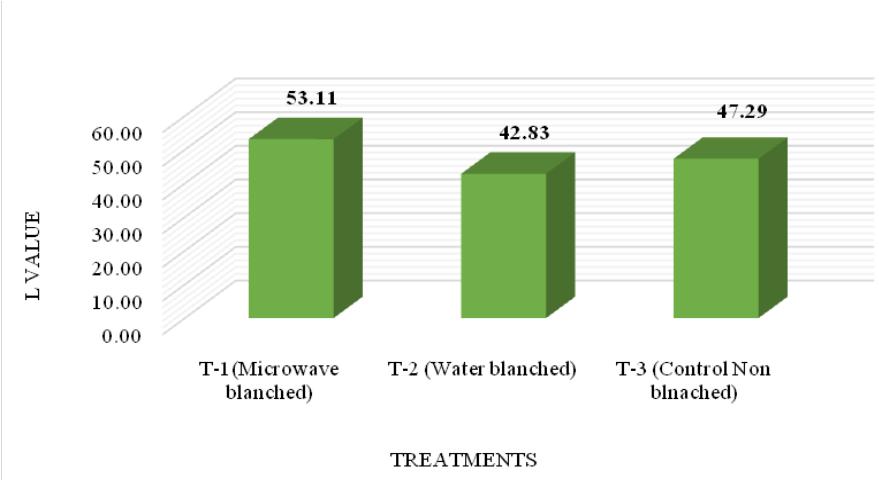

Fig. 1: Effect of different blanching methods on L value of colour of Moringa dry leaf powder

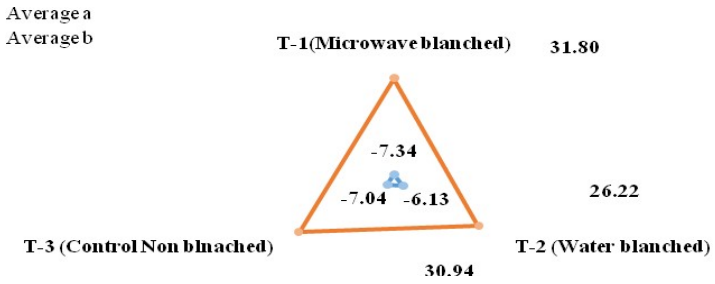

Fig. 2: Effect of different blanching methods on a and b value of colour of Moringa dry leaf powder

IV. CONCLUSION

On the basis of present experiment under Microwave blanching (T1), Recovery (13.8%), Overall shrinkage (23 %) and Ash content (10.51%) were found highest, While Moisture content (8.39%) was lowest as well as Colour properties i.e. L, and b value of colour were found highest while a value found lowest under T1. So microwave blanching method can be beneficial for Moringa oleifera L. dry leaf powder production.

REFERENCES

[1] Behera, Gitanjali; Rayaguru, Kalpana and Nayak, P. (2017). Effect of Microwave Blanchingon Slice Thickness and Quality Analysis of Star Fruit. Curr. Res. Nutr. Food Sci. J., **5**(3): 274-281.

[2] Galoburda, R.; Kuka, M.; Cakste, I. and Klava, D. (2015). The effect of blanching temperatureon the quality of microwave-vacuum dried mushroom Cantharellus cibarius. Agronomy Res., **13**(4): 929–938.

[3] Kshirsagar, R.B.; Sawate, A.R.; Sadawate, S.K.; Patil, B.M. and Zaker, M.A. (2017). Effect of blanching and drying treatment on the proximate composition of Moringa oleiferaleaves. Int. J. Agric. Engg.,**10**(1): 10-15.

[4] Kumara, D. S.; Doriyaa, Kruthi and Gopalakrishnanb, Lakshmipriya (2016). Moringa oleifera:A review on nutritive importance and its medicinal application. Food Sci. and Human Wellness,**5**: 49–56.

[5] Mayani, J. M.; Patel, G. D.; Modi, Shivani; Bhatt, Zalak K.; Raghvendra, H. R. and Patel, M. B. (2018). Effect of different packaging material on dehydrated fenugreek (Trigonellafoenum graecum L.) leaves. Int. J. Chem. Studies, **6**(5): 233-235.

[6] Patel, P. B.; Patel, P. V.; Joshi, S. B.; Pandya, D.D.; Chaudhary, M. K.; Patel, B. G. and Joshi, A. B. (2016). Effect of different blanching treatments on ascorbic acid retention ingreen leafy vegetables. Int. J. of Agric. Sci.,**8**(51): 2353-2355.

[7] Srimagal, A.; Mishra, S. and Pradhan, R. C. (2017). Effects of ethyl oleate and microwaveblanching on drying kinetics of bitter gourd. J. Food Sci. Tech.,**54**(5): 1192–1198.

[8] Titi, M. K.; Harijono; Teti, E. and Endang, S. (2012). Nutrient Content of Kelor (MoringaOleifera Lamk) Leaves Powder under Different Blanching Methods. Food and Public Health,**2**(6): 296-300.

[9] Trivedi, Aayushi; Saraswat, Surbhi and Yadav, Priya (2018). Effect of blanching on greenvegetables. URRJ-JVWU,**1**(2): 218 – 225.