The Pharma Innovation Journal 2023; 12(5): 1779-1781

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 1779-1781

www.thepharmajournal.com
Received: 21-02-2023
Accepted: 29-04-2023

Jagbir Rehal
Department of Food Science and Technology, Punjab Agricultural University, Ludhiana, Punjab, India

Mansi Sharma
College of Horticulture and Forestry, Punjab Agricultural University, Ludhiana, Punjab, India

Ripandeep Kaur
College of Horticulture and Forestry, Punjab Agricultural University, Ludhiana, Punjab, India

Corresponding Author:
Jagbir Rehal
Department of Food Science and Technology, Punjab Agricultural University, Ludhiana, Punjab, India

Development of spice mix enriched with tomato pomace powder and its acceptability studies

Jagbir Rehal, Mansi Sharma and Ripandeep Kaur

Abstract
A spice mix was formulated using an optimum mixture of spices and condiments and enriched with varying percentage of tomato pomace powder which will help in providing a convenient mix for easy preparation of vegetables with the enhanced nutritive values due to the addition of tomato pomace, a potential storehouse of antioxidants, dietary fibre and minerals. The treatment T5 having up to 20% of tomato pomace powder in it was found most acceptable as per the sensory evaluation studies of the vegetable to which it was added. This spice mix will help in reducing the time of cooking, enhance the nutrition level, utilize the industrial by-product for better sustainability.

Keywords: Tomato pomace powder, spice mix, convenient product, by-product utilization

1. Introduction
In India, the food is prepared fresh every time during the respective mealtimes. A lot of prepping goes in before the preparation of the final food which involves procuring, peeling, chopping, blending and cooking. Indian cuisine and meals comprise of cooked vegetables accompanied with chappati or rice. Various spices and condiments along with tomatoes are added to the vegetables to make them delicious. With the increase in the number of working women the paucity of time required for traditional cooking demands for the convenient products which can deliver the same taste within least time and with reduction in the drudgery (Sehgal *et al.,* 2010) [10]. Hence, there is an increase in the demand for convenient foods which can help to reduce the cooking time of the traditional foods.
Tomato is a major crop of India with a production of 21.18 million metric tons (Statistica, 2022). It is also the most processed vegetable to get paste, puree, ketchup juice etc which results in generation of large amounts of byproduct, tomato pomace (Aghajanzadeh *et al.*, 2010) [2] which refers to the solid residue that remains after the juice and pulp have been extracted from the fruit. Tomato pomace is a rich source of nutrients such as dietary fiber, antioxidants, and minerals, but it also poses a significant disposal challenge due to its high moisture content and potential environmental impact. Almost 4-5% of tomato pomace is generated during its processing (Kalogeropoulos *et al.,* 2012) [3] which is a rich source of nutrients and should not be wasted. A study by Parihar *et al.* (2017) [4] analyzed the phytochemical composition and antioxidant activity of tomato pomace and reported high levels of lycopene, phenolic compounds, and flavonoids. Various studies have explored ways to utilize tomato pomace for different purposes, including animal feed, food products, and bioenergy generation. For instance, Isik and Topkaya (2016) [7] investigated the potential of using tomato pomace as a source of dietary fiber in crackers, Rehal *et al.* (2022) [5] utilized it in the development of nutritious ready-to-cook snack and instant soup mix (Rehal and Kaur, 2022) [6]. Such research has not only helped in reducing the environmental impact of tomato processing but also created new value-added opportunities for the food industry. Keeping this in mind ready- to- use spice mix was formulated which can be added to a known amount of vegetable to get a flavorful and wholesome taste. To increase the utilization and valorisation of tomato pomace, it was also added in the spice mix in varying proportion to replace the addition of dried mango powder or tomatoes as done in traditional cooking.

2. Materials and Method
A convenient spice mix was formulated per 100 g of vegetables as given in table 1 and shown in figure 1. The control treatment (T0) had no tomato pomace and the other treatments had additional 1, 2, 3, 4 and 5 g of tomato pomace powder (T1, T2, T3, T4, T5) contributing to 0 to5% of tomato pomace per 100 gram of vegetable and 0-20% of tomato pomace powder in the spice mix treatments.

Fig 1: Components of the spice mix

Table 1: Formulation of the spice mix (required per 100g of vegetables)

Ingredients (g)	Treatments					
	T0	T1	T2	T3	T4	T5
Salt	2.0	2.0	2.0	2.0	2.0	2.0
Garlic powder	0.5	0.5	0.5	0.5	0.5	0.5
Onion powder	1.65	1.65	1.65	1.65	1.65	1.65
Ginger powder	0.25	0.25	0.25	0.25	0.25	0.25
Turmeric powder	0.10	0.10	0.10	0.10	0.10	0.10
Red chilli powder	0.15	0.15	0.15	0.15	0.15	0.15
Tomato pomace powder	0	1.0	2.0	3.0	4.0	5.0
Garam masala powder*	10.0	10.0	10.0	10.0	10.0	10.0

*Constituted of 15% cloves, 15% cardamom, 15% black pepper, 25% cumin, 30% coriander seeds

The formulated spice mix was subjected to color analysis with Color Flex metre (Hunter Lab Color Flex, Hunter Associates Inc., USA) to determine the colour characteristics (L, a, b). The L, a, and b measurements were used to compute hue angle and chroma as per Singh *et al.* (2013) [8].

2.1 Product preparation: For this experiment potatoes were boiled, peeled and diced into cubes. One teaspoon of oil per 100 g of boiled potatoes was heated in a pan and the spice mix as per the various treatments was added along with the potatoes and sautéed for 2 to 3 minutes. The prepared vegetable was then subjected to sensory evaluation (Figure 2). The sensory evaluation of the product was performed on a 9-point hedonic scale by a semi trained panellists aged between 20 to 55 years. The samples were coded (using different alphabet combinations) before being presented, and water was provided to rinse the mouth in between different samples. The product was assessed for its appearance, colour, flavour, texture, taste and overall acceptability. The 9-hedonic scale employed is as: 9-Like extremely, 8-Like very much, 7-Like moderately, 6-Like slightly, 5-Neither like or dislike,4-Dislike slightly, 3-dislike moderately, 2-Dislike very much, 1-Dislike extremely.

Fig 2: Vegetable prepared by addition of treatments T0 to T5 of Spice mix

3. Results and Discussion

The spice mix colour L, a and b values and hue angle and chrome values and are listed in table 2.

Table 2: Color values of the various formulations of spice mix

Treatments	Color				
	L	a	b	Hue	Chroma
T0	57.21±0.313^{b}	5.95±0.253d	13.36±0.537e	65.99±0.493a	14.63±0.580d
T1	57.64±0.038b	7.64±0.077c	15.02±0.323d	63.00±0.446b	16.85±0.305c
T2	57.98±0.077ab	9.04±0.084b	16.69±0.098c	61.55±0.143c	18.99±0.120b
T3	58.21±0.195ab	9.17±0.280b	17.34±0.487b	62.12±0.056bc	19.61±0.561b
T4	58.35±0.419ab	10.40±0.018a	18.14±0.115ab	60.16±0.119d	20.91±0.108a
T5	58.57±0.282a	10.84±0.013a	18.87±0.284a	60.10±0.353d	21.77±0.250a

Values are mean ±SE; values within a column with different superscripts are significantly different ($p \leq 0.05$).

It was observed that the addition of tomato pomace powder results in an increase in the L, a and b values. The tomato pomace powder has peels of the tomatoes which are a good source of lycopene pigment (Calvo *et al.*, 2008) [9]. This causes the 'a' values to see a continuous increment. Hue refers to the actual color of the object, such as red, blue,

green, or any other color on the visible spectrum. It is measured in degrees around a color wheel, with red at 0 degrees, green at 120 degrees, and blue at 240 degrees. The values of the hue show an increase in the intensity of the color of the spice mix. Chroma, on the other hand, refers to the intensity or purity of the color. It represents the amount of gray or white added to a color. The lower chroma value indicates muted color of the spice mix of the T0 control sample which keeps on increasing as the tomato pomace powder increases in the formulations.

The result of sensory analysis of the vegetable prepared by adding the various formulations (T0 to T5) are tabulated under table 3. The results of the sensory evaluation showed that T5 got highest scores for the appearance value while the least scores were obtained by T0. This was attributed to the attractive colour of the potato vegetable owing to the presence of higher amount of tomato pomace powder which has lycopene pigment. Lycopene is a carotenoid and gives enhanced colour appeal in the presence of fat used to saute the potatoes. Similar trend was observed in case of the flavour parameter as well. Regarding the taste parameter of the product, T5 obtained the highest scores and an increasing trend in the taste was observed as the concentration of tomato pomace powder was increasing in the spice mix. The control sample T0 got least score for taste. The addition of tomato pomace in the spice mix lends a tangy ness to the vegetable which was most acceptable till T5 level as beyond that it gave slight bitterness in the product. The overall acceptability scores were maximum for T5 owing to the highest scores for all the sensory parameters followed by T4 whereas the control sample T0 had least overall acceptability.

Table 3: Sensory scores for the Vegetable prepared with various treatments of spice mix

Treatments	Appearance/color	Flavor	Taste	Texture	OA
T0	6.27	7.1	7.20	8.28	7.19
T1	6.89	7.30	7.48	8.41	7.50
T2	6.87	7.41	7.55	8.33	7.54
T3	7.8	8.01	7.56	8.41	7.94
T4	8.1	8.40	8.54	8.72	8.44
T5	8.69	8.56	8.89	8.86	8.75

4. Conclusions

The addition of treatment T5 of the spice mix to the vegetable preparation will hence help in reducing the preparation time of the vegetables, enable novice and amateurs to make acceptable and nutritious vegetables, reduce drudgery and add convenience, improve the nutritional status of the vegetable due to lycopene as a potent antioxidant and dietary fiber and maximize the by-product utilization of the tomato pomace. It will also result in reducing the overall cost of the mix as tomato pomace powder helps to replace the dry mango powder (amchoor) in the spice mix which is costly and is usually used to enhance the taste of the dry vegetables in traditional cooking.

5. References

1. Statista.com. India—Production Volume of Tomatoes, 2015–2020. 2020. Available online: https://www.statista.com/statistics/1039712/india-production-volume-of-tomatoes/#:~:text=For%20fiscal%20year%202020%2C%20the,of%20tomato%20across%20the%20country 1 May 2023.
2. Aghajanzadeh GA, Maheri SN, Mirzaei AA, Baradaran HA. Comparison of nutritional value of tomato pomace and brewer's grain for ruminants using in vitro gas production technique. Asian J Anim. Vet. Adv. 2010;5:43-51.
3. Kalogeropoulos N, Chiou A, Pyriochou V, Peristeraki A, Karathanos VT. Bioactive phytochemicals in industrial tomatoes and their processing byproducts. LWT—Food Sci. Technol. 2012;49:213-216.
4. Parihar PS, Dubey AK, Mishra VK. Antioxidant activity and phytochemical profiling of tomato (Solanum lycopersicum) pomace and its fractions. Journal of Food Science and Technology. 2017;54(9):2737-2745. doi: 10.1007/s13197-017-2735-5
5. Rehal JK, Aggarwal P, Dhaliwal I, Sharma M, Kaushik P. A Tomato Pomace Enriched Gluten-Free Ready-to-Cook Snack's Nutritional Profile, Quality, and Shelf Life Evaluation. Horticulturae. 2022;8(5):403. https://doi.org/10.3390/horticulturae8050403
6. Rehal J, Kaur I. Development and Evaluation of Soup Mix Utilizing Tomato Pomace Powder. J Krishi Vigyan. 2022;11(1):59-62.
7. Isik F, Topkaya C. Effects of tomato pomace supplementation on chemical and nutritional properties of crackers. Ital J Food Sci. 2016;28:525-535.
8. Singh KK, Mridula D, Barnwal P, Rehal J. Selected Engineering and Biochemical Properties of 11 Flaxseed Varieties. Food Bioprocess. Technol. 2013;6:598-605.
9. Calvo MM, García ML, Selgas MD. Dry fermented sausages enriched with lycopene from tomato peel. Meat Science. 2008;80(2):167-172.
10. Sehgal N, Bode P, Das S, Hernandez-Monteagudo C, Huffenberger K, Lin YT, Ostriker JP, Trac H. Simulations of the microwave sky. The Astrophysical Journal. 2010 Jan 8;709(2):920.