

# SHIVAJI UNIVERSITY, KOLHAPUR



Estd.in 1962

'A<sup>++</sup>' Accredited by NAAC (2021) with CGPA 3.52

## CHOICE BASED CREDIT SYSTEM

Syllabus For B.Sc. Part - II

Food Science (Entire)

SEMESTER III & IV

(Syllabus to be implemented from June-2022)

**CBCSB.Sc.FoodScience(Entire):Listofcourses**

**B.ScFoodSciencePart-II(SemesterIII& IV)**

**THEORY**

Coursecode	NameofCourse	Coursecode	NameofCourse
<b>Semester-III</b>		<b>Semester-IV</b>	
<b>DSCFS-C1</b>	CerealandBakeryProductProcessing-I	<b>DSCFS-D1</b>	MilkandMilkProductProcessing-I
<b>DSCFS-C2</b>	CerealandBakeryProductProcessing-II	<b>DSCFS-D2</b>	MilkandMilkProductProcessing-II
<b>DSCFS-C3</b>	LegumeandOilseedProcessing-I	<b>DSCFS-D3</b>	Meat,FishandPoultryProcessing-I
<b>DSCFS-C4</b>	LegumeandOilseedProcessing-II	<b>DSCFS-D4</b>	Meat,FishandPoultryProcessing-II
<b>DSCFS-C5</b>	FruitsandVegetableProcessing-I	<b>DSCFS-D5</b>	SpicesandCondimentsProcessing-I
<b>DSCFS-C6</b>	FruitsandVegetableProcessing-II	<b>DSCFS-D6</b>	SpicesandCondimentsProcessing-II
<b>AECC-C</b>	EnvironmentalStudies(Theory)	<b>AECC-D</b>	EnvironmentalStudies(Project)

**PRACTICAL**

<b>*DSCFS-P5</b>	LabCourseV (BasedonDSCFS-C1&DSCFS-C2,DSCFS-D1&DSCFS-D2)
<b>DSCFS-P6</b>	LabCourseVI (BasedonDSCFS-C3&DSCFS-C4,DSCFS-D3&DSCFS-D4)
<b>DSCFS-P7</b>	LabCourseVII (BasedonDSCFS-C5&DSCFS-C6,DSCFS-D5&DSCFS-D6)

DSCFS:DisciplineSpecificCoreCourseFoodScience

\*AECC:AbilityEnhancementCompulsoryCourse:EnvironmentalStudies

**(i) Structure of B.Sc. Food Science (Entire) Program [Semester III & IV]  
Structure-II**

<b>SEMESTER-III (Duration-6Months)</b>																	
Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME									
		THEORY			PRACTICAL			THEORY				PRACTICAL					
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Max	Total Marks	Min	Hours	Max	Min			
1	DSC-FS-C1	2	3	2.4	4	8	6.4	2	50	100	35	Practical Examination is ANNUAL	50	18			
2	DSC-FS-C2	2	3	2.4				2	50								
3	DSC-FS-C3	2	3	2.4				2	50								
4	DSC-FS-C4	2	3	2.4				4	8	6.4	2		50	100	35	50	18
5	DSC-FS-C5	2	3	2.4							2		50				
6	DSC-FS-C6	2	3	2.4							2		50				
7	AECC-C	4	4	3.2	---	---	---	---	---	---	---		---	---			
	<b>TOTAL</b>	<b>16</b>	<b>22</b>	<b>17.6</b>	<b>12</b>	<b>24</b>	<b>19.2</b>			<b>300</b>	<b>---</b>		<b>---</b>	<b>---</b>			
<b>SEMESTER-IV (Duration-6Months)</b>																	
1	DSC-FS-D1	2	3	2.4	4	8	6.4	2	50	100	35	As per BOS Guidelines	50	18			
2	DSC-FS-D2	2	3	2.4				2	50								
3	DSC-FS-D3	2	3	2.4				4	8						6.4	2	50
4	DSC-FS-D4	2	3	2.4						2	50						
5	DSC-FS-D5	2	3	2.4						4	8		6.4	2		50	100
6	DSC-FS-D6	2	3	2.4				2	50								
7	AECC-C AECC-D	---	---	---	---	---	---	3	70 30	100	25 10		---	---			
	<b>TOTAL</b>	<b>12</b>	<b>18</b>	<b>14.4</b>	<b>12</b>	<b>24</b>	<b>19.2</b>				<b>400</b>	<b>---</b>		<b>---</b>	<b>---</b>		
			<b>40</b>	<b>32</b>		<b>48</b>	<b>38.4</b>			<b>700</b>	<b>--</b>		<b>300</b>				
<ul style="list-style-type: none"> <li>Student contact hours per week: 32 Hours (Min.)</li> </ul>						<ul style="list-style-type: none"> <li>Total Marks for B.Sc.-II (Including EVS) <b>1000</b></li> </ul>											
<ul style="list-style-type: none"> <li>Theory and Practical Lectures: 48 Minutes Each</li> </ul>						<ul style="list-style-type: none"> <li>Total Credits for B.Sc.-II (Semester III &amp; IV):</li> </ul>											
<ul style="list-style-type: none"> <li><b>DSC</b>:- Discipline Specific Core Course: All papers are compulsory.</li> </ul>																	
<ul style="list-style-type: none"> <li><b>AECC</b>- Ability Enhancement Compulsory Course (C): Environmental Studies: EVS (Theory-70 &amp; Project-30 Marks)</li> </ul>																	
<ul style="list-style-type: none"> <li>Practical Examination will be conducted annually for 100 Marks per course (subject).</li> </ul>																	
<ul style="list-style-type: none"> <li>There shall be separate passing for theory and practical courses also for Environmental Studies.</li> </ul>																	

# Shivraj College Gadhinglaj Syllabus B.Sc. Part II, semester III and IV

## Theory

**CBCS B. Sc. Food Science (Entire): List of courses  
B. Sc Food Science Part-II (Semester III & IV)**

<b>THEORY Course code</b>	<b>Name of Course</b>	<b>Course code</b>	<b>Name of Course</b>
<b>Semester-III</b>		<b>Semester-IV</b>	
<b>DSC FS-C1</b>	Cereal and Bakery Product Processing-I	<b>DSC FS-D1</b>	Milk and Milk Product Processing-I
<b>DSC FS-C2</b>	Cereal and Bakery Product Processing-II	<b>DSC FS-D2</b>	Milk and Milk Product Processing-II
<b>DSC FS-C3</b>	Legume and Oilseed Processing-I	<b>DSC FS-D3</b>	Meat, Fish and Poultry Processing-I
<b>DSC FS-C4</b>	Legume and Oilseed Processing-II	<b>DSC FS-D4</b>	Meat, Fish and Poultry Processing-II
<b>DSC FS-C5</b>	Fruits and Vegetable Processing-I	<b>DSC FS-D5</b>	Spices and Condiments Processing-I
<b>DSC FS-C6</b>	Fruits and Vegetable Processing-II	<b>DSC FS-D6</b>	Spices and Condiments Processing-II
<b>AECC-C</b>	Environmental Studies --- --- (Theory)	<b>AECC-D</b>	Environmental Studies--- --- (Project)

## **B.Sc. Part II, Semester III**

### **DSC FS –C1 Cereals and Bakery Product Processing-I**

#### **Unit I**

##### **Wheat:**

Structure and chemical composition of wheat grain

Wheat milling

Grades of wheat flour

Dough rheology

##### **Rice:**

Structure and chemical composition of rice grain

Milling of rice

Modern rice milling unit operation

Rice Parboiling technology

#### **Unit II**

##### **Raw material of bakery products:**

Introduction and importance of bakery

Ingredients used and their function

Process parameter

##### **Equipments:**

Working, principle and application

1. Dough mixer
2. Molding machine
3. Oven machine

##### **Suggested Reading:**

1. Bakery Products Science and Technology, Y.H.Hui, Wiley Blackwell Publishing, 2014.
2. Bakery and Confectionary products, Acharya N.G.Ranga Agricultural University
3. Cereal Processing Technology, Gavin Owens, WoodHead Publishing Ltd, 2000.
4. Textbook of Bakery and Confectionery, Yogambal Ashokkumar, Prentice Hall India Learning Private Limited, 2012.
5. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014.

**B.Sc. Part II, Semester III**  
**DSC FS –C2 Cereals and Bakery Product Processing-II**

**Unit I**

**Corn**

Structure and composition of corn grain (different types)

Wet and dry milling

High fructose syrups and their uses

**Barley**

Structure and composition of barley

Barley malting process

Significance of malting

Different types of malts and their food applications

**Unit II**

**Processing of bakery product:**

Procedure of different types of bakery products (bread, cookies, crackers, cake and biscuits etc)

Defects of baked products

**Preservation of bakery products:**

Freezing and frozen storage of baked products

Canned bakery product

Safety and hygiene of bakery plants

**Suggested reading:**

1. Bakery Products Science and Technology, Y.H.Hui, Wiley Blackwell Publishing, 2014.
2. Bakery and Confectionary products, Acharya N.G.Ranga Agricultural University
3. Cereal Processing Technology, Gavin Owens, WoodHead Publishing Ltd, 2000
4. Textbook of Bakery and Confectionery, Yogambal Ashokkumar, Prentice Hall India Learning Private Limited, 2012.
5. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014.

**B.Sc. Part II, Semester III**  
**DSC FS –C3 Legume and Oilseed Processing –I**

**Unit I**

**Legume**

Introduction and composition of legumes

Structure of legumes

Processing (germination, fermentation, soaking, popping, dehulling, milling etc)

**Unit II**

**Introduction to oilseeds**

Structure and chemical composition of oilseeds

Functional and nutritional importance of dietary oil seeds

Post harvest handling storage processing of oilseeds

**Suggested reading:**

1. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014.
2. Cereal Processing Technology, Gavin Owens, WoodHead Publishing Ltd, 2000.
3. Food Science, B. Srilakshmi, New Age International Pvt Ltd Publisher 7<sup>th</sup> Edition, 2018.
4. Physical and chemical characteristics of oils, fats and waxes, David Firestone, Amer oil chemist's society, 3<sup>rd</sup> Edition, 2006
5. Vegetables and oils in food technology Frank D.Gunstone.2002

**B.Sc. Part II, Semester III**  
**DSC FS – C4 Legume and Oilseed Processing II**

**Unit I**

Introduction and composition of pulses

Structure of pulses

Processing of pulses (milling, decortications, soaking, fermentation, parching and puffing, extrusion etc)

**Unit II**

**Extraction and refining of oil**

Extraction methods

Traditional and modern

Advantage and disadvantages

**Refining**

Refining processes (clarification, degumming, deodorization, bleaching, nutilisation ,etc )

Processing of refined oils (hydrogenation, fractionation, winterization etc)

**Suggested reading:**

1. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014.
2. Cereal Processing Technology, Gavin Owens, WoodHead Publishing Ltd, 2000.
3. Food Science, B. Srilakshmi, New Age International Pvt Ltd Publisher 7<sup>th</sup> Edition, 2018.
4. Physical and chemical characteristics of oils, fats and waxes, David Firestone, Amer oil chemists society, 3<sup>rd</sup> Edition, 2006
5. Vegetables and oils in food technology Frank D.Gunstone.2002



## **B.Sc.Part II, Semester III**

### **DSC FS –C5 Fruits and vegetables processing I**

#### **Unit I**

##### **Introduction of fruits and vegetable**

Classification and composition of fruits and vegetables

Climacteric and non- climacteric fruits

Post harvest handling and treatments

Storage of fresh fruits and vegetables

#### **Unit II**

##### **Processed fruit products**

Jam (constituents, processing and technology)

Jelly (Essential constituents, processing defect in jelly)

Marmalade (types, processing and technology, defects)

##### **Suggested reading:**

1. Preservation of fruits and vegetables: principles and practices Dr.Shrivastav and Dr. Sanjeevkumar, Hardback Published, 2002.
2. Preservation of Fruits and Vegetables GirdhariLal, Siddhapa and Tondon,New Delhi : Publications and Information Division, Indian Council ofAgricultural Research, 2011.
3. Fruit and Vegetable Processing, Sri S. ChennaKesava Reddy, Acharya NG Ranga Agricultural University.
4. Fruit and Vegetables Harvesting, Handling and Storage, A. K. Thompson, Blackwell Publishing Ltd,2003.
5. Handbook of Fruits and Fruit Processing, Editor Y. H. Hui Associate Editors J´ozsefBarta, M. Pilar Cano, Todd W. Gusek, Wiley-Blackwell publisher, 2006.

## **B.Sc. Part II, Semester III**

### **DSC FS – C6 Fruits and Vegetable Processing II**

#### **Unit I**

##### **Introduction and processing of fruit juices**

Types of fruit juices

Preservation of fruit juices (pasteurization, chemical preserved with sugar, freezing, drying, tetra- packaging, cordial, nector etc.)

#### **Unit II**

##### **Processed vegetable products**

Tomato (introduction, processing of tomato juice, puree, paste, sauce, ketup and soup)

Potato (introduction, processing of potato chips and French fries)

##### **Suggested reading:**

1. Preservation of fruits and vegetables: principles and practices Dr. Shrivastav and Dr. Sanjeevkumar, Hardback Published, 2002.
2. Preservation of Fruits and Vegetables Girdhari Lal, Siddhapa and Tondon, New Delhi : Publications and Information Division, Indian Council of Agricultural Research, 2011.
3. Fruit and Vegetable Processing, Sri S. Chenna Kesava Reddy, Acharya NG Ranga Agricultural University.
4. Fruit and Vegetables Harvesting, Handling and Storage, A. K. Thompson, Blackwell Publishing Ltd, 2003.
5. Handbook of Fruits and Fruit Processing, Editor Y. H. Hui Associate Editors J'ozsef Barta, M. Pilar Cano, Todd W. Gusek, Wiley-Blackwell publisher, 2006.

**B.Sc. Part II, Semester IV**  
**DSC FS –D1 Milk and Milk Products Processing I**

**Unit I**

**Introduction of dairy industry**

Milk processing industry in India

Dairy layout for small scale industry

Introduction and composition of milk

**Unit II**

**Introduction of Milk and Primary Processes**

The Food value and Composition of milk.

Factors affecting Composition of milk

(Buying, receiving, collection, Transportation of milk, storage and distribution of milk, processing of milk, filtration, clarification, cream separation and heat, Treatment of milk.)

**Suggested reading**

1. Outlines of Dairy Technology, Sukumar De, Oxford University Press, 1st edition, 2001.
2. Dairy Engineering Advanced Technologies and Their Applications, Rupesh S Chavan, Netra R Goyal, Murlidhar Meghwal, Taylor and Fancis, 1st edition, 2017.
3. Dairy Technology, Shivashraya Singh, illustrated, New India Publishing Agency- Nipa, 2013.
4. Structure of Dairy Products, A.Y. Tamime, Wiley-Blackwell, 1st edition, 2007.
5. Indian Dairy Products, Rangappa K.S., Asia Pub. House, 2nd edition, 1975.

## **B.Sc. part II, semester IV**

### **DSC FS –D2 Milk and milk product processing II**

#### **Unit I**

##### **Different milk products**

Concentrated milk products (Condensed Milk, Evaporated Milk, Khoa, Gulabjamun, Pedha)

Coagulated milk products (Paneer, Rasgula)

Fermented product (curd, yoghurt, shrikhand)

Dried product (butter milk powder, whey powder, ice cream mix powder, infant milk food, WMP, SMP)

Other product (whole milk, standardized milk, reconstituted milk, toned & double toned milk, cream and butter )

#### **Unit II**

##### **Byproducts Utilization**

Introduction, Classification and Composition of byproducts.

Principles and methods of Utilization Whey utilization and whey based beverages like lassi and buttermilk.

##### **Suggested reading:**

1. Outlines of Dairy Technology, Sukumar De, Oxford University Press, 1st edition, 2001.
2. Dairy Engineering Advanced Technologies and Their Applications, Rupesh S Chavan, Netra R Goyal, Murlidhar Meghwal, Taylor and Francis, 1st edition, 2017.
3. Dairy Technology, Shivashraya Singh, illustrated, New India Publishing Agency- Nipa, 2013.
4. Structure of Dairy Products, A.Y. Tamime, Wiley-Blackwell, 1st edition, 2007.
5. Indian Dairy Products, Rangappa K.S., Asia Pub. House, 2nd edition, 1975.

## **B.Sc. part II, semester IV**

### **DSC FS – D3 Meat, fish and poultry processing I**

#### **Unit I**

##### **Poultry processing**

Poultry products: types

Chemical and nutritive value of poultry meat

Slaughtering and evaluation of poultry carcasses

Poultry cut parts and meat/ bone ratio

Preservation of poultry- meat.

#### **Unit II**

##### **Egg and egg products**

Structure, composition and nutritive value of egg

Storage and shelf -life problems

Quality evaluation of eggs

Egg products: egg powder, value added egg products

Preservation of egg

#### **Suggested reading:**

1. Meat, Poultry & Fish Products Technology, Syed Imran Hashmi, VNMAU Parbhani
2. Principles of Meat Science Aberle E.D. Kendall Hunt Publication, Fifth edition, 2012
3. Handbook of Heat and Meat Processing Hue Y.H. CRC Press, New York, 2012
4. Meat Processing Improving Quality, Joseph Kerry.
5. Fish Processing Technology, George M Hall published by Backie academic and professional, 2<sup>nd</sup> edition.
6. Post-harvest technology of fish and fish products, K.K.Balachandran published DAYA publishing house, 2016

## **B.Sc. Part II, Semester IV**

### **DSC FS –D4 Meat, Fish and Poultry Processing II**

#### **Unit I**

##### **Meat processing**

Introduction and importance of meat products in India

Chemical composition and nutritive value of meat

Ante-mortem examination of meat animals

Pre- slaughtering operations

Scientific techniques of slaughtering

Post-mortem inspection, storage, preservation

#### **Unit II**

##### **Fish processing**

Introduction, types of fish, water activity and shelf life, factors affecting quality of fish

Processing of fish (chilling, freezing, curing, smoking, canning etc)

Fish products

By products of fish industries and their utilization

##### **Suggested reading:**

1. Meat, Poultry & Fish Products Technology, Syed Imran Hashmi, VNMAU Parbhani
2. Principles of Meat Science Aberle E.D. Kendall Hunt Publication, Fifth edition, 2012
3. Handbook of Heat and Meat Processing Hue Y.H. CRC Press, New York, 2012
4. Meat Processing Improving Quality, Joseph Kerry.
5. Fish Processing Technology, George M Hall published by Backie academic and professional, 2<sup>nd</sup> edition.
6. Post-harvest technology of fish and fish products, K.K.Balachandran published DAYA publishing house, 2016

## **B.Sc. part II, semester IV**

### **DSC FS – D5 Spices and condiments processing I**

#### **Unit I**

##### **Spices**

Definition, Classification, Properties of spices

Spice oil and Oleoresins - Definition,

Technology of Manufacturing, Use of Spices,

Production of spices in India, Adulteration of spices

##### **Major Spices**

Production and processing of Major Spices: Pepper, Cardamom, Ginger, Chilies, Turmeric and onion.

#### **Unit II**

##### **Minor Spices**

Production and processing of Minor spices –

Ajwain, coriander, cumin, cinnamon, fenugreek, garlic, mustard, saffron, tamarind, cloves, mint, vanilla, asafoetida and spice production.

#### **Suggested reading:**

1. Production technology of spices, Aromatic, Medicinal, and Plantation crops - Acharya N.G. Ranga.
2. Production technology of spices, Aromatic, Medicinal, and Plantation crops, N.kumar, Oxford and IBH publish ungco.pvt.ltd.2018.
3. Plantation Crops, P.K. Abdul Khader, University of Calicut, 2005.
4. Spices and plantation crops, Jitendra Singh, National Book Trus, 1996.
5. Handbook of herbs and spices, K. V. Peter. Woodhead Publishing, 2012
6. Spices and Plantation Crops K.G. ShanmugaveluAgrotech Publication, Delhi

## **B.Sc. Part I, Semester IV**

### **DSC FS –D6 Spices and Condiments Processing II**

#### **Unit I**

##### **Plantation Crops**

Importance of plantation crops and Chemical composition

Processing of Tea leaves: Black tea, Green tea and Oolong tea, Instant tea,

Processing of coffee: coffee beans, grinding, storage, Soluble /Instant coffee, Use of chicory in coffee, decaffeinated coffee.

#### **Unit II**

##### **Condiments**

Definition, difference between spices and condiments, types of condiments

##### **Herbs**

Definition, difference between herbs and condiments, types of herbs

##### **Seasoning**

Definition, types of seasoning

#### **Suggested reading:**

1. Production technology of spices, Aromatic, Medicinal, and Plantation crops - Acharya N.G. Ranga.
2. Production technology of spices, Aromatic, Medicinal, and Plantation crops, N.kumar, Oxford and IBH publish ungco.pvt.ltd.2018.
3. Plantation Crops, P.K. Abdul Khader, University of Calicut, 2005.
4. Spices and plantation crops, Jitendra Singh, National Book Trus, 1996.
5. Handbook of herbs and spices, K. V. Peter. Woodhead Publishing, 2012
6. Spices and Plantation Crops K.G. ShanmugaveluAgrotech Publication, Delhi



## Practical

<b>DSCFS-P5</b>	LabCourseV (BasedonDSCFS-C1&DSCFS-C2,DSCFS-D1&DSCFS-D2)
<b>DSCFS-P6</b>	LabCourseVI (BasedonDSCFS-C3&DSCFS-C4,DSCFS-D3&DSCFS-D4)
<b>DSCFS-P7</b>	LabCourseVII (BasedonDSCFS-C5&DSCFS-C6,DSCFS-D5&DSCFS-D6)

### **DSC FS –P5 Cereals and Bakery Processing**

1. Effect of kneading on the development of gluten
2. Determination of gluten content in wheat flour
3. Effect of water ratio on cooking quality of rice
4. Parboiling of paddy
5. Preparation of malt
6. Production of popcorn
7. Cake faults and their causes
8. Quality testing of flour and yeast
9. Preparation of food grade cake
10. Preparation of bread
11. Preparation of pancake
12. Preparation of cream biscuits

### **DSC FS –P5 Milk and Milk Product Processing**

1. Physical examination of milk
2. Specific gravity of milk
3. Determination of heat stability of milk
4. Determination of natural acidity of milk
5. Preparation of khoa
6. Preparation of gulabjamun
7. Preparation of paneer
8. Preparation of mishit dahi
9. Preparation of rasgulla
10. Preparation of whey beverage
11. Preparation of lassi
12. Preparation of shrikhand

### **DSC FS –P6 Legume and Oilseeds Processing**

1. Sprouting of whole pulses
2. Preparation of instant dhokhla
3. Production of protein rich product
4. Preparation of extruded products that is noodles
5. Determination of melting point of fats and oil
6. Determination of specific gravity and refractive index of fats and oils
7. To prepare test sample and determine moisture content of fats and oils
8. To determine adulteration in fats and oils
9. Detection of presence of rancidity

### **DSC FS –P6 Meat Fish and Poultry Processing**

1. Slaughtering and dressing of poultry bird
2. Study of poultry meat cut
3. Quality evaluation of meat
4. Quality evaluation of egg
5. To study shelf-life of eggs by different method of preservation
6. Quality evaluation of fish
7. Study of the anatomy of fish
8. Determination of moisture content from the different fish samples
9. Estimation of moisture content of meat
10. Study of post-mortem changes in meat

### **DSC FS –P7Fruits and Vegetables Processing**

1. Study of different equipments
2. Preparation of fruits jam
3. Preparation of fruit jelly
4. Preparation of RTS and squash
5. Preparation of jam marmalades
6. Preparation of tomato soup
7. Preparation of tomato chutey
8. Preparation of tomato sauce / ketchup
9. Processing of potato
10. Preparation of Anola pickle

## **DSC FS –P7 Spices and Condiments Processing**

1. Microscopic examination of spices
2. Determination of adulteration of argemone seed on mustard
3. Detection of adulteration mineral oil in black pepper
4. Detection of adulteration of papaya seed in black pepper
5. Detection of adulteration in turmeric
6. Detection of adulteration in chilies
7. Detection of adulteration in coriander
8. Detection of adulteration in black pepper
9. Detection of adulteration in saffron
10. Detection of adulteration in Asafoetida