

Title	A Study on the Factors Influence the Processing of Some Fruit Sources
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Abstract	<p>The present research placed its emphasis on the processing of Sweet Chili Sauce and GreenTomato Sauce. In this study, the effect of sugar on the physicochemical characteristics of prepared sauces was studied. In sauce preparation, the use of thickener was found to be effective in the prevention of layer separation which would shorten the shelf-life of the sauce. In this experimental work, two types of thickener, xanthan gum and sodium carboxymethyl cellulose (SCMC) were used. It was observed that xanthan increased the yield of sauce and so the use of xanthan as thickener would be economical in commercial sauce manufacture without using artificial dyes. In processing of Sweet Chili Sauce, the ratio of chili and sugar used were 1:2, 1:2.5 and 1:3. The proportion of xanthan and SCMC were also varied and the sample using 3% w/w each thickener (Sample 2) was found to be more favorable in consistency than other two samples processed with 5% w/w and 7% w/w each of the thickeners. It was also observed that the sample prepared with 2.5 times of sugar (sample 2) was more favorable in the physicochemical properties, taste and consistency than other two samples. In addition, it was found that the proportion of xanthan in sauce had a relation with the specific gravity of the sauce. In comparing the values of specific gravity, sample 2 prepared with 3% xanthan had greater weight than other samples processed with 5% and 7% xanthan. In comparing the characteristics of green tomato sauces, it was observed that the sample prepared with 45% w/w sugar was more favorable in the physicochemical properties and taste than other two samples (using 25% and 65% sugar). From the organoleptic point of view, it was observed that all of the prepared sauces had natural color of the fruit and good consistency. In two types of processed sauces, acidity, pH, moisture, soluble solids and ash content were found in the range of food grade value.</p>
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A Study on the Factors Influence the Processing of Some Fruit Sources

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Abstract

The present research placed its emphasis on the processing of Sweet Chili Sauce and Green Tomato Sauce. In this study, the effect of sugar on the physicochemical characteristics of prepared sauces was studied. In sauce preparation, the use of thickener was found to be effective in the prevention of layer separation which would shorten the shelf-life of the sauce. In this experimental work, two types of thickener, xanthan gum and sodium carboxymethyl cellulose (SCMC) were used. It was observed that xanthan increased the yield of sauce and so the use of xanthan as thickener would be economical in commercial sauce manufacture without using artificial dyes. In processing of Sweet Chili Sauce, the ratio of chili and sugar used were 1:2, 1:2.5 and 1:3. The proportion of xanthan and SCMC were also varied and the sample using 3% w/w each thickener (Sample 2) was found to be more favorable in consistency than other two samples processed with 5% w/w and 7% w/w each of the thickeners. It was also observed that the sample prepared with 2.5 times of sugar (sample2) was more favorable in the physicochemical properties, taste and consistency than other two samples. In addition, it was found that the proportion of xanthan in sauce had a relation with the specific gravity of the sauce. In comparing the values of specific gravity, sample 2 prepared with 3% xanthan had greater weight than other samples processed with 5% and 7% xanthan. In comparing the characteristics of green tomato sauces, it was observed that the sample prepared with 45% w/w sugar was more favorable in the physicochemical properties and taste than other two samples (using 25% and 65% sugar). From the organoleptic point of view, it was observed that all of the prepared sauces had natural color of the fruit and good consistency. In two types of processed sauces, acidity, pH, moisture, soluble solids and ash content were found in the range of food grade value.

Key words: sweet chili sacue, green tomato sauce, thickener, consistency

Introduction

In developing countries, agriculture is the mainstay of the economy. Some vegetables and fruits are wasted due to negligence and lack of processing facilities which could convert them into non-perishable form permitting its transportation and storage without wastage. Fruit and vegetable processing, therefore, becomes important in the agricultural industries. The main objective of fruit and vegetable processing is to supply wholesome, safe, nutritious and acceptable food to consumers throughout the year.

Due to the change in life style of the people living in the cities, the consumption of processed foods, ready-made and fast foods becomes increase gradually. Sauces are one type of the food products which become favourite among the consumers and the market. Now, different types of sauces are produced from Myanmar Food Industries and various brands of sauces are also imported from other countries. Moreover, sauces have demand with local food processors and in the retail market.

The objectives of this study were to:

- find out economical method of preparing sauce without using artificial colors and synthetic dyes
- gain an efficient process of producing good quality sauces and substitute in place of imported sauces

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Materials and Methods

Materials

Fresh chili is the main raw material for the preparation of sweet chili sauce and green tomato for green tomato sauce. The ingredients such as sugar, water, garlic, thickener, vinegar, citric acid, salt (NaCl) and preservatives (potassium sorbate & sodium metabisulfite) were also used for both types of sauces.

Methods of Preparation

Sweet Chili Sauce

In this experimental study, sweet chili sauce was prepared by changing three proportions of chili and sugar (1:2, 1:2.5 and 1:3). (100) g of fresh chilies were washed and crushed with a cutter. 50 g, 75 g and 100 g of garlic were used for 100 g of chili. Then, the calculated amount of garlic was also crushed with a cutter. In preparing sugar syrup, calculated amount of sugar crystals was dissolved in (1.5) times of hot water and then the sugar solution was filtered. The thickeners - SCMC and xanthan gum were mixed with water, thoroughly stirred and made into a viscous colloidal solution. After preparing the ingredients, sugar syrup and thickener were placed in a large sauce pan. The mixture was cooked at about 70-80°C, stirred frequently and made into a concentrated solution. Then, the rest of the ingredients; crushed chili and garlic, salt, vinegar and citric acid were added and simmered until the required consistency was obtained which took about (2-3) hours depending upon the productive capacity. Then, calculated amount of preservative was added into the sauce. The resultant sauces were filled into the bottles and pasteurized at 85°C for 15 minutes.

Green Tomato Sauce

In this experimental study, green tomato sauce was prepared by changing three percentages of sugar (25%, 45% & 65%) based on green tomato. (100) g of green tomato was washed and placed in a steel vessel. Then, (200) ml of water was added to it. The green tomatoes were boiled at 100°C until the tomato pulps became soft which took about 30 minutes. The softened green tomatoes were cooled, removed skins, seeds and then crushed. The crushed tomato pulps were screened through a sieve to obtain a homogeneous puree. Green chili and garlic were washed and boiled in vinegar solution for about 15 minutes and then made into a homogeneous puree with a suitable blender. Preparation of sugar syrup, thickener and processing of sauce were in the same way as in sweet chili sauce.

Methods of Analysis

Physicochemical characteristics showing the quality of sauces such as acidity, pH, soluble solids content, total solids content, moisture content, ash content and specific gravity were determined. Organoleptic properties were also investigated. pH was measured by a pH meter (Mi 150, pH/Temperature Bench Meter), the soluble solids content was measured by using a refractometer (WYT – 4, 0 – 80°Brix) and specific gravity by using a specific gravity bottle. Acidity, moisture content, total solids content and ash content were determined by using the methods stated in the chemical analysis of Foods (Pearson, 1970).

Results and Discussion

In this research work, three samples of “Sweet Chili Sauce” were produced with various proportions of sugar. The ratio of chili and sugar used were 1:2, 1:2.5 and 1:3. Table (1) shows the ingredients involved in three samples of sweet chili sauces. In processing of these

sauce samples, the use of thickener was found to be essential in order to prevent layer separation and for longer shelf-life. In this experimental work, two types of thickener, xanthan gum and sodium carboxymethyl cellulose (SCMC) were used. The proportion of xanthan and SCMC were varied and the sample using 3%w/w of each thickener was found to be more favorable in consistency than other two samples processed with 5%w/w and 7%w/w each of the thickeners. It was also observed that xanthan increased the yield of sauce and so the use of xanthan as thickener would be economical in commercial sauce manufacture without using artificial dyes. In addition, other ingredients such as sugar, salt (NaCl), vinegar and citric acid have preservative action and so the percentage of preservative can be reduced. It will give positive effect on the health of the consumers.

Table (2) shows comparison of the characteristics of sauce samples processed with various percentages of sugar and those of the sauce from local market. It was observed that the sample prepared with 2.5 times sugar was more favorable in the physicochemical properties than other two samples. Although soluble solids content ($^{\circ}$ Brix) increased in accordance with the increase in proportion of sugar used for samples 1 and 2, soluble solids and total solid contents were found to be increased with the decrease in moisture content of the samples. In addition, it was found that the proportion of xanthan in sauce had a relation with the specific gravity of the product. In comparing the values of specific gravity, sample 2 prepared with 3% xanthan had greater weight than other samples processed with 5% and 7% xanthan. Its weight was found to be 8.2% heavier than water. Acidity, pH and ash content were found in the range of food grade value.

The organoleptic properties of processed sweet chili sauces were presented in Table (3). It was observed that all of the prepared sauces had natural color of fresh red chili. From the aspect of taste and consistency, sample 2 was found to be more favorable than other two samples. The respective pictures of the sauces were shown in Figure (1), (2) and (3).

In the preparation of green tomato sauce, the percentages of sugar used were 25%w/w, 45%w/w and 65%w/w based on green tomato. Table (4) shows the ingredients involved in three samples of green tomato sauces. Table (5) shows comparison of the characteristics of sauce samples processed with various percentages of sugar and those of the sauce from local market. It was observed that the sample prepared with 45% w/w sugar was more favorable in the physicochemical properties than other two samples. It was evident that soluble solids content ($^{\circ}$ Brix) increased in accordance with increase in proportion of sugar. Acidity, pH and ash content were found in the range of food grade value.

The organoleptic properties of processed green tomato sauces were presented in Table (6). It was observed that all of the prepared sauces had natural color of green tomato and good consistency. From the aspect of taste, sample 2 was found to be more favorable than other two samples. The respective pictures of the sauces were shown in Figure (4), (5) and (6).

Table (1) Proportion of Ingredients Involved in the Sweet Chili Sauce

Ingredients	Sample 1	Sample 2	Sample 3
Chili (g)	100	100	100
Sugar (g)	200	250	300
Xanthan (g)	7	3	5
SCMC (g)	7	3	5
Garlic (g)	50	75	100
Water (ml)	700	700	700
Vinegar (ml)	75	75	75
Citric acid (g)	1	1	1
NaCl (g)	10	10	10
PS (g)	0.05	0.05	0.05
NaMBS (g)	0.05	0.05	0.05
Yield (ml)	1150	690	720

Basis: 100 g of chili. SCMC - Sodium Carboxymethyl Cellulose, PS - Potassium Sorbate
NaMBS - Sodium Metabisulfite

Table (2) Effect of sugar on the Characteristics of Sweet Chili Sauce

Characteristics	Sample 1	Sample 2	Sample 3	Sauce from Local Market
pH	5.3	5.4	5.3	4.8
Acidity (% w/w)	1.75	1.61	0.91	2.31
°Brix	20	34	28	51
Total Solids	22.2	40.52	33.7	-
Moisture Content (% w/w)	77.8	59.48	66.30	-
Ash (% w/w)	0.8	1.2	1.2	-
Specific Gravity	1.063	1.082	1.066	-

Table (3) Organoleptic Properties of Sweet Chili Sauce

Sr. No.	Color	Taste	Consistency	Shelf- life
Sample 1	Red	Light Sweet	Viscous	1 Year
Sample 2	Red	Sweet	Good	1 Year
Sample 3	Red	Very Sweet	Viscous	1 Year

Table (4) Proportion of Ingredients Involved in Green Tomato Sauce

Ingredients	Sample 1	Sample 2	Sample 3
Green Tomato(g)	100	100	100
Sugar (g)	25	45	65
Garlic (g)	30	30	30
Green Chili (g)	5	5	5
Xanthan (g)	0.6	0.6	0.6
SCMC (g)	0.6	0.6	0.6
Vinegar (ml)	10	10	10
Citric acid (g)	1	1	2
Water (ml)	200	200	200
PS (g)	0.05	0.05	0.05
NaMBS (g)	0.05	0.05	0.05
Yield (ml)	190	200	210

Basis: 100 g of green tomato. SCMC - Sodium Carboxymethyl Cellulose

PS - Potassium Sorbate , NaMBS - Sodium Metabisulfite

Table (5) Effect of Sugar on the Characteristics of Green Tomato Sauce

Characteristics	Sample 1	Sample 2	Sample 3	Sauce from Local Market
pH	4.4	4.9	4.0	4.9
Acidity(% w/w)	2.24	1.47	2.03	4.13
°Brix	17	27.5	35	21
Total Solid (%w/w)	35.8	21.4	36.5	-
Moisture Content (%w/w)	64.2	78.6	63.5	-
Ash (%w/w)	1.2	1.25	1.3	-
Specific Gravity	1.036	1.152	1.087	-

Table (6) Organoleptic Properties of Green Tomato Sauce

Sr. No.	Color	Taste	Consistency	Shelf- life
Sample 1	Green	Light	Good	1 Year
Sample 2	Green	Sweet & Sour	Good	1 Year
Sample 3	Green	Very Sweet & Sour	Good	1 Year



Figure (1) Sweet Chili Sauce; Sample 1



Figure (2) Sweet Chili Sauce; Sample 2



Figure (3) Sweet Chili Sauce; Sample 3



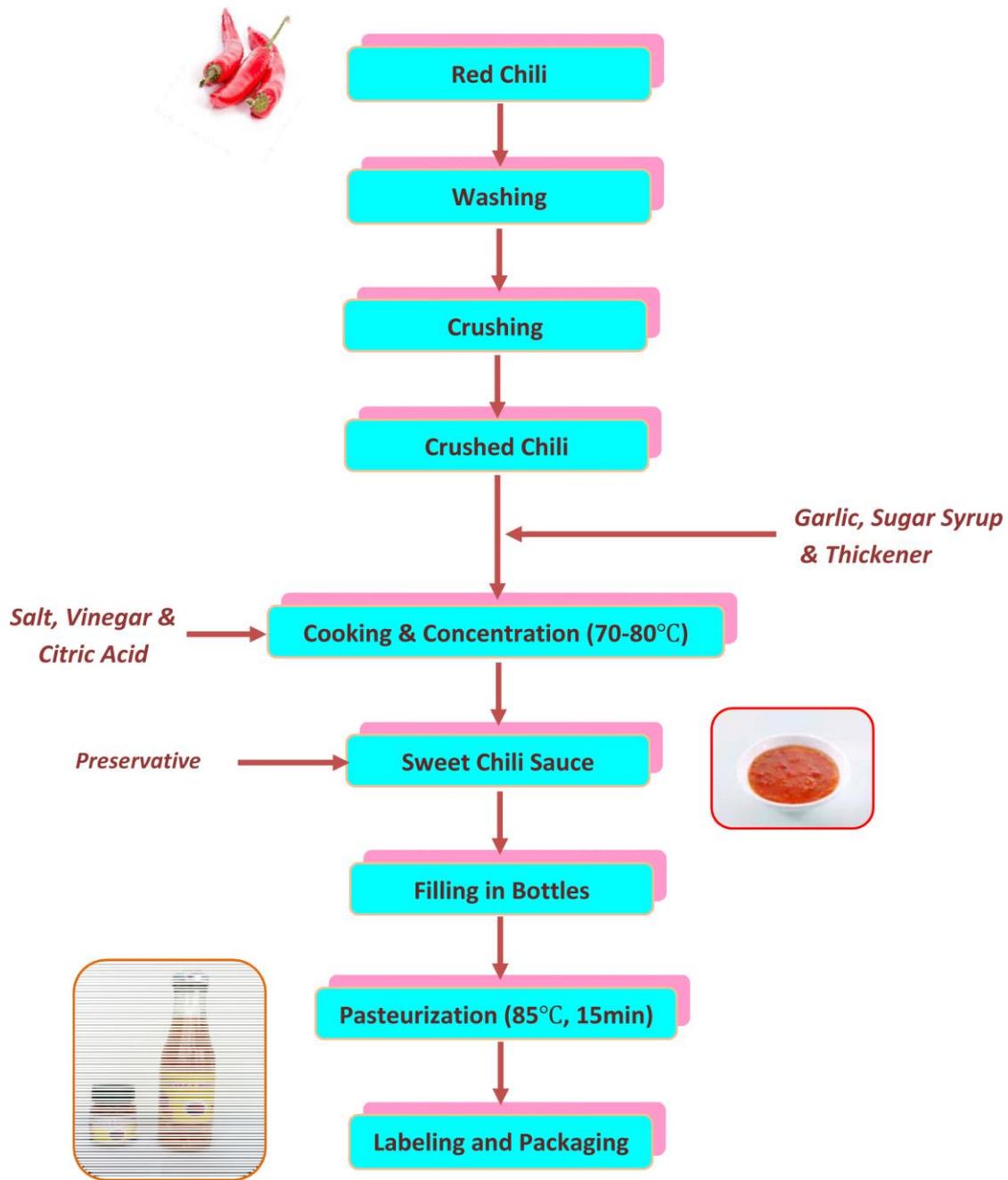
Figure (4) Green Tomato Sauce; Sample 4



Figure (5) Green Tomato Sauce; Sample 5



Figure (6) Green Tomato Sauce; Sample 6



Figure(7) Process Flow Diagram for the Preparation of Sweet chili Sauce



Figure(8) Process Flow Diagram for the Preparation of Green Tomato Sauce

Conclusion

In this project work, three formulae of “Sweet Chili Sauce and Green Tomato sauce” were produced with various proportions of sugar. The ingredients involved in preparation of sauces affect the quality of the product. In processing of these sauce samples, the use of thickener was found to be effective for longer shelf-life without layer separation. It was also observed that xanthan increased the yield of sauce, stabilized the sauce and gave the sauce in good consistency. So, the use of xanthan as thickener would be economical in commercial sauce manufacture without using artificial dyes. In addition, other ingredients such as sugar, salt (NaCl), vinegar and citric acid have preservative action and so the percentage of preservative can be reduced. It will give positive effect on the health of the consumers. It was observed that all of the prepared sauces had natural red color of chili and sauce consistency.

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