Extraction and Properties of Papaya Seed Oil

S. D. Appese¹, Naveen Kumar Pattar², Prasanna Gouda³

¹,²,³Assistant Professor, Department of Mechanical Engineering, SKIT Engineering college, Bengaluru, India

Abstract: The papaya seed oil was extracted by solvent extraction method. The properties of seed oil were studied. Percentage of seed oil was recorded 30 and chemical composition of papaya seed was found to be Protein (28.12%), Ash (8.19%), Crude fiber (18.18%), and total Carbohydrate (25.6%). The papaya seed oil contains Iodine value (65.9), Saponification value (156.4), Unsaponifiable matter (1.369%) and free fatty acid (0.31%). The major fatty acid of papaya seed oil was Oleic acid (72.6%) followed by Palmitic acid (13.5%) and Stearic acid (4.5%). Thus it can be concluded that the seed can be used for extraction of oil which has various benefits with respect to essential fatty acids.

Keywords: Papaya, Seed oil, Oleic acid and Essential Fatty Acids.

1. Introduction

In recent years, it has been on growing to importance to explore new energy resources as substitutes to fossil fuels. Carica papaya is a plant that grows wild in many places of the tropics. The seeds of papaya fruits are generally discarded. When I visited some fruit centers they are all throwing the seeds of papaya into dustbins. However, in order to make more efficient use of papaya, it is worth investigating the use of the seeds as a source of oil. Thus, the aim of this work is to determine and to compare the physiochemical properties and quality of oil extracted from papaya seeds.

2. Materials and methods

A. Papaya fruit

Papaya fruits were collected from the local market of Mysore. They were obtained from Testing house Bangalore.

B. Pretreatment of fruits

Collected papaya was washed, wiped and then stored at 100°C to 150°C in the cool place.

C. Preparation of essential oil

Solvent extraction, 150 g of ground seeds were placed in cellulose paper cone and extracted using light petroleum in 5-L Soxlet extractor for 8 hr. The oil was recovered by evaporating the solvent using a rotary evaporator model N-1 and the residual solvent was removed by drying in an oven at 600C for 1 hr by flushing with 99.95% nitrogen.

D. Flow chart for extraction of papaya seed oil

Ripe papaya fruits
Cut into two longitudinal halves
Seed removing manually & Weight of sample
Oven drying 60°C for 24 hrs & Wt. of sample
Weigh pre dried extract beaker
Place thimble in glass holding tube attached condenser
Place in hydrous ethyl ether in extract beaker
Put beaker on heater apparatus
Extract for 4 hrs & cooling
Remove extraction beaker and lets air dried oven night (100°C for 30 min) cool the beaker in desiccators and weigh it

E. Saponification value

Take 2g of oil interested in a 250ml of conical flask, offer 25ml of strong KOH and suspend the oil fully. Connect air condenser to the flask and boil for about 25 to 30 min on a boiling water bath. Put 2 drops of phenolphthalein indicator and merge it. Titrate adjacent to standard 05 N HCl until the pink color disappears. Treat blank similarly in the absence of oil.

Saponification value = [(Blank+titre)*100]/weight of oil.

F. Iodine value

Take 2g of oil interested in a 500ml of conical flask, add 20ml of chloroform and liquefy the oil fully. Keep in dark for 25-30 min. Put 20ml of KI solution and mix it. Titrate against 0.1 N Na2S2O3 solution using starch as an indicator with vigorous shaking to extract iodine from the chloroform layer. Extravagance blanks likewise in the absence of oil.

Iodine Value = [A*N*0.1269*100]/Weight of oil

Where A= ml of Na2S2O3, and N=Normality of Na2S2O3.

Physical properties of Papaya oil:

Yield% = [Weight of oil/weight of sample]*100.
G. Free fatty acid

The FFA in oil is predictable by titrating it aligned with KOH in existence of phenolphthalein pointer. The acid number is defined in 1g of sample. Therefore the free fatty acid is expressed as oleic equivalents. 1 ml N/10 KOH= 0.0289 g Oleic acid.

3. Results

In this paper, the papaya seeds were analyzed for its chemical composition and average values were given in below chart.

4. Discussion

It is from table 1 that seed contained moisture 8.2 %, oil 29.6%, protein 27.8%, Ash 7.9%. The result of the present paper investigation are more or less similar to that of Syed HM, Kunte SP et al. 2012. The chemical properties are the most important characteristics of oil the FFA and iodine value is a measure of the unsaturation of the oil. From table 2 it is observed that iodine value 66.3, Saponification value 156.1, and FFA value as per Oleic acid % is 0.41.

5. Conclusion

In this paper, papaya seed oil was recorded 29.6% and chemical composition of papaya seed found to be moisture 8.2 %, protein 27.8%, Ash 7.9% and total carbohydrates 26.3% and iodine value 66.3. Saponification value 156.1, and FFA value as per Oleic acid % are 0.41.

6. Acknowledgment

I express immense gratitude to Professor B. R. Hosamani and Dr. Balakrishe Gowda project Co-ordinate Biofuel Park, Madenur, Hasan-573225. University of Agricultural Sciences Bengaluru 560065, for providing necessary lab facilities and his motivation and constant encouragements and to carry out this work successfully.

References


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<tr>
<th>S. No.</th>
<th>Composition</th>
<th>Values (Mean values) %</th>
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<td>Protein</td>
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<td>3</td>
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<td>4</td>
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<td>5</td>
<td>Total Carbohydrate</td>
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<td>Crude Fiber</td>
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<td>3</td>
<td>Unsaponification values</td>
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<tr>
<td>4</td>
<td>FFA as per Oleic acid</td>
<td>0.41</td>
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Table 1

Table 2

Chemical composition of papaya seeds as percent wet weight

Chemical composition of papaya seeds as percent wet weight

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<tr>
<th>S. No.</th>
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