A COMPARATIVE STUDY ON THE QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDERS

Work done at

EASTERN CONDIMENTS (P)Ltd, ADIMALY

Project work submitted to

MAHATMA GANDHI UNIVERSITY, KOTTAYAM

In partial fulfilment of the requirement for the award of the

DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY

Submitted by

AMAL SUNIL (Reg no : 200021026725)

DEPARTMENT OF CHEMISTRY

PAVANATMA COLLEGE

MURICKASSERY

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Submitted by

ANAT ALPHONSA ROY (Reg no : 200021026713)

DEPARTMENT OF CHEMISTRY

PAVANATMA COLLEGE

MURICKASSERY

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CERTIFICATE

This is to certify that the project work entitled **" A COMPARITIVE STUDY ON THE QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDERS**" is an authentic work carried out by Mr.Amal Sunil, final year BSc Chemistry student with reg no. 200021026725 under my supervision and guidance in the partial fulfilment of the requirement for the Degree of Bachelor Science at Pavanatma College Murickassery affiliated to Mahatma Gandhi University, Kottayam.

Mr. Saji K. Jose

HOD, Department of Chemistry

Pavanatma College Murickassery

CERTIFICATE

This is to certify that the project work entitled **" A COMPARITIVE STUDY ON THE QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDERS**" is an authentic work carried out by Miss.Amala Benny**,**final year BSc Chemistry student with reg no. 200021026711 under my supervision and guidance in the partial fulfilment of the requirement for the Degree of Bachelor Science at Pavanatma College Murickassery affiliated to Mahatma Gandhi University, Kottayam.

Mr. Saji K. Jose

HOD, Department of Chemistry

Pavanatma College Murickassery

CERTIFICATE

This is to certify that the project work entitled **" A COMPARITIVE STUDY ON THE QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDERS**" is an authentic work carried out by Miss.Anat Alphonsa Roy, final year BSc Chemistry student with reg no. 200021026713 under my supervision and guidance in the partial fulfilment of the requirement for the Degree of Bachelor Science at Pavanatma College Murickassery affiliated to Mahatma Gandhi University, Kottayam.

Mr. Saji K. Jose

HOD, Department of Chemistry

Pavanatma College Murickassery

DECLARATION

I hereby declare that the project work entitled "**A COMPARITIVE STUDY OF QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDER''** submitted by Amal Sunil to Mahatma Gandhi University for the partial fulfilment of the BSc Degree in Chemistry, under the supervision of Mr. Priyesh B, Senior Manager Quality, Eastern Condiments (P) Ltd Adimali .I declare that this has not been submitted for the award of any degree from any other university.

Murickassery — Amal Sunil

2020-2023 — Reg No: 200021026725

DECLARATION

I hereby declare that the project work entitled ‘’**A COMPARITIVE STUDY OF QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDER’’** submitted by Amala Benny to Mahatma Gandhi University for the award of Bachelor of Science in Chemistry, under the supervision of Mr. Priyesh B (Senior Manager Quality),Eastern Condiments (P) Ltd Adimali, in partial fulfilment for the BSc Degree of Chemistry in Mahatma Gandhi University .I declare that this has not been submitted for the award of any degree from any other university.

Murickassery — Amala Benny

2020-2023 — Reg no: 200021026711

DECLARATION

I hereby declare that the project work entitled ‘’**A COMPARITIVE STUDY OF QUALITY PARAMETERS OF DIFFERENT BRANDS OF CHILLY POWDER’’** submitted by Anat Alphonsa Roy to Mahatma Gandhi University for the award of Bachelor of Science in Chemistry, under the supervision of Mr.Priyesh B Senior Manager Quality,Eastern condiments Adimali, in partial fulfilment for the BSc Degree of Chemistry in Mahatma Gandhi University .I declare that this has not been submitted for the award of any degree from any other university.

Murickassery — Anat Alphonsa Roy

2020-2023 — Reg No: 200021026713

ACKNOWLEDGEMENT

First, I bow my head before the God Almighty who blessed me with the power to complete this industrial endeavour successfully.

I wish to express my deep sense of gratitude to the management of **Eastern condiments Pvt Ltd** for giving me an opportunity to do my project work in their quality control department.

I am grateful to Mr. Priyesh B, Senior Quality Manager under whose expert guidance I carried out this project work. I am very thankful to him for his constant encouragement for the completion of this work

My sincere thanks to Mr. Gokul Krishna, Mrs. Simi Murukesan, Mrs. Linty Poulose, Mrs. Sethulakshmi CS, Mrs. Selvakani S the faculties of the Quality Department, Eastern Condiments Pvt.Ltd, Adimali for their guidance and motivation throughout my project work. I would like to express my sincere thanks to the Principal of Pavanatma College, Murickassery Rev.Dr.Bennichan Scaria who has given us an opportunity to carry out this work in one of the most prestigious industrial organisation , Eastern Condiments (P) Ltd .

I wish to express our profound and sincere thanks to Mr. Saji K Jose, HOD, Department of Chemistry for his guidance, suggestions and encouragement throughout the project. I would like to convey my grateful acknowledgement to all my family members, teachers, friends, classmates and all who have one way or other extended their help and support for the successful accomplishment of this project and to my complete study purpose.

Amal Sunil

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Amala Benny

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Anat Alphonsa Roy

CONTENT

INTRODUCTION

The Eastern condiments Pvt Ltd is one of the largest manufacturers of condiments in South India. Eastern condiments Pvt Ltd was established in the year 1983. The Eastern group was founded by Mr. M.E. Meeran, Founder Chairman of the group. The widest range of products of eastern brand are Eastern spice powders, Masalas, Rice powders,Curry Powders, Coffee, Eastea and snacks.

In the area of curry powders, production is strictly under the control of specific quality parameters. Eastern condiments Pvt Ltd is an ISO 22000 and HACCP certified company. The quality of products is tested by chemical and microbiological methods in the quality control department of Eastern condiments Pvt Ltd.

In the quality department, direct powders (chilli powder, turmeric powder etc.), direct seeds (mustard, cumin etc.), blended curry powders (sambar powder, fish masala etc.), Pickle (mango, ginger, etc.), outsourced product (tamarind, palada, coconut oil etc.) are analysed for quality control.

Chilli (*Capsicum annuum*) is one kind of the vegetable belonging to the family of Solanaceae. Chilli is generally found to be used in three forms, namely, as fresh green chillies, red chilli powder and raw red chilli. Chilli powder is prepared from ripe chilli. It is an important spice used as flavourings or condiments and an indispensable item in the Kitchen For cooking.

Chilli is dried to make chilli powder and to store it for both short- and long-term storage. The most important quality characteristics in chilli are the colour and pungency. Each quality parameter is tested and analysed based on specification limits, present study involves comparison of quality parameters of different brands of chilli powder.

ABOUT EASTERN CONDIMENTS (P) Ltd

Eastern Condiments Pvt Ltd is a flagship company of the Eastern Group. The Eastern Group was founded by late Mr. M.E. Meeran. By starting a wholesale provision goods store at a small town in Idukki district, named Adimaly in 1969, he paved the foundation for a business empire. It was named as "Eastern Trading Company". As being a milestone in the Eastern group's progress, Eastern Coffee and Curry Powder established in 1983 as a pioneer in the state to produce packed curry powders, coffee powder and food products. Eastern Condiments was established in 1991, as an expanded form of Eastern Coffee and Curry Powder.

Today the company has grown to one among the favourites in India. Eastern Condiments PVT. LTD. is a well-established name as Kerala's largest manufacturer of condiments and one of the leading brands among South India. The company exports its products to Saudi Arabia and the United Arab Emirates for the past few years and now the company exports its products to various parts of the world like Middle East, the UK, the U.S.A, Australia, Germany etc.

The production at the initial period was only 100 kg per day. In those days, the process of production was enhanced from grinding to pulverizing and so the production could also help to preserve the natural taste of the powder. As Eastern curry powder unit could not meet the increased demand, establishment of Eastern Condiments with a production capacity of 20 tonnes a day was an absolute necessity. From the initial production capacity of 100 kg per day, now it can produce around 78 tonnes per day.

DESCRIPTION OF CHILLI

Chilli is one of the most important commercial crops of India. It is grown almost throughout the country. There are more than 400 different varieties of chillies found all over the world. It is also known as hot pepper, cayenne pepper, sweet pepper, bell pepper, etc. Its botanical name is "*Capsicum annuum*". The world's hottest chilli "*Naga Jolokia*" is cultivated in hilly terrain of Assam in a small town Tezpur, India. Different varieties are grown for vegetables, spices, condiments, sauces and pickles. Chilli occupies an important place in Indian diet. It is an indispensable item in the kitchen, as it is consumed daily as a condiment in one form or the other. Among the spices consumed per head, dried chilli fruits constitute a major share. Currently, chillies are used throughout the world as a spice and also in the making of beverages and medicines. If some varieties of chillies are famous for red colour because of the pigment *capsanthin*, others are known for biting pungency attributed to *capsaicin.* India is the only country which is rich in many varieties with different quality factors. Chillies are rich in vitamins, especially in vitamins A and C. They are also packed with potassium, magnesium and iron. Chillies have long been used for pain relief as they are known to inhibit pain messengers, extracts of chilli peppers are used for alleviating the pain of arthritis, headaches, burns and neuralgia. It is also claimed that they have the power to boost immune system and lower cholesterol. They are also helpful in getting rid of parasites of gut. The fruit of chilli or Capsicum plants have a variety of names depending on place and type. It is commonly called chilli pepper, red or green pepper, or sweet pepper in Britain, and typically just capsicum in Australian and Indian English. The large mild form is called bell pepper in the US and Canada. It is called paprika in some other countries (although paprika can also refer to the powdered spice made from various capsicum fruit). The original Mexican term, chilli (now

Chile in Mexico) came from the Nahuatl word chilli or xilli, referring to a larger Capsicum variety cultivated since 3000 BC, as evidenced by remains found in pottery from Puebla and Oaxaca. It is universally called by different names such as Piment, Puvre de Guinee, Filfil Ahmar, Paprika, Spaanse Peper, Peperone, Pimento, Struchkovy pyeret, Togarashi, Hesiung Yali chiao, Lal-mirch,etc.

In Indian subcontinent, chillies are produced throughout the year. Two crops are produced in kharif and rabi seasons in the country. Chilli grows best at 20-30°C. Growth and yields suffer when temperature exceeds 30°C or drops below 15°C for extended periods. The crop can be grown over a wide range of altitudes from sea level up to nearly 2100 meter. Chillies are known from pre-historic times in Peru. They are believed to have originated in the tropical America. It is also said that chillies have originated in the Latin American regions of the New Mexico and Guatemala as a wild crop around 7500 BC, as per the remains of the pre-historic Peru. The people native to these places domesticated this crop in and around 5000 BC. Chilli is said to be the first ever domesticated crop in America. The three species *Capsaicin annuum, Capsaicin frutescens and Capsaicin chinense* evolved from a common ancestor located in the North of the Amazon basin (NW-Brazil, Columbia). Further evolution brought *Capsaicin annuum* and *Capsaicin frutescens* to Central America, where they were finally domesticated (in México and Panamá, respectively), whereas *Capsaicin chinense* moved to the West and was first put to cultivation in Perú. Two other species were first cultivated in Western South America*: Capsaicin baccatum* in the Peruvian lowlands and *Capsaicin pubescens* at higher elevations, in the Andes (Perù, Bolivia, Ecuador). At that time, chillies were cultivated by the farmers together with a primary crop to protect the primary crop from any damage from birds. Columbus carried chilli seed to Spain in 1493. The cultivation of

chilli and Capsicum spread rapidly from Spain to Europe. The Portuguese brought capsicum from Brazil to India during the year 1584. Chillies became popular in the whole of Asia rapidly and native Asians started cultivating this crop as well. The south Asian climate suited this crop, and since its introduction in the sixteenth centuries, it has been increasingly cultivated in south Asia. Chillies are the cheapest spices available in India and are eaten across all groups of people. The most important chilli growing states in India are Andhra Pradesh, Maharashtra, Karnataka and Tamil Nadu, which together constitute nearly 75 per cent of the total area. Andhra Pradesh tops the list in dry chilli production followed by Tamil Nadu, Maharashtra, Orissa and Karnataka.

Chilli is a fruit of the plants *'Capsicum annuum'* and *'Capsicum frutecens'* that come from the genus 'Capsicum, belonging to the family of Solanaceae, which also includes tomato and potato. Capsicum is derived from the Greek word “Kapsimo” meaning "to bite." Genus Capsicum is divided into three sections by Hunziker- Monotypic Tubocapsicum, Pseudoacnistus and Capsicum. All the species in the genus have n=12 except *Capsaicin ciliatum* and *capsaicin scolnikianum* which have n=13. Genus Capsicum includes 22 wild species and three varieties as well as five domesticated species and their wild relatives. In general, domesticated species have larger but fewer fruits than its wild counterparts though seed per plant is about the same. Chilli Plant is an annual sub-herb, and the fruits vary in shape, size, colour and degree of pungency. Capsicum plants are herbaceous or semi-woody annuals or perennials. The leaves are ovate, tapering to a sharp point, measuring up to 15 cm, dark green on the upper surface and pale green on the lower surface. The flowers are small, white and borne singly or in clusters of 2 or 3 in the axils of the leaves. The fruits are of diverse shapes and sizes depending upon the variety.

OBJECTIVES

Chilli powder and all other curry powders should meet certain specifications to ensure the quality of the product. In order to maintain the best quality of the product it is very much necessary to manufacture under some specific standards. Chilli powder is greatly consumed for preparing a variety of vegetable and non – vegetable food items. The quality of these products increases the taste and quality of the food products. The quality of chilli powder is tested mainly by chemical and instrumental analysis in the Quality control department of Eastern condiments Pvt Ltd.

The main objectives of the project are to determine the quality parameters of chilli powder such as:

- The moisture contents
- Total ash
- Acid insoluble ash
- Non-Volatile Ether Extract
- ASTA colour value

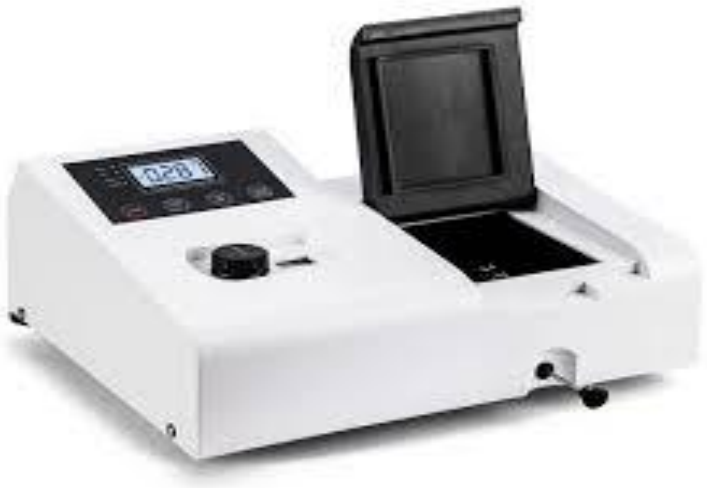
METHODS AND MATERIALS

PHYSICAL AND CHEMICAL ANALYSIS OF CHILLY POWDER

EXPERIMENT	EQUIPMENTS &CHEMICALS
Moisture	Moisture distillation apparatus (Dean and stark apparatus), Hexane
Total ash	Crucible, Muffle furnace, Desiccator, Fume hood, Analytical balance, Bunsen burner
Acid insoluble ash	Crucible, Muffle furnace, Desiccator, Fume hood, Analytical balance ,Bunsen burner , Funnel , Filter paper ashless , Watch glass ,HCl ,Distilled water
Non - Volatile Ether Extract	Soxhlet apparatus, Petroleum Ether, Thimble

INSTRUMENTATION METHOD

ASTA colour	Spectrophotometer, Absorption cells, Standard glass filter, Volumetric flasks, Acetone.



SPECTROPHOTOMETER

SIGNIFICANCE OF PARAMETERS

1. THE MOISTURE CONTENT

Moisture content or water content is the quantity of water contained in a material such as soil, rock, ceramics, crops or wood. The determination of moisture is often a critical component in manufacturing processes and quality assurance.

Moisture content influences the taste, texture, weight, appearance and self-life of food stuffs. Even a slight deviation from a defined standard can adversely impact the physical properties of food material. For example, substances which are too dry could affect the consistency of the end product. Conversely, excess moisture may cause food material to agglomerate or become trapped in the piping systems during production. Also the rate of microbial growth increases with water content, possibly resulting in spoiled batches, that need to be disposed off . However, water is also an expensive ingredient adding to the weight of the final product. Hence, obtained an optimal analytical value for moisture is of great economic importance to a food manufacturer. For these reasons, analysts engage in the delicate balancing of moisture and total solids to ensure consistent product quality, safety and profitability.

Moisture content analysis is a critical component of material quality and essentially a function of quality control in production and laboratory facilities. From biological research organisations, pharmaceutical manufacturers, to food producers and packers, moisture content control greatly influences the physical properties and product quality of nearly all

substances and materials at all stages of processing and final product existence.

2. TOTAL ASH

The ash content is a measure of the total amount of minerals present within a food. Whereas the mineral content is a measure of the amount of specific inorganic components present within a food such as Ca, Na, K, Cl.

Ash is the inorganic residue remaining after the water and organic matter have been removed by heating in the presence of oxidising agents, which provides a measure of the total amount of minerals within a food.

The analysis of ash content in foods is simply the burning away of organic content, leaving inorganic minerals. This helps determine the amount and type of minerals in food, and it is important because the amount of minerals can determine physiochemical properties of foods, as well as retard the growth of microbial organisms.

3. ACID INSOLUBLE ASH

The total ash is the residue remaining after incineration. The acid insoluble ash is the part of the total ash which is insoluble in diluted hydrochloric acid. Ash values are helpful in determining the quality and purity of crude drugs in powder form.

4.NON VOLATILE ETHER EXTRACT

Non Volatile Ether Extract (NVEE); The whole of the non-volatile substances extracted be diethyl ether undressed the conditions specified in this international standard . NVEE is a qualitative measure of the flavour component in a spice that is not volatile and is present as fixed oil.

5. ASTA COLOUR VALUE-SPECTROPHOTOMETER

The pigment content increases as the fruit ripens and continues after maturity. The extractable colour is usually in ASTA colour value or in units which are 40 times the ASTA colour.

ASTA stands for American Spice Trade Association, which provide the industry standard for analytical testing of spices.

SPECTROPHOTOMETER

Spectrophotometer is an instrument that measures the amount of light absorbed by a sample. Spectrophotometer techniques are used to measure the concentration of solutes in solutions by measuring the amount of light that is absorbed by the solution in a cuvette placed in the spectrophotometer.

The spectrophotometer technique is to measure light intensity as a function of wavelength. It does thus by diffracting the light beam into a spectrum of wavelengths, detecting the intensities with a charge- couple device, and then the displaying device.

A spectrophotometer optically determines the absorbance or transmissions or characteristics the wavelength radiant energy (light) by a chemical species in a solution. Each molecule absorbs light at certain wavelengths in a unique spectral pattern because of the number and arrangement of its characteristic functional groups such as double bonds between carbon atoms.

According to Beer -Lambert's law the amount of light absorbed at this wavelength is directly proportional to the concentration of the chemical species. Beer-Lamberts law is the basic principle of spectrophotometer.

The main uses of spectrophotometer are to measure the concentration of the solution, for identifying organic compounds by determining the absorption maximum and also used for colour determination within the spectral range.

SAMPLE PRESENTATION IN TABLE

BRAND 1	EASTERN
BRAND 2	KITCHEN TREASURES
BRAND 3	SARAS
BRAND 4	DEVON
BRAND 5	RAIDCO

EXPERIMENTS

DETERMINATION OF MOISTURE

AIM

To find the moisture content in spices. The amount of water is determined by distilling the material with water and collecting the distillate in a graduated tube.

PRINCIPLE

Thermogravimetric method of moisture content determination is determined as the material is heated. The sample weight is taken prior to heating and again after reaching a steady state. Mass is measured before and after the drying process for final moisture determination on percentage basis.

REAGENTS

Hexane- for capsicums, onions, garlic and other spices containing large amount of sugar.

APPARATUS

Moisture distillation apparatus- consists of 500 ml short neck round bottomed flask heating by suitable means and provided with a reflux condenser discharging into a trap connected to the flask. The trap serves to collect and measure the condensed water and to return the condensing solvent to the flask.

PROCEDURE

Weigh to the nearest 0.01 gm of about 40 gm of prepared sample (or enough to yield 2-5 ml H20 in the trap). Transfer to the distilling flask with hexane. Add enough hexane to cover test portion completely. Fill receiving tube with hexane pouring it through top of the condenser until it begins to overflow into the distillation flask. Insert loose cotton plug in top of the condenser to prevent condensation of amphoteric moisture in the tube. Add a few boiling chips to avoid bumping.

Bring to boil and distil slowly about 2 drops per second (about 100 drops per minute) until most of water distils over, then increase rate of distillation to 4 drops per second. Continue distilling until two consecutive readings 15 minutes apart show no change (about 3 hrs). Dislodge any water held up in the condensed with wire loop. Rinse condenser carefully with 5 ml hexane. Continue distillation for 3-5 minutes, cool receiver to room temperature allowing it to stand in air or cooling it in water. Solvent and water layers should now be clear if not let stand until clearing occurs. Read volume of water estimating to nearest 0.1 ml and calculate percentage.

CALCULATIONS

Moisture content (% by weight) = ((volume of water collected (ml)) / weight of sample (g)) *100

Brand 1

Moisture content = ((2.2) / 40.0482) *100 = 5.49 %

Brand 2

Moisture content = ((2.2) / 40.0074) *100= 5.49 %

Brand 3

Moisture content = ((2.6) / 40.1295) *100= 6.48 %

Brand 4

Moisture content = ((2.3) / 40.0375) *100 = 5.74 %

Brand 5

Moisture content = ((2.1) / 40.0043) *100 = 5.25 %

RESULT

Moisture content of Brand 1 = 5.49 %

Moisture content of Brand 2 = 5.49 %

Moisture content of Brand 3 = 6.48 %

Moisture content of Brand 4 = 5.74 %

Moisture content of Brand 5 = 5.25 %

TOTAL ASH

AIM

To determine as ash, the residue remaining after ignition.

PRINCIPLE

Ash is the inorganic residue remaining after the water and organic matter have been removed by heating in the presence of oxidizing agents, which provides a measure of the total amount of mineral within a food.

APPARATUS

- Flat bottomed dish or crucible, preferably platinum or silica with minimum capacity of 50 ml.
- Muffle Furnace-regulated at 600+/-20 °C
- Desiccators containing desiccant such as anhydrous CaSO4 or silica gel with indicator.
- Fume hood or equivalent ventilating system
- Analytical balance, sensitivity 0.0001g (0.1 mg)

PROCEDURE

Ignite the bottomed dish or crucible to a dull redness, cool to room temperature in a desiccator and weigh to the nearest 0.0001 g (0.1 mg). Weigh accurately 2 to 3 g of well mixed sample in the dish or crucible to the nearest 0.1 mg. Place a dish or crucible in the entrance of open muffled furnace until the sample is well carbonized at 600+/- 20 °C. Incinerate for 2 hrs until light ray ash is obtained or to constant weight. If carbon remains, leach ash with hot water, filter through ashless filter paper. Wash paper thoroughly and transfer paper and contents to the original crucible. Dry and ignite in the muffle furnace at 600+/-20°C, until the ash is white. Cool dish with filtrate to place the crucible in desiccator, cool and weigh to nearest 0.0001 g (0.1 mg)sensitivity 0.0001 g (0.1 mg)

CALCULATIONS

Ash % = ((weight of ash (g)) / weight of sample (g))*100

Brand 1

Ash % = ((0.1107) / 2.0127)*100 = 5.5%

Brand 2

Ash % = ((0.1402) / 2.0127)*100 = 6.97 %

Brand 3

Ash % = ((0.1562) / 2.0731)*100 = 7.53 %

Brand 4

Ash % = ((0.1631) / 2.0072)*100 = 8.126 %

Brand 5

Ash % =((0.1681) / 2.0583)*100 = 8.17 %

RESULT

Ash percentage of Brand 1 = 5.5%

Ash percentage of Brand 2 = 6.97 %

Ash percentage of Brand 3 = 7.53 %

Ash percentage of Brand 4 = 8.126 %

Ash percentage of Brand 5 = 8.17 %

DETERMINATION OF ACID INSOLUBLE ASH

AIM

To determine ash, the insoluble residue remaining after treatment of total ash with HCl.

PRINCIPLE

The acid insoluble ash content is the proportion of a sample that is not hydrolysed by 72 % sulphuric acid and is not subsequently volatilised upon the incineration of this acid insoluble residue for determining ash (acid insoluble).

REAGENTS

- Con. HCI
- Distilled water

APPARATUS

- Flat bottomed dish or crucible, preferably platinum or silica with minimum capacity of 50 ml.

- Muffle Furnace-regulated at 600+/-20 °C
- Desiccators containing desiccant such as anhydrous CaSO4 or silica gel with indicator.
- Fume hood or equivalent ventilating system
- Analytical balance, sensitivity 0.0001g (0.1 mg)

PROCEDURE

Add 25 ml of the HCI solution and boil for 5 minutes. Cover the dish with a watch glass to prevent splattering. Filter through an ashless filter paper. Wash with hot distilled water until the washings are acid free. Transfer the filter paper and its contents to the original crucible. Dry and ignite in a muffle furnace at 600+/-20°C until the ash is carbon free. Ash is obtained. Remove the crucible to a desiccator, cool to room temperature and weigh immediately.

CALCULATIONS

Acid insoluble ash (% by weight) = ((Weight of acid insoluble ash (g)) / Weight of spice sample(g)) *100

Brand 1

Acid insoluble ash (% by weight) = ((0.0030) / 2.0127) *100 = 0.1494%

Brand 2

Acid insoluble ash (% by weight) = ((0.0024) /2.0127) *100 = 0.1192%

Brand 3

Acid insoluble ash (% by weight) = ((0.0035) /2.031) *100 = 0.1688 %

Brand 4

Ash insoluble ash (% by weight) = ((0.0075) / 2.0072) *100 = 0.37 %

Brand 5

Acid insoluble ash (% by weight) = ((0.002) /2.0583) *100 = 0.097 %

RESULT

Acid insoluble ash percentage of Brand 1 =0.1494%

Acid insoluble ash percentage of Brand 2 = 0.1192 %

Acid insoluble ash percentage of Brand 3 = 0.1688 %

Acid insoluble ash percentage of Brand 4 = 0.37%

Acid insoluble ash percentage of Brand 5 = 0.097 %

DETERMINATION OF NON-VOLATILE

ETHER EXTRACT

AIM

To determine the non - volatile ether extract of different brands of chilli powder.

PRINCIPLE

Extraction of the material with diethyl ether is carried out by the removal of the volatile fractions and removal of the insoluble substances then drying of the non - volatile residue and weighing is done.

REAGENTS

- Petroleum Ether

APPARATUS

- Flask with reflux
- Thimble
- Soxhlet extractor
- Reflux condenser

PROCEDURE

Extract 2g of sample in a continuous extraction apparatus (Soxhlet apparatus) with Petroleum Ether for 18 hrs. Remove the ether by distillation followed by blowing with a steam of air with the flask on a boiling water bath and dry in an oven at 100 + /-1°c till the loss in weight between two successive weighing is less than 2 mg. Shake the residue with 2-3 ml of petroleum ether at room temperature allowing to settle and decant the ether. Repeat the extraction until no residue dissolves. Dry the flask again until the loss in mass between two successive weighing is less than 2 mg. Record the lowest weight.

CALCULATIONS

Non-volatile ether extract (% by weight) = ((W1-W2) / W)*100

Where, W1 - weight of the flask with Non-Volatile Extract

W2-weight of the flask with ether insoluble residue after decantation

W - weight of the sample taken for test

Brand 1

Non-Volatile Ether Extract (% by weight) =((206.9343 - 206.5940) / 2.0161)*100 = 16.88%

Brand 2

Non-Volatile Ether Extract (% by weight) = ((206.8860 – 206.5200) / 2.0502)*100 =17.85%

Brand 3

Non-Volatile Ether Extract (% by weight) = ((189.4796 – 189.1525) / 2.0131) *100= 16.25%

Brand 4

Non-Volatile Ether Extract (% by weight) = ((206.9435 – 206.5940) / 2.0171)*100 = 17.33%

Brand 5

Non-Volatile Ether Extract (% by weight) = ((189.5104 – 189.1406) / 2.0145)*100 = 18.36%

RESULT

Non-Volatile Ether Extract of Brand 1 =16.88%

Non-Volatile Ether Extract of Brand 2 = 17.85%

Non-Volatile Ether Extract of Brand 3 = 16.25%

Non-Volatile Ether Extract of Brand 4 = 17.33%

Non-Volatile Ether Extract of Brand 5 = 18.36%

DETERMINATION OF COLOUR VALUE

AIM

To determine the extractable colour in chillies.

PRINCIPLE

ASTA colour is based on a transmission measurement of chilli powder in solution using a 10 mm path length cell rather than measuring the chilli in reflectance through the bottom of a sample cup.

APPARATUS

- Spectrophotometer- capable of accurately measuring at 460 nm
- Absorption cells-1 cm quartz cells
- Standard glass filter-(standard reference material 2030 from the national bureau standards)
- Volumetric flasks- Amber coloured 100 mL with ground glass stopper

REAGENTS

- Acetone

PROCEDURE

- Unground Capsicum must be ground to pass through 0.5 No.20 sieve.
- Accurately weigh 0.1 g of sample and transfer to a 100mL volume flask.
- Fill to mark with acetone and stopper tightly.
- Shake the flask and let stand minimum 16 hr at room temperature in dark.
- Shake the flask and allow two minutes for the particles to settle.
- Transfer a portion of the extract to the spectrophotometer cell and measure the absorbance (A) at 460 nm with acetone blank.

CALCULATIONS

Extractable ASTA colour = (Absorbance of acetone extract x16.4)/

Sample weight in g

Brand 1

Extractable ASTA colour = (0.451 x 16.4) / 0.1042 = 70.98 ASTA

Brand 2

Extractable ASTA colour = (0.407 x 16.4) / 0.1075 = 62.09 ASTA

Brand 3

Extractable ASTA colour= (0.383 x 16.4) / 0.1069 = 58.76 ASTA

Brand 4

Extractable ASTA colour = (0.322 x 16.4) / 0.1024 = 51.57 ASTA

Brand 5

Extractable ASTA colour = (0.296 x 16.4) / 0.1027 = 47.26 ASTA

RESULT

Extractable ASTA colour of Brand 1 = 70.98 ASTA

Extractable ASTA colour of Brand 2 = 62.09 ASTA

Extractable ASTA colour of Brand 3 = 58.76 ASTA

Extractable ASTA colour of Brand 4 = 51.57 ASTA

Extractable ASTA colour of Brand 5 = 47.26 ASTA

RESULTS AND DISCUSSIONS

SL No	PARAMETERS	SPECIFICATION	BRAND 1	BRAND 2	BRAND 3	BRAND 4	BRAND 5
1	Moisture	11% max	5.49%	5.49%	6.48%	5.74%	5.25%
2	Total Ash	8% max	5.5%	6.97%	7.53%	8.126 %	8.17%
3	Acid insoluble ash	1.3% max	0.055 %	0.119 %	0.168 %	0.370 %	0.097 %
4	Non-Volatile Ether Extract	12% min	16.88 %	17.85 %	16.25 %	17.33 %	18.36 %
5	ASTA Colour	130 ASTA	70.98 ASTA	62.09 ASTA	58.76 ASTA	51.57 ASTA	47.26 ASTA

From the entire study and analysis done through the project work it gave us important details and results about quality parameters of different brands of chilli powder. All samples were in the specification limits. The slight variations in different brands may due the processing, packing material or the place of storage or the transportation.

- The maximum limit of moisture content is 11 percentage. And all brands having less percentage of moisture content than the specification limit.
- Brand 5 has high ash content than the other four samples, but all are under the specification limit.
- Acid insoluble ash percentage is very less in all brands compared with the maximum specific limit.
- Non-Volatile Ether Extract is higher for the sample 5 and that will be more favouring among the five brands.
- The colour value of chilli powder is expressed in ASTA and the specific limit of colour value is different for different type chillies. From the result of analysed samples, colour value is greater in sample 1.

CONCLUSION

Chilli powder is a main spice powder commonly used in India. In this work five brands of chilli powders are chosen randomly and analysed. It's chemical and physical properties were analysed; mainly colour, moisture, total ash content, acid insoluble ash content, and non-volatile ether extract.

Tabulated results give the quality parameters of chilly powders of different brands in the market. All results are well within the limits specified in the **FSSAI** Standards and these products are safe.....

REFERENCE

- ASTA method 20 ,14th edition revised January 1997
- ASTA method 20,4th edition revised January 1997
- ASTA method 4.0 ,4th edition revised January 1997
- Indian standard procedures
- PM Formalisation of Micro Food Processing Enterprises Scheme
- Eastern manuals for analysis of parameters of chilly
- I L Finer ‘Organic Chemistry ‘Volume 2 stereochemistry of natural products
- O P Agarwal Chemistry of natural products
- V K Ahluwalia, Renu Agarwal comprehensive practical organic chemistry preparation and quantitative analysis