

PRACTICAL MANUAL

Post Harvest Management and Value Addition of Fruits and Vegetables

(Course No. APH 376) Credits: 2(1+1)

[For B. Sc. (Hons.) Agriculture 6th Semester Students]

Dr. Amit Kumar Singh
and
Dr. Ghanshyam Abrol



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College of Horticulture & Forestry
Rani Lakshmi Bai Central Agricultural University
Jhansi, Uttar Pradesh

Syllabus:

Applications of different types of packaging, containers for shelf life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products -- physico-chemical and sensory. Visit to processing unit/ industry.

Name of Student

Roll No.

Batch

Session

Semester

Course Name :

Course No. :

Credit

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CERTIFICATE

This is to certify that Shri./Km.ID No.....
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in the year.....in the respective lab/field of College.

Date:

Course Teacher

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2	Modified atmosphere packaging on ripening and shelf life of fruits			
3	Determination in physiological loss in weight (PLW) during storage			
4	Preparation of jam			
5	Preparation of jelly from guava/apple/jackfruit			
6	Preparation of Ready to serve (RTS) from lime/lemon/mango			
7	Preparation of squash			
8	Preparation of preserve			
9	Preparation of tomato sauce/ketchup			
10	Preparation of tomato puree and paste			
11	Preparation of mixed vegetable pickle			
12	Determination of maturity on the basis of TSS content			
13	To understand the method of total sugar estimation by Alcohol method			
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15	Determination of Titrable acidity from given sample			
16	To understand the method of ascorbic acid estimation by titration method			
17	Drying and dehydration of fruits and vegetables			
18	Visit to market, packaging houses and cold storage units			

Exercise: 4

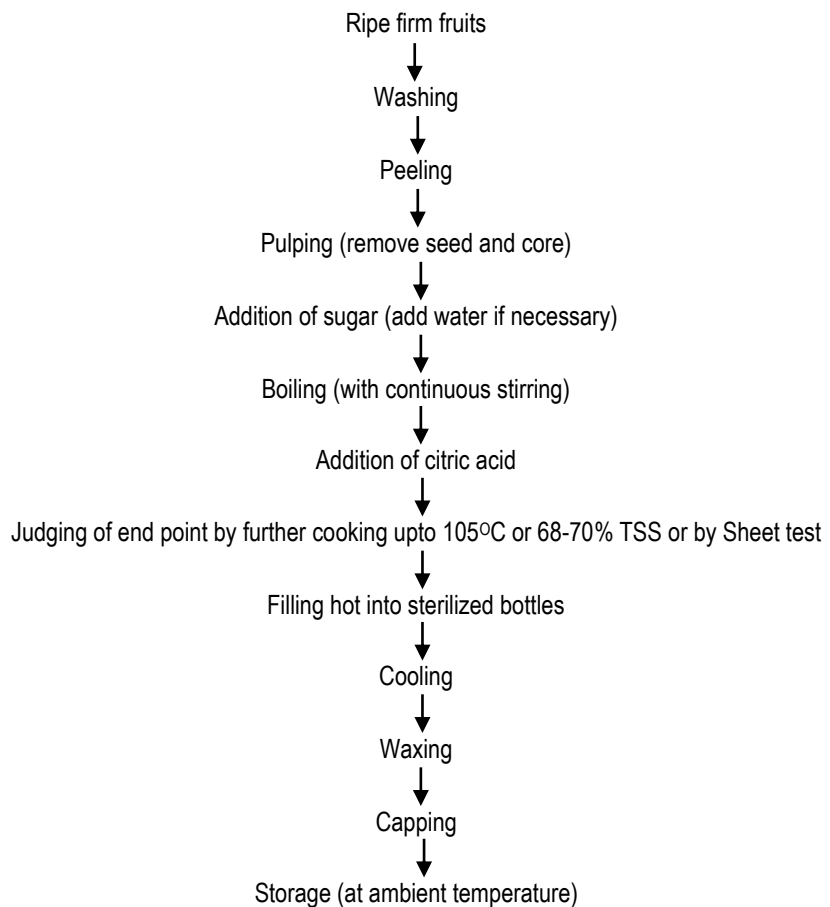
Objective: Preparation of jam.

Jam:.....

Sl. No.	Fruit/ Vegetable	Ingredients for one kg pulp		
		Sugar (kg)	Citric acid (g)	Water (ml)
1	Aonla	0.75	-	150
2	Apple	0.75	2.0	100
3	Apricot	0.60	1.0	100
4	Carrot	0.75	2.5	200
5	Grapes	0.70	1.0	50
6	Guava	0.75	2.5	150
7	Karonda	0.80	-	100
8	Loquat	0.75	1.0	100
9	Mango	0.75	1.5	50
10	Musk melon	0.75	2.5	50
11	Plum	0.80	-	150
12	Peach	0.80	3.0	100
13	Pear	0.75	1.5	100

Elaborate Procedure:

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Problems in jam production:

i) Crystallization:.....

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Sticky or gummy jam:.....

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Premature setting:.....

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Surface gaining and shrinkage:.....

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Microbial spoilage:.....

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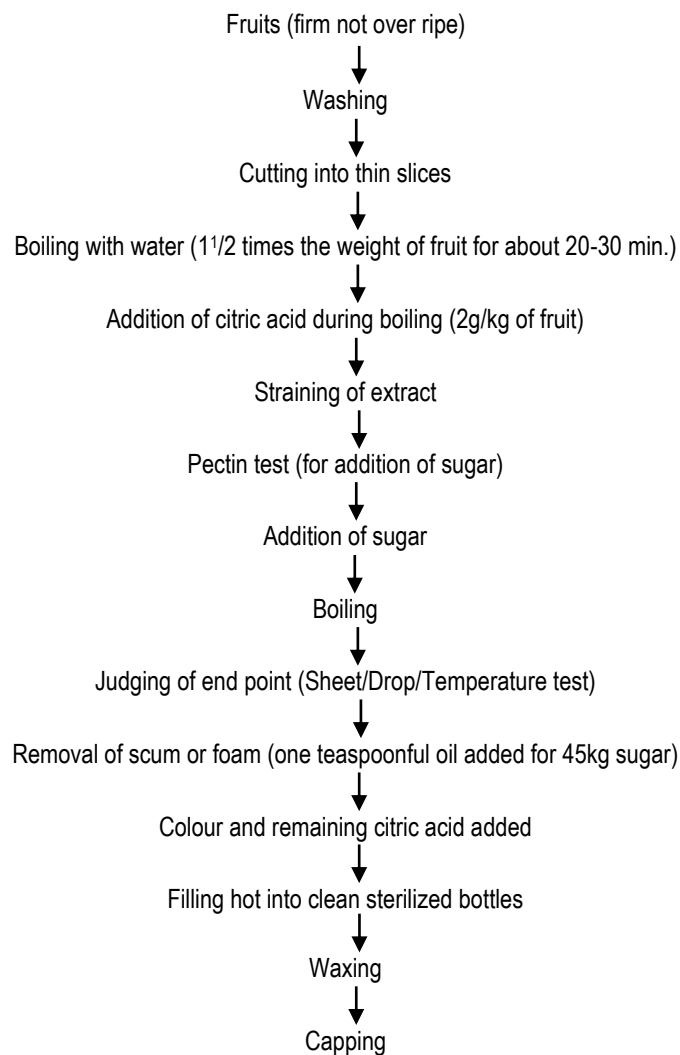
Exercise: 5

Objective: Preparation of jelly from guava/apple/jackfruit.

Jelly:.....

Sl. No.	Fruit	Ingredients for one litre extract	
		Sugar (kg)	Citric acid (g)
1	Guava	0.75	3.0
2	Sour apple	0.75-1.00	2.0
3	Gooseberry	0.80	-
4	Karonda	0.75	-
5	Jamun	0.75	1.0
6	Wood apple	1.00	-
7	Plum	0.75	2.5
8	Loquat	0.80	2.0
9	Papaya	0.75	3.0

Elaborate Procedure:



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Storage at ambient temperature

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Determination of pectin content:

i) Alcohol test:.....
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ii) Jelmeter test:.....
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Judging of end point:

i) Sheet or Flake test:
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ii) Drop test:
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Exercise: 9

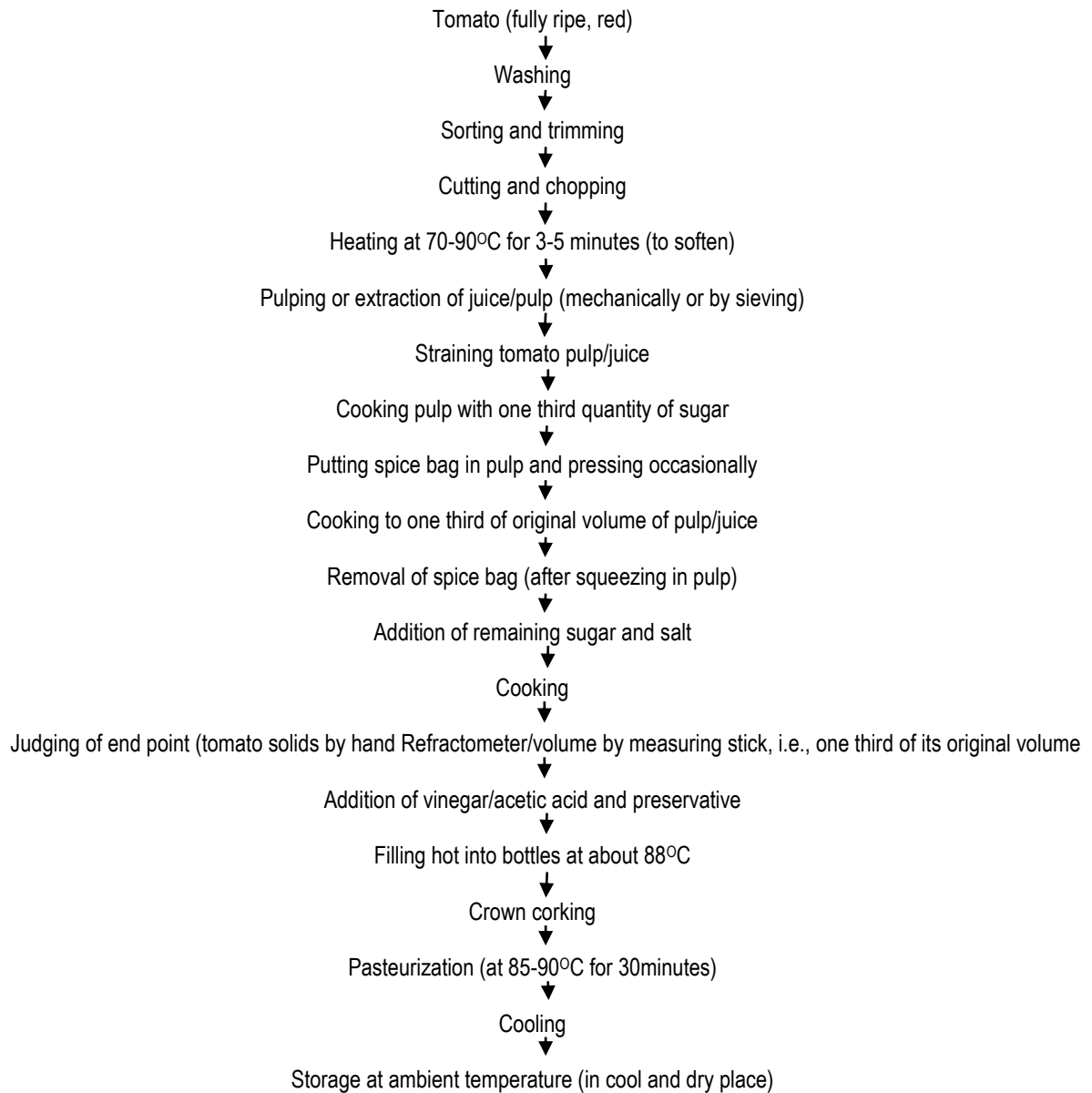
Objective: Preparation of tomato sauce/ketchup.

Sauce/ketchup:.....

Recipe for tomato sauce/ketchup

Sl. No.	Ingredients	Quantity	Sl. No.	Ingredients	Quantity	Sl. No.	Ingredients	Quantity
1	Tomato pulp	1 kg	6	Garlic chopped	5 g	11	Aniseed	10 g
2	Sugar	0.75 g	7	Red chilli powder	5 g	12	Cumin powder	10 g
3	Salt	10 g	8	Cinnamon	10 g	13	Clove headless	5 No.
4	Onion chopped	50 g	9	Black pepper	10 g	14	Vinegar	25 ml.
5	Ginger chopped	10 g	10	Large cardamom	10 g	15	Sodium benzoate	0.25 g per kg of final product

Process:



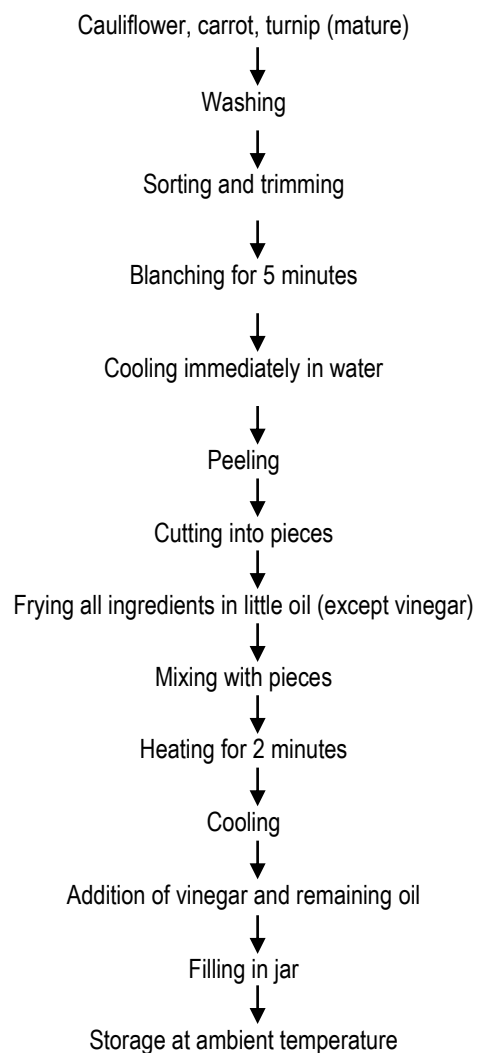
Elaborate procedure:.....

Objective: Preparation of mixed vegetable pickle.

Recipe for mixed vegetable pickle

Sl. No.	Ingredients	Quantity	Sl. No.	Ingredients	Quantity
1	Cauliflower pieces	1.0 Kg	11	Turmeric	10 g
2	Diced carrot	1.0 Kg	12	Large cardamom	10 g
3	Turnip slices	1.0 Kg	13	Aniseed	10 g
4	Peas	1.0 Kg	14	Cumin	10 g
5	Salt	100 g	15	Fenugreek powdered	10 g
6	Ginger chopped	20 g	16	Cloves	5 No.
7	Onion chopped	50 g	17	Mustard ground	50 g
8	Garlic chopped	10 g	18	Vinegar	200 ml
9	Red chilli	10 g	19	Mustard oil	450 ml
10	Black pepper	10 g			

Process:



Elaborate procedure:.....

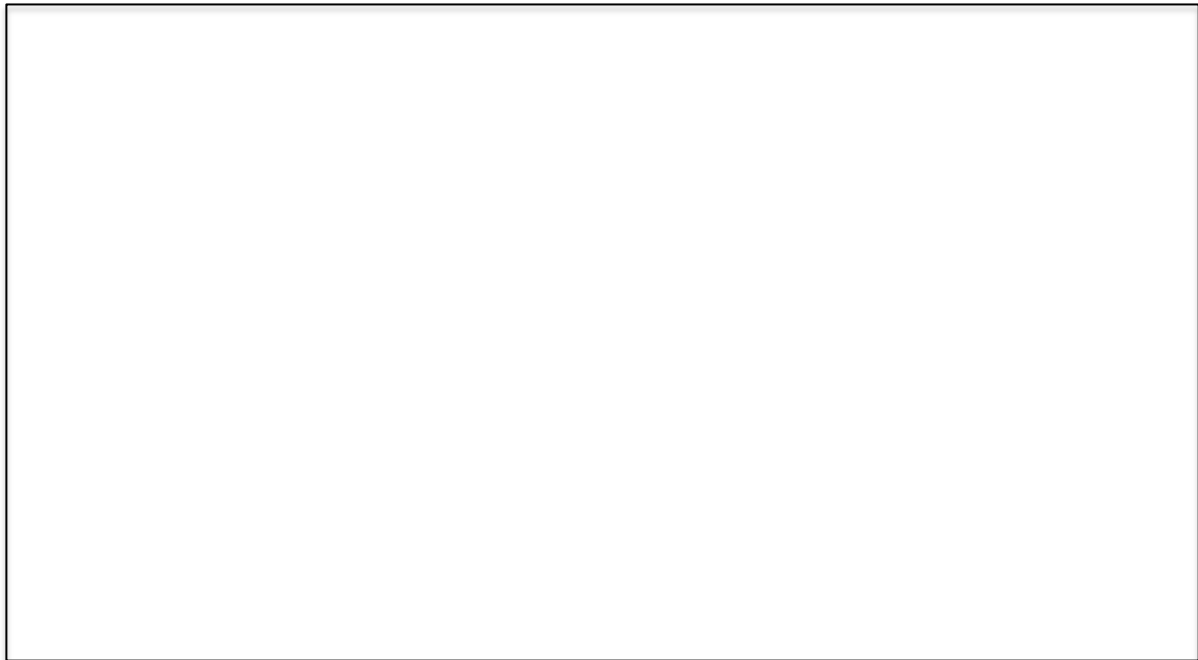
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Draw a picture of Hand Refractometer:



Conclusion:.....

Temperature correlation for standard model of sugar Refractometer calibrated at 20 °C

Temp. (°C)	Percentage of dry substance													
	5	10	15	20	25	30	35	40	45	50	55	60	65	70
Subtract of dry substance														
15	0.29	0.31	0.33	0.34	0.34	0.35	0.36	0.37	0.37	0.38	0.39	0.39	0.40	0.40
16	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.30	0.30	0.31	0.31	0.32	0.32
17	0.18	0.19	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24
18	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16
19	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Add to the reading														
21	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.14	0.16	0.16	0.16	0.16	0.16	0.16
23	0.20	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.24
24	0.27	0.28	0.29	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.32	0.32
25	0.35	0.36	0.37	0.38	0.38	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
26	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
27	0.50	0.52	0.53	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
28	0.57	0.60	0.61	0.62	0.63	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
29	0.66	0.68	0.69	0.71	0.72	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
30	0.74	0.77	0.78	0.79	0.80	0.80	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81

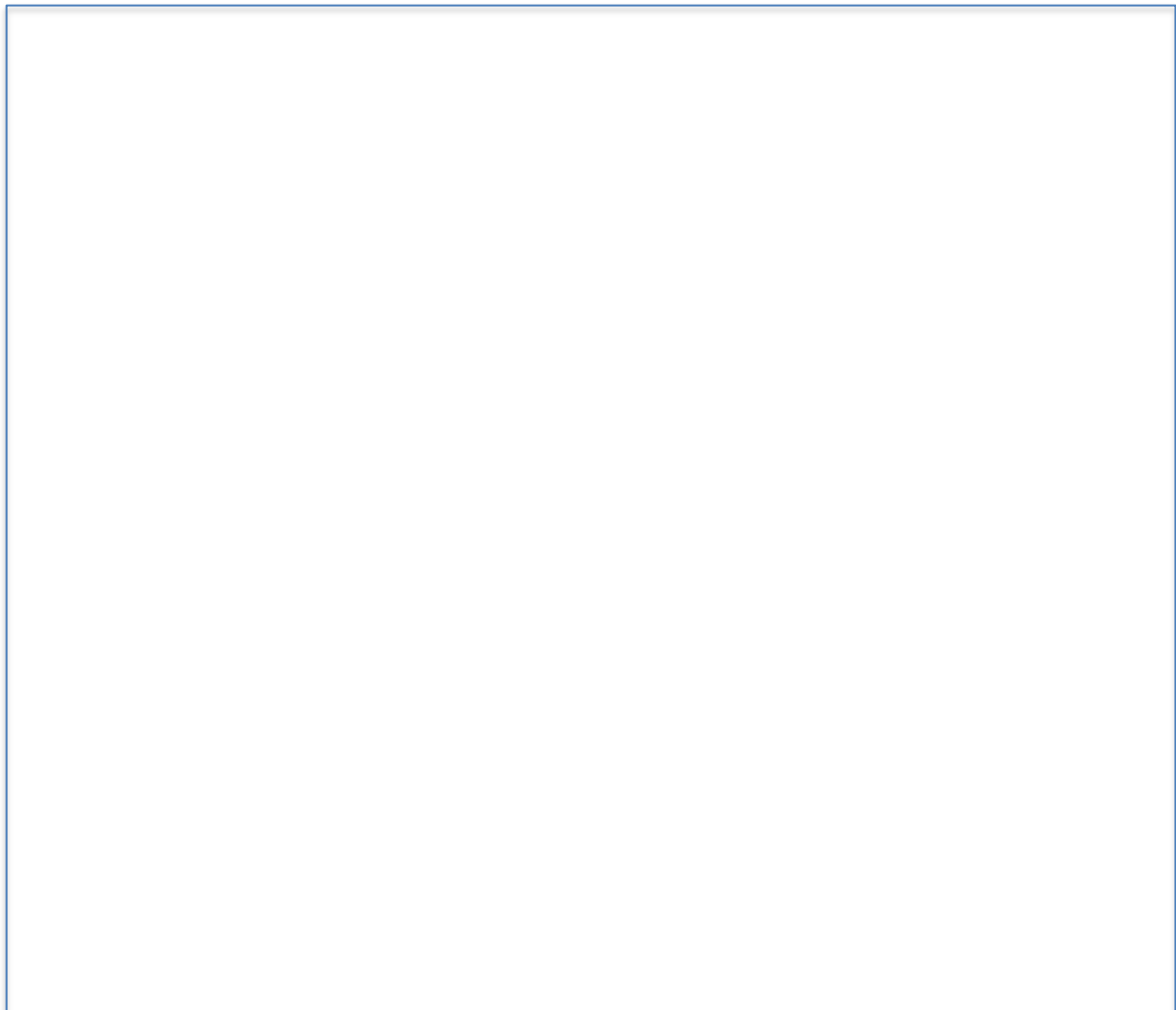
Source: Proceeding of the ninth session of the International Commission for Uniform Methods of sugar analysis, London, 1936.

Objective: Drying and dehydration of fruits and vegetables

Drying:.....
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Dehydration:.....
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Draw a neat sketch of dryer:



Student's Notes

A series of horizontal dotted lines for writing notes.