

“DEVELOPMENT AND QUALITY EVALUATION OF INSTANT HALWA POWDER MIX PREPARED FROM SWEET POTATO (*Ipomoea batatas*)”

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Abstract

The experiment was conducted for development and quality evaluation of instant halwa powder mix from sweet potatoes. Sweet potato was dried at 70°C for 6-7 hours to get flour after grading of sweet potato slices. Two methods were used for optimization of sweet potatoes flour to get a desired quality of flour. The present investigation was undertaken to evaluate the quality as well as acceptability of sweet potato flour for the instant halwa powder mix. The physico-chemical and sensory evaluation of instant halwa powder mix has been carried out. Study of quality was based on physico-chemical analysis that is moisture, ash, fat, soluble protein, content of the mixes. Sensory evaluation is done for the optimization and overall acceptability of instant halwa powder mix. Instant halwa powder mix packed in LDPE bag and stored at room temperature. The result of study beginning presented and discussed in following section.

Key word

Sweet potato, LDPE, Physico-chemical, Instant

Introduction

Sweet potato

The Sweet potato (*Ipomoea batatas*) is a dicotyledonous plant that belongs to the family *Convolvulaceae*. It's large starchy sweet – tasting, tuberous roots are an important root vegetable. The young leaves and shoots are sometimes eaten as greens. The plant is an herbaceous perennial vine, bearing alternate heart shaped or palmately lobed leaves and medium sized sympetalous flowers. The edible tuberous root is long and tapered, with a smooth skin whose colour ranges between yellow, orange, red, brown, purple, and beige. Its flesh ranges from beige through white, red, pink, violet, yellow, orange, and purple. Sweet potato varieties with white or pale yellow flesh are less sweet and moist than those with red, pink, or orange flesh (Zhang et al, 1998).

Table .1. Nutritional value per 100 gm of sweet potato per 100 gm.

Nutrition	Amount
Energy	86 Kcal
Carbohydrates	20.1 g
Starch	12.7 g
Sugars	4.2 g
Dietary fibers	3.0 g
Fat	0.1 g
Protien	1.6 g
Vitamin A	700 µg
Beta carotene	8509 µg
Thiamine (Vit B ₁)	0.1 mg
Riboflavine (Vit B ₂)	0.1 mg
Niacin (Vit B ₃)	0.61 mg
Pantothenic acid (Vit B ₅)	0.8 mg
Vitamin B ₆	0.2 mg
Folate (Vit B ₉)	11 µg
Vitamin C	2.4 mg
Vitamin E	0.26 mg
Calcium	30 mg
Iron	0.6 mg
Magnesium	25 mg
Phosphorus	47 mg
Potassium	337 mg
Sodium	55 mg

Materials and Method

Raw Material:

sweet potatoes, Sugar, Coconut, Ghee, Cashew nut, Cardamom

Method

Method for preparation of sweet potato flour:

1. By Conventional method
2. By KMS treatment

Conventional method:

In this method peeled sweet potatoes are being kept in tap water and slicing is done of thickness 3-4 mm. after this excess water is drained and slices are placed in hot air oven and dried at 70°C for 6- hrs. Then these dried slices are grind and flour is obtained and this flour is packed in poly zip pouches.

KMS treatment method:

In this method peeled sweet potato slices of thickness 3-4 mm is placed in 200 ppm KMS solution for 15-20 mins. Solution is drained and slices is placed in hot air oven and dried at 70°c for 6- hrs. After drying grinding is done for flour preparation and the packed in poly zip pouches.

Optimization of sweet potato flour

Sweet potato flour is optimized on the basis of physico-chemical analysis of the flour is which yield, colour of flour, moisture, ash, fat, protein, is considered.

Formulation and Preparation of Instant Halwa Powder mix

For the optimization of IHP mix, 2 samples were prepared with different combination of all ingredients in which sweet potato flour was kept constant i.e. 100 gm and other ingredients where varies as follow :

Ghee – 5-30%, Sugar – 10 %, Coconut powder – 2-%, Cashew nut powder 2%, Cardamom – 1%.

Table 2 Formulation of Instant Halwa Powder Mix

Sample no	1	2
SPF (gms)	100	100
Ghee (gms)	5	30
Sugar (gms)	10	10
Coconut powder (gms)	2	2
Cashew nut powder (gms)	2	2
Cardamom powder (gms)	1	1

Preparation of Instant Halwa Powder mix:

For preparation of IHP mix take sweet potato flour and roast it in pan with addition of given amount of ghee for all samples. Roast it for 5-8 mins till its get light brown colour. Cool the roasted flour and add rest of all ingredients powder and mix it properly. Instant halwa powder is ready packed it in poly pouched and seal and stored at cool dry place at room temperature.

Physicochemical analysis of sweet potatoes, sweet potatoes flour and instant Halwa powder mix.**Moisture content:**

The moisture content of sweet potato, flour, and IHP was determined as described by Ranganna, 1977. Accurately weighed sweet potato flour/IHP was taken in previously dried and weighed petri-dish. The petri dish along with sample was placed in the oven maintained at 105±1°C for 3 to 4hrs, by repeating the process of drying, cooling and weighing at 30 min intervals, until the difference between consecutive

weights was less than 1mg. Then it was transferred to desiccators and cooled and weighed. The percent moisture content was calculated as:

$$\text{Moisture content (\%)} = \frac{(W_2 - W)}{(W_1 - W)} \times 100$$

Where;

W = Weight of empty Petri dish;

W₁ = Weight of Petri dish with sample before drying.

W₂ = Weight of Petri dish with sample after drying to constant weight.

Ash content:

The ash content was determined by the method as described by Ranganna, 1977. Accurately weighed sweet potato flour/IHP was put in to a previously dried and weighed silica crucible. The silica crucible with sweet potato flour/IHP was heated gently on a flame for complete charring and then it was heated in a muffle furnace at 550 ± 10°C for 4 to 5hrs, until ash was formed. Then cooled in desiccators and weighed. The percent ash content was calculated as:

$$\text{Total Ash (\%)} = \frac{(W_2 - W)}{(W_1 - W)} \times 100$$

Where;

W = Weight of empty dish;

W₁ = Weight of dish with sweet potato flour/IHP;

W₂ = Weight of dish with ash.

Fat content (AOAC, 1995)

Reagents: - Petroleum ether (boiling range 60 – 80 °c)

Apparatus:

Soxhlet extraction apparatus, Hot air oven, Extraction thimbles, Fat beakers

Procedure:

- 10gm of sample of was taken accurately. (i.e. W = weight of sample)
- The empty soxhlet flask was taken and the weight of empty flask was taken. (i.e. W₁= weight of empty flask)
- After that the sample was defatted with 80ml-100ml of petroleum ether in soxhlet apparatus for 3-4 hours at 80°C.
- Petroleum ether was evaporated and oil was extracted from the sample
- Then the final weight of flask with oil was taken. (i.e. W₂= weight of flask with oil)
- Fat content was calculated by using following formula

Calculations:-

$$\text{Fat (\%)} = \frac{(W_2 - W_1)}{W} \times 100$$

Where,

W₂= weight of flask with oil (g)

W₁= weight of empty flask (g)

W= weight of initial sweet potato slice/flour/IHP sample (g)

Soluble protein estimation by Lower's method:

Reagent:

Sodium carbonate, Sodium hydroxide, Copper sulphate, Folin-ciocalteau reagent, Bovine serum albumin, 80% Ethanol

Procedure:

1. Pipette out 0.2,0.4,0.6,0.8 and 1ml of the working standard into a series of test tubes
2. Pipette out 0.2 ml of the sample extract in other test tubes.
3. Make up the volume to 1 ml in all the test tubes.
4. A tube with 1 ml of water serves as the blank.
5. Add 5mL of reagent C to each tube including the blank. mix well and allow to stand for 10 min.
6. Then add 0.5 ml of reagent D, mix well and incubate at RT. In the dark for 30 min. blue colour is developed.
7. Take the readings at 660 nm.

Estimation of reducing sugar by Dinitrosalicylic Acid Method:

Reagent:-

DNS Reagent, Potassium sodium tartarate

Procedure:

1. Pipette out 0.5 to 3 mL of the extract in test tubes and equalize the volume to 3 ml with water in all the tubes.
2. Add 3 ml of DNS reagent.
3. Heat the contents in a boiling water bath for 5 Min.
4. When the contents of the tubes are still warm, add 1 ml of 40% Rochelle salt solution. Cool
5. read the intensity of dark red colour at 510 nm. Run the series of standard using glucose (mg/ml) and plot a graph.

Yield percentage

Yield of flour is determined by weighing the flour obtained after grinding and this weight is divided by weight of raw sweet potato used for flour preparation and multiplied by 100.

$$\text{Yield percentage} = \frac{\text{weight of flour obtained}}{\text{weight of raw sweet potato used}} \times 100$$

Preparation of Halwa from IHP mix

Take instant halwa powder mix. Heat or roasts in pan for 3-4 mins add water 100ml for 100 gms of IHP mix. Heat the mixture for 3-5 mins with continuously in the pan. Halwa is ready serves it in plates. (Source: Raj Dev et al. 2007, JFST)

Optimization of Instant Halwa Powder Mix

The Instant Halwa Powder mix is optimized on the basis of the physic chemical analysis of IHP mix and sensory evaluation based on overall acceptability of halwa prepared by IHP mix

Sensory evaluation analysis of prepared halwa

Sensory evaluation is used to measure the degree of pleasurable & unpleasurable experiences in foods. This measures overall quality of food & is used in the consumer analysis of new food product acceptability. Consumer / Discriminative & Communicative or Semi trained panels used.

9 point scale: To reflect panelist action / response to food. Ranges from Like Extremely to Dislike extremely. Panelist given one or more samples & asked to rate acceptability on Hedonic Scale. Scaling chart is as follow.

9 – Like extremely

8 – Like very much

7 – Like moderately

6– Like slightly

5– Neither like nor dislike

4 – Dislike slightly

3 – Dislike moderately

2 – Dislike very much

1 – Dislike extremely

Result and Discussion

This chapter deals with the result and discussion of the products which have be experimentally analysis in the laboratory.

Physico – chemical analysis of Sweet potato flour:

The flour was prepared by 2 methods

(a) Conventional method.

(b) KMS treatment method.

Physical characteristics of sweet potato flour:

According to Maruf Ahmed et al (2010) the physical characteristics of flour like yield, 11-30%, respectively. The result obtained after analysis of flour was as follow.

(a) Analysis of flour by obtained by conventional method yield , were 12.3%, respectively. This data in detailed is mentioned in table no.4. And graphical form fig no 1.

(b) Analysis of flour by obtained by KMS treatment method yield, were 13.7%, respectively. This data in detailed is mentioned in table no.4 and graphical form fig no 1.

The colour of flour obtained by conventional method was dull white while flour obtained by KMS Treatment method was cream white. This data in detailed is mentioned in table no.4. Respectively. The physical characters of sweet potato root are given bellow.

Table no. 3 Physical characteristics of sweet potato flour.

S No	Method	Yield %	Colour of flour
1	SPF	12.3	Dull white
2	SPF KMS	13.7	White

Chemical Analysis of sweet potato flour:

Table.4. Chemical Analysis of sweet potato Flour.

S N	Sample	Moisture %	Ash %	Fat %	Soluble Protein mg/ml	Reducing Sugar Mg/ml
1	Conventional	6.03	1.18	2.23	42.7	27
2	KMS	8.24	1.12	2.54	47.2	29

Table.5. Physico-chemical Analysis of IHP mix

SN	Sample	Moisture %	Ash %	Fat %	Soluble protein mg/ml	Reducing sugar mg/ml
1	Sample with 5% ghee.	6.53	1.09	18.6	59.2	34
2	Sample with 30% ghee.	6.94	1.32	27.3	61.5	36

Sensory evaluation analysis of instant Halwa powder mix:

Table.6. Sensory evaluation chart of Instant Halwa Mix

SN	Sample	Color and Look	Mouth feel	Taste	Flavor	Overall acceptability
1	Sample with 5% ghee.	8	8.1	8.3	8.5	8.25
2	Sample with 30% ghee.	8.2	8.5	8.4	8.1	8.27

(Note: - The score is the mean value of score obtained from 10 panel members)

Conclusion:

The present work was assumed towards development of Instant Halwa Powder mix from Sweet Potato.

Preparation of flour by using conventional and KMS method. KMS result was the best method. Out of 2 sample sample with 30% ghee is gives best result. There was no much more effect on addition of ingredient in quality or sensory evaluation.

Out of 2 sample, 30% ghee gives more fat percent that is 27.3% and less fat content with 5% ghee that is 18.6%. And the protein was increased in sample with 30% ghee that is 61.5 mg/ml.

On the basis of above result the method for flour preparation was optimized for the preparation of good quality flour from sweet potatoes. Instant Halwa Powder mix was prepared by roasting of flour in ghee and blending of all ingredients in the roasted flour is done after cooling it. After blending mix is packed in poly zip pouches and stored. Halwa is prepared from the IHP mix and served in front of the panel member for sensory evaluation of the halwa. It was done on 9 point hedonic scale rating score. In sensory overall acceptability has been considered. By this rating score sample with 30% ghee has been found best with scoring of 8.27 marks from 9 marks in overall acceptability.

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