

Research

A Study on the preparation method and characterization of seasoning powder

Shwe Sin Win^{a,*}, Phyu Phyu Tun^{a,b}, Seinn Lei Lei Phyu^a

^aDepartment of Industrial Chemistry, West Yangon University, Yangon, Myanmar

^bSchool of Resources and Environmental Engineering, Wuhan University of Technology, Wuhan, China

***Corresponding Author**

Accepted : 11 July 2019; Published online : 15 July, 2019

DOI: <https://doi.org/10.5281/zenodo.3334951>



Abstract: This study deals with the preparation of seasoning powder from the two sources of vegetables: sweet potato and pumpkin. Vegetable seasoning powder can be used to enhance the taste and flavor of cooking. The nutritional value of as prepared seasoning powders such as moisture, ash, protein, fat and fiber contents were determined and compared with literature value. The shelf life of prepared samples was also studied. The studied shows that the nutritional values are comparable with literature value. The most suitable shelf life of the prepared sample is four months.

Keywords: Sweet potato, Pumpkin, Seasoning powder, Nutritional value, shelf life

1. Introduction

Herbs and spices have been used for centuries to season and flavor foods. In primitive times, people discovered that certain parts of plants make the food taste better. Herbs were the flavoring of the common people and often used to grown in kitchen gardens or gathered in the woods. The herbs were used for nutritional, medicinal purposes and also to enhance the flavor of foods. Additionally, they were even used to mask the taste of off-flavor, tainted meats[1-3].

Spices are usually grown in tropical countries and are the natural aromatic parts of the plant from the dried seeds, buds, fruit, flower, bark, or root. Modern consumers use both herbs and spices to enhance the flavor and healthfulness of foods. Seasonings can be in the form of crushed, powdered, dry, or fresh to provide a variety of flavors. A complementary seasoning can enhance the flavor of food[4-6].Seasoning blends are mixtures of ground or whole spices, herbs, seeds, or other flavorings. Herbs and spices have long been used to reduce the growth of bacteria in foods. For example, certain herbs and spices, including

cloves, cinnamon and garlic can function as antibacterial agents[7, 8]. The flavor of herbs and spices are fragile and can be destroyed by heat, light, and moisture. Many popular herbs and spices are sources of natural antioxidants, the compounds that play an important role in neutralizing free radicals and reducing cancer risk. Some herbs have more antioxidant power per gram than many fruits and vegetables; however, people usually don't eat them in the same quantities as fruits and vegetables[9]. There are many seasoning powder in market such as chicken seasoning powder, fish seasoning powder and vegetable seasoning powder.

In this study, seasoning powder was made from vegetables sources such as sweet potato and pumpkin. Onion, garlic, ginger, pepper, sugar and salt were also added to enhance flavor and taste. Garlic, ginger and pepper have antibacterial properties, which helps to reduce bacterial infections in the body. The aim of this study is to prepare seasoning powder from sweet potato and pumpkin and, to determine and compare the nutritional value of prepared seasoning powder with literature value.

1.1 Seasoning powder

Seasoning blends are mixture of ground or whole spices, herbs, seeds, or other flavorings. Seasonings such as apple pie spice are blends of several spices and are ready to use. Seasoning includes herbs and spices, which are themselves frequently referred to as "seasonings". Seasoning includes a large or small amount of salt being added to a preparation. Other seasonings like black pepper and basil transfer some of their flavor to the food. A well designed dish may combine seasonings that complement each other. In addition to the choice of herbs and seasoning, the timing of when flavors are added will affect the food that is being cooked. In various cultures, meat may be existing as a seasoning techniques[10].

2. Materials and methods

2.1 Raw Materials

Raw materials for the preparation of seasoning powder such as sweet potato, pumpkin, onion, garlic, ginger, black pepper, salt and sugar were purchased from Aung San Bazaar, Insein Township, Yangon Region.

2.2 Preparation of seasoning powders

The ingredients for making sweet potato seasoning powder such as sweet potato, onion, garlic and ginger were peeled and cut into small pieces. They were spread in the tray and placed under sunlight for about two days. And then 40 gm of dried sweet potato, 15 gm of dried onion, 8 gm of dried garlic, 1 gm of dried ginger, and 1 gm of dried black pepper

were separately roasted in pan at 70 °C for 2 minutes. After that, the roasted ingredients were ground in the blender until all are well mixed and powder. During grinding, 30 gm of sugar and 5 gm of salt were added. The powder was screened with 100 mesh screen. Finally, as obtained sweet potato seasoning powder was added into airtight glass bottle. With different ratios of sweet potato and sugar, series of sweet potato seasonings were prepared (40: 30), (50:20) and (60:10) and denoted as sample I, sample II, and sample III respectively. Moreover, the same procedure was repeated for the preparation of pumpkin seasonings where in place of sweet potato pumpkin was used. The different ratios of pumpkin and sugar was taken to prepare pumpkin seasoning and sample marked as sample IV, sample V and sample VI.

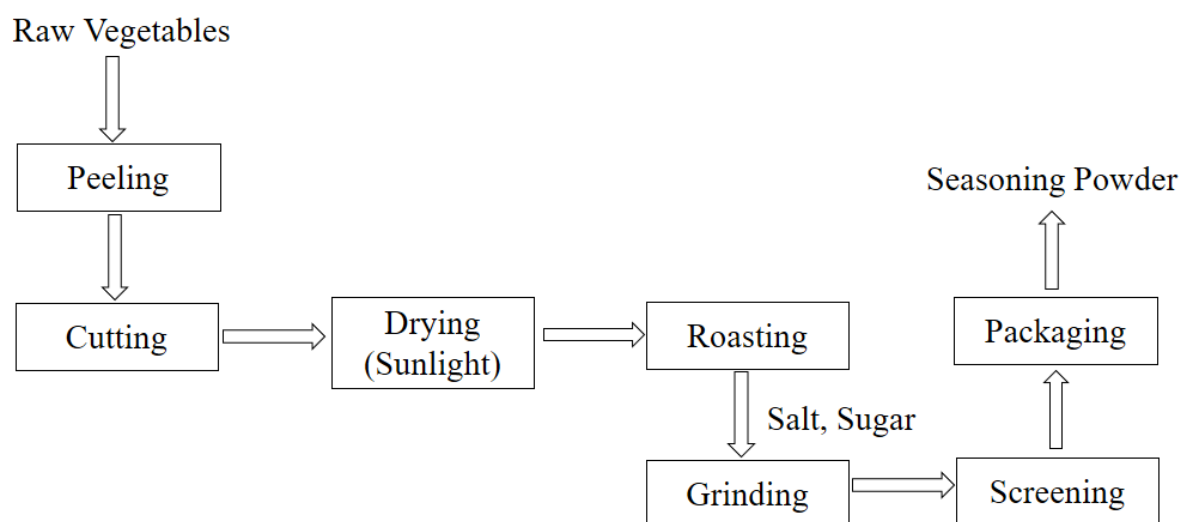


Figure 1. Process Flow diagram for the preparation of Seasoning Powder

Table 1Preparation of Sweet Potato Seasoning Powder with different ratios of sweet potato and sugar

Samples	Sweet Potato (gm)	Sugar (gm)	Yield (%)	Observation
I	40	30	84.9	Too sweet and sugar taste
II	50	20	85.3	Sweet and no sugar taste
III	60	10	85.2	Low sweet

Table 2 The amount of Pumpkin Seasoning powder obtained with different ratios of pumpkin and sugar

Samples	Pumpkin (gm)	Sugar (gm)	Yield (%)	Observation
IV	40	30	85.6	Too sweet and sugar taste
V	50	20	85.4	Sweet and no sugar taste
VI	60	10	85.45	Low sweet

2.3 Analysis of Nutritional value of seasoning powders

2.3.1 Determination of moisture content

5gm of sweet potato seasoning powder sample was weighed in a clean, dried and tarred porcelain basin. The basin was placed in an oven maintained at 105 °C and dried at least for 2 hours. Then the sample was cooled in a desiccator and weighed. The process of heating, cooling and weighing were repeated until a constant weight was obtained. Moisture content was calculated as follows:

$$\text{Moisture percentage (w/w)} = \frac{w_1 - w_2}{w_1} * 100 \quad (1)$$

where, w_1 = weight of sample before drying

w_2 = weight of sample after drying

Similar process was also followed in case of pumpkin and results were recorded as shown in Table 7.

2.3.2 Determination of ash content

5 gm of sweet potato seasoning powder sample was weighed in a previously well-dried and tared porcelain crucible. The sample was placed inside the muffle furnace. Incineration was done at 600°C for about 3 hour until a white ash was obtained. After ashing, the crucible was cooled in a desiccator and weighed. The total ash percent of the sample was calculated as follows:

$$\text{Ash percentage (w/w)} = \frac{x}{y} * 100 \quad (2)$$

where, x = weight of ash

y = weight of sample

The same procedure was repeated for pumpkin. The results are recorded as shown in Table 7.

2.3.3 Determination of protein content

Principle

The sample is digested in sulphuric acid in the presence of a catalyst. The nitrogen from protein and some other constituents are converted to ammonium sulphate. The ammonia is distilled into receiver solution (Boric acid) after the digest has been made alkaline. The percentage of nitrogen is calculated and the result converted to “Crude protein” by multiplication by a factor. (corresponding factor = commonly 6.25)

Apparatus

Protein content of 1% w/v solution of sweet potato seasoning powder was determined by the Micro-Kjeldahl Distillation Unit, Kjeltree™ 2100, Sweden.

Reagents

- (i) Sulphuric acid. Very high purity is not essential but the nitrogen should be less than 0.005%.
- (ii) Ready prepared tablets (8 gm potassium sulphate and 0.7gm copper II sulphate)
- (iii) NaOH (40%) – 400 gm NaOH per liter of solution. It was commercially available in concentration up to 50%.
- (iv) 0.1N hydrochloric acid.
- (v) 4% boric acid solution.
- (vi) Indicator (mixture of methyl red, 0.066gm, and bromocresol green, 0.033gm, were dissolved in 95% ethanol and made up to 100mL)

Procedure

About 25gm of the above solution was accurately weighed and placed in a small digestion flask (capacity 30-35mL). Then, the sample was digested using 8.7gm of catalyst mixture (8 gm potassium sulphate and 0.7gm copper II sulphate) and 12mL of concentrated H₂SO₄. The whole mixture was then digested at 420°C for 1 hour until a clear solution was obtained. The clear solution was cooled and diluted with 80mL of distilled water and neutralized with 50mL of 40% w/v NaOH and then distillation was continued. The distillate was then added into the conical flask containing 25mL of 4% w/v boric acid and 0.4mL of indicator mixture (methyl red, 0.066 gm, and bromocresol green, 0.033gm, were dissolved in 95% ethanol and made up to 100mL). After 5 minutes of distillation, 125mL of distillate was obtained in this conical flask. The distillate changed the color of the indicator from red to green. The distillate was then titrated with standard 0.1 N HCl. The end point was reached when green color suddenly changed to grey.

A blank determination was also carried out by the same procedure, but without including the sample. The percentage of nitrogen content was calculated by using the following equation.

$$\text{Nitrogen (\%, w/v)} = \frac{v_1 - v_2 (a * 0.014)}{w} * 100 \quad (3)$$

Where,

v_1 = volume of sample titration

v_2 = volume of blank titration

a = concentration of standard NaOH in Normality

w = weight of sample

The percent of protein content was calculated by using the following equation;

$$\text{Protein (\%, w/v)} = (\text{Nitrogen\%, w/v}) * 6.25 \quad (4)$$

The same procedure was repeated for pumpkin. The results are recorded as shown in Table 7.

2.3.4 Determination of crude fiber content

Principle

Crude fiber is organic residue left after the defatted material has been treated with boiling dilute sulphuric acid solution and then boiling with dilute sodium hydroxide solution.

Apparatus

Crude fiber apparatus, Silica or porcelain crucibles, Muffle furnace

Reagents

Sulphuric acid (1.25%, w/v), Sodium hydroxide (1.25%, w/v)

Procedure

About 2gm of moisture and fat-free dehydrated sample was weighed in a cleaned, dried and weighed watch glass and added into 500mL conical flask and 200mL of 1.25%, w/v sulphuric acid was added. The mixture was boiled for 30 minutes and the volume was kept constant by frequent additions of boiling water, and the flask was swirled occasionally, such that no particles adhered to the sides. The flask and its contents were cooled for 30 minutes and filtered through a Whatman filter paper No. 43, which was fitted in a Buchner funnel. The sample on the filter paper was washed into the original flask with 200 mL of 1.25%, w/v sodium hydroxide and again boiled for 30 minutes and again filtered with a weighed Whatman filter paper No.43. The sample was then washed successively with boiling water, 1% w/v hydrochloric acid solution and finally with boiling water which removed any excess hydrochloric acid present. The insoluble matter on the filter paper was washed dropwise with about 1mL each of methyl alcohol (spirit) and acetone. It was then placed inside a previously weighed porcelain crucible and dried at 100°C in an oven until a constant weight (w_2) was

obtained. The crucible and its contents were ashed in a muffle furnace at 550°C for 3 hours, placed in a desiccator and weighed (w_3). The percent fiber content was calculated as follow:

$$\text{Crude Fiber Content (\%, w/w)} = \frac{w_2 - w_3}{w_1} * 100 \quad (5)$$

Where,

w_1 = weight of sample

w_2 = weight of insoluble matter

w_3 = weight of ash

The same procedure was repeated for pumpkin and results are recorded as shown in Table 7.

2.3.5 Determination of fat content

About 5gm of sweet potato seasoning powder was placed into a filter extraction thimble and the end of the thimble was plugged with fat-free cotton wool. The thimble and contents were placed in the central siphon portion of the soxhlet apparatus. 40mL of analytical grade diethyl ether into the flask and the flask was connected to the soxhlet siphon and condenser. After refluxing five hours, the mixed ether was distilled off and the flask and contents were placed in an oven at 105°C for 3 hours. Then, the flask and the contents were cooled in a desiccator and weighed. The flask and the contents were replaced in an oven for 30 minutes and placed in a desiccator. The weight was checked to ensure no further weight loss has occurred. The fat content was calculated from the weight of material held in the receiver flask.

2.3.6 Organoleptic properties of seasoning powders

The organoleptic properties of seasoning powders were evaluated at room temperature for color, taste, aroma and acceptability by a panel of 10 judges who were randomly selected from West Yangon University. The results are recorded as shown in Table 3 and 4.

2.3.7 Determination of shelf-life

The prepared samples were kept in room temperature for 6 months and its appearance and odor were evaluated for every two months. The results are recorded as shown in Table 5 and 6.

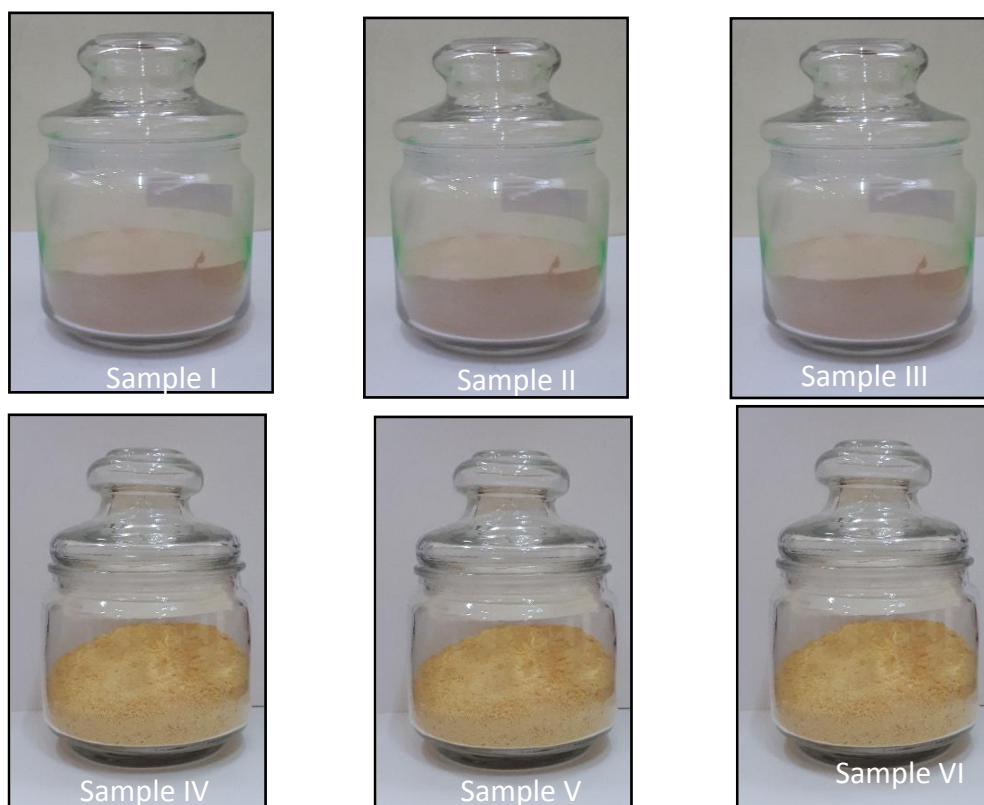


Figure 2. Synthesized seasoning powder samples

3. Results and discussion

In this work, seasoning powders were prepared from sweet potato and pumpkin. Two different samples of as synthesized seasoning powder are shown in Fig 2. The ratios of prepared seasoning powder are shown in Table 1 and 2. The most suitable ratio of sweet potato and sugar is (50:20) and that of pumpkin is also (50:20). It was found that the yield percent of prepared sample I, II, III, IV, V and VI are 84.9 %, 85.3%, 85.2% 85.6%, 85.4% and 85.45% respectively.

The organoleptic properties of the prepared samples are shown in Table 3 and 4. It was found that, sample (I) is pale yellow color, sugar taste and pleasant smell. The sample (II) is pale yellow color, sweet taste and pleasant smell. The sample (III) is pale yellow color, low sweet taste and pleasant smell. Sample (IV) is yellow color, sugar taste and pleasant smell. The sample (V) is yellow color, sweet taste and pleasant smell. The sample (VI) is yellow color, low sweet taste and pleasant smell.

Table 3 Organoleptic properties of prepared sweet potato seasoning powder

Sr. No	Samples	Organoleptic Properties
1	I	Pale yellow, sugar taste and pleasant smell
2	II*	Pale yellow, sweet taste and pleasant smell
3	III	Pale yellow, low sweet and pleasant smell

* The most suitable condition

Table 4 Organoleptic properties of prepared pumpkin seasoning powder

Sr. No	Samples	Organoleptic Properties
1	IV	Yellow, sugar taste and pleasant smell
2	V*	Yellow, sweet taste and pleasant smell
3	VI	Yellow, low sweet and pleasant smell

* The most suitable condition

The effect of storage time at room temperature on characteristic of the most suitable carrot seasoning powder is shown in Table 5 and that of pumpkin seasoning powder is shown in Table 6. After passing two months and four months there is no change in color, taste and flavor. At six months, both sample become cake and off-flavor.

Table 5 Effect of Shelf-life on characteristic of the most suitable sweet potato seasoning powder (stored at room temperature)

Sr. No	Shelf-life (Month)	Temperature	Observation
1	2	Room temperature	No change
2	4*	Room temperature	No change
3	6	Room temperature	Caking and off-flavor

* The optimum shelf life

Table 6 Effect of Shelf-life on characteristic of the most suitable pumpkin seasoning powder (stored at room temperature)

Sr. No	Shelf-life (Month)	Temperature	Observation
1	2	Room temperature	No change

2	4*	Room temperature	No change
3	6	Room temperature	Caking and off-flavor

* The optimum shelf life

The nutritional values of the most suitable samples were determined. The nutritional values of samples were compared with literature value. The results are shown in Table 7. It was found that fiber content of prepared samples is comparable with the literature value. Protein content is higher than the literature value. Sweet potato seasoning powder has more protein content than pumpkin seasoning powder.

Table 7 Comparison of nutritional values of prepared seasoning powders with literature values

Sr. No.	Parameters	Sample (II)	Literature Value for sweet potato	Sample (V)	Literature Value for pumpkin
1	Moisture Content (%)	8.2	-	7.37	-
2	Ash Content (%)	1.37	-	1.37	-
3	Protein (%)	5.53	1.6	1.81	0.82
4	Fiber (%)	3.11	3	4.36	1.22
5	Fat (%)	0.51	0.1	0.67	0.08

4. Conclusion

Seasoning powders was successfully prepared from sweet potato and pumpkin separately. The series of seasoning powders were prepared with different ratios of sweet potato/pumpkin and sugar, and their characteristics were studied. The result shows that the most suitable ratio of sweet potato and sugar, pumpkin and sugar are (50:20). At this ratio, both samples are sweet taste and pleasant smell. The analysis shows that the protein content of prepared samples was higher than the literature value. Sweet potato seasoning powder has more protein content than pumpkin seasoning powder. So that sweet potato seasoning powder could be well suitable for protein needed people. In addition, Vegetable seasoning powder can be used to substitute meat seasoning powder to enhance the taste and flavor.

5. Reference

- [1] K. S. Panickar, "Beneficial effects of herbs, spices and medicinal plants on the metabolic syndrome, brain and cognitive function," *Cent Nerv Syst Agents Med Chem*, vol. 13, pp. 13-29, Mar 2013.
- [2] I. Paur, M. H. Carlsen, B. L. Halvorsen, and R. Blomhoff, "Antioxidants in Herbs and Spices," in *Herbal Medicine: Biomolecular and Clinical Aspects. 2nd edition*, ed: CRC Press/Taylor & Francis, 2011.
- [3] F. G. Lamb, "Dehydro-freezing of mixed ingredients of foods to predetermined degrees," ed: Google Patents, 1968.
- [4] H. Eguchi, "Seasoning composition and preparation thereof," ed: Google Patents, 1978.
- [5] O. Hanas, "Seasoning ingredients," in *Handbook of Industrial Seasonings*, ed: Springer, 1994, pp. 20-42.
- [6] S. Kunieda, "Flavor enhancer, food or beverage containing the flavor enhancer, and method of flavor enhancement," ed: Google Patents, 2006.
- [7] M. Bethel, *The healing power of herbs*: Wilshire Book Company, 1968.
- [8] M. Mueller, S. Hobiger, and A. Jungbauer, "Anti-inflammatory activity of extracts from fruits, herbs and spices," *Food Chemistry*, vol. 122, pp. 987-996, 2010.
- [9] W. X. R. G. D. Shan and D. X. J. Aili, "Screening of Natural Antioxidants from Chinese Medicines, Herbs and Spices," *Journal of the chinese cereals and oils association*, vol. 4, 1998.
- [10] L. M. Poste, G. Butler, D. Mackie, V. E. Agar, B. K. Thompson, R. L. Cliplef, *et al.*, "Correlations of sensory and instrumental meat tenderness values as affected by sampling techniques," *Food Quality & Preference*, vol. 4, pp. 207–214, 1993.



Shwe Sin Win, Lecturer completed MSc (Dagon University).
BSc (Hons:) Dagon University



Phyu Phyu Tun, Assistant Lecturer completed MSc (Dagon University), BSc (Hons:) Dagon University



Dr.Seinn Lei Lei Phyu, Lecturer completed Ph.D. , MRes(Q), DFT(Q),MSc(Q),BSc (Qualify) Yangon University.



© 2019 by the authors. TWASP, NY, USA . Author/authors are fully responsible for the text, figure, data in above pages. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>)

