International Journal of Scientific Research in Science, Engineering and Technology
Print ISSN: 2395-1990 | Online ISSN : 2394-4099 (www.ijsrset.com)

Post Harvest Technology for Improving Quality of Vegetable Oil Seeds and Subsequent Vegetable Oil Production

Dr. Prashant B. Shingwekar[1], Dr. P.K Wankhade[1]
[1]Department of Chemical Technology, S.G.B. Amravati University, Amravati, Maharashtra, India

Article Info
Volume 9, Issue 5
Page Number: 23-26

Publication Issue :
July-August-2021

Article History
Accepted : 02 July 2021
Published: 25 July, 2021

ABSTRACT

India is the largest producer of oil seeds and has a potential at being the second largest with food and agricultural sector. After harvesting period of oil seeds they are liable to accelerated physiological, chemical and microbial process that invariably lead to deterioration and loss of wholesomeness. All oil seeds are reach in protein and concentrated source of energy. Post Harvest Technology plays a key role in minimizing losses during handling, processing and preservation of oil seeds and their products. By adopting proper post harvest technology the input caused in processing of oil seed is reduced and increased oil yield. In the present work, it was found by experiment that moisture plays an important role in post harvest technology. When seeds are fully ripped their moisture status at the time of collection may be high enough to place them at risk of deterioration through aging.

I. INTRODUCTION

A seed has been defined as a “mature ovule” or a reproductive unit formed from fertilized ovule consisting of embryo, reserve food and a protective cover . The time between collection and extraction of oil is very important to maintain high yield and vigour. The safe moisture level for collection in the field is around 50% equilibrium relative humidity (eRH). Seed life span approximately doubles for every 10% reduction in seed eRH. Plants store the require food for their seedlings in the form of oil in seeds. Thus the oil is used by the seedlings during germination and early growth. The oil content of the seed sustains the seedling, until the leaves develop chlorophyll and start producing own food by the process of photosynthesis. Oil is placed well spread in all the cells of seed in very tiny ultramicroscopic droplets in the form of emulsion. Each drop lets is surrounded by the albuminoid cell matter composed of proteins & carbohydrate. Post harvest technology plays an important key role in minimizing losses during handling, processing and oil extraction.

The safe moisture level for collection in the field is around 50% equilibrium relatively humidity (eRH). Seed life span approximately doubles for every 10% reduction in seed eRH. The rate at which seeds age during the post harvest period depends on the ambient relative humidity RH and temperature. Immature oil seeds (eRH is 85-100%) acquired maximum storage potential but very immature seeds

(eRH =100%) were not fully desiccation, tolerant and needs particular care as rapid drying .

In the present work it was found by experiment that moisture plays an important role in post harvest technology. The critical moisture contact for most of the traditional oil seeds are in between 8 to 13%. Higher moisture content and relative humidity conditions favours the activity of lipolytic enzyme that increased the FFA content. Even when seeds are fully ripe their moisture status at time of collection may be high enough to place them at risk of deterioration through ageing.

The non glyceried constituents of the seed degrade and produced oil soluble pigment resulted in dark colour of oil. Aflatoxins produced in oil seeds by strain of *Aspergilas Havus* come out in the expressed oil and rest was remaining in the residual cake. Chlorophyll in the oil was undesirable because of difficulty of remaining green colour.

Proper handling and storage of oil seeds is important for their processing otherwise they are prone to autocatalytic deteriorative processes, enzyme action and microbial spoilage etc. Immature seeds harvested before their enzymes have became dormant, they deteriorate more rapidly than normal seeds during storage. The moisture content of oil seeds at the time of harvest is usually high & uncongenial for their safe storage. It is observed that injured seeds respire at a faster rate than normal seeds. As a consequence the oxygen uptake is increases leading to oxidation of polyunsaturated fatty acids & reduce nutritive value of oil.

II. MATERIALS & METHODS

Post Harvest Losses:

Oil seed production in India is about 32.5 million tones & losses due to improper post harvest technology is about 7%. Post harvest losses of oil seeds occur at different stages are, harvesting, threshing, winnowing, storage and oil extraction process.

The seeds were analyzed for –

(i) Seeds storage Behavior: It refers to the capacity of seeds to survive desiccation.
(ii) Seed Weight: It refers the weight criteria of mature and immature seeds (due to % moisture within it.)
(iii) Seed Oil content: Oil % in the seed.
(iv) Seed Protein Content: Protein % of the seed content.

The oil seeds like ground nut, soyabean, seasame, linseed, cotton seed, mustard, safflower, sunflower were collected in matured and immatured stage. The seeds were kept in a safe storage to check there safe moisture content. The safe moisture content of selected seeds were summarized in Table No.1.

To minimize post harvest losses the following measures should be followed:

(i) Use of proper method of harvesting.
(ii) Avoid excessive drying, fast drying and rewetting of oil seeds.
(iii) Ensure uniform drying to avoid hot & wet spots on oil seeds and mechanical damage due to handling.
(iv) Use of proper way of scientific techniques in storage for maintaining optimum moisture content i.e. less than 9%.
(v) Provision of proper ventilation i.e. aeration around storage area.

By experimental methods carried out directly from the field and in laboratory the following figures of % losses were obtained which were shown due to improper post harvest technology.

III. DISCUSSION AND CONCLUSION

Thus from the above tables and graph, it was observed that post harvest technology plays an important role as far as the oil production economy of country is concerned. Post harvest losses of oil seeds are more

serious in developing countries then those in developed countries. It was observed that after harvesting period the Physiological, chemical and microbial changes takes place which invariable leads to deterioration and losses. Thus for oil seeds the following parameters (conditions) should be maintained to get maximum oil recovery from oil seeds.

A) Keep low moisture content typically between 8% to 13%.
B) Small unit size of seed, less than 1 gm.
C) Very low respiration rate with small generation of heat (0.05 mega joule/tone/day) for dry oil seed.
D) Hard texture
E) Stable and natural shelf life.
F) Avoid losses usually caused by molds, insects & rodents, sprouting & brushing.

IV. REFERENCES

[1]. Achaya, K.T., Oil Seeds & Oil Milling in India. A Cultural & Historical Survey, Oxford & IBH Publishing Co.Pvt.Ltd., Calcutta, Pg.39-104, (1982)
[2]. Anon, Wealth of India : Raw Material Vol.1A, PP 603-611, New Delhi Publication & Information Director, CSIR.
[3]. Brooker D.B., Bakker-Arkema F.W. & Hall C.W. Drying of Oilseeds, Pg. 450, (1992)
[4]. Hodges, R.J., J.C.Buzby and B.Bennett. Post Harvest Losses in Developed Countries, J.Agric Res.-149:37-45, (1999).
[5]. Owino, W.O. & H. Ezura, Biotechnology in Post Harvest Research, Stewart Post Harvest Review, Vol. 1:4, P.7-10, (2011)
[6]. Pareek S., R.M.Yania, O.P.Pareek and R.A.Kaushik, Post Harvest Physiology and Tech. of Oil Seeds. Food Res.Int'l. Vol.-44, Pg.1741-51, (2011).
[7]. Rees, D. G. Farrel & Orchard J.,Crop.Post Harvest Science & Tech., Wiley-Blackwell, Oxford UK,P-451, (2012)
[8]. Shewfelt R.L. and Prussia S.E., Post Harvest Handling, PP-358, (1993)
[9]. Thomson J.R. Introduction to Post Harvest Technology,PP- 252, (1979)
[10]. Yahia, E.M., Post Harvest Biology and Technology of Seeds. Vol-4, PP-501, (1998)

Table No.1: Safe Moisture Content of Some of the Oil Seeds

Sr.No.	Oil Seeds	Maximum Moisture Content (Safe Moisture %)
1	Cotton Seed	9.6
2	Soyabean	12.3
3	Safflower	11.2
4	Sunflower	7.5
5	Ground Nut	10.3
6	Mustard	6.3

Table No.2: Loss (%) of Oil Seeds due to improper Post Harvest Technology

Sr. No.	Oil Seeds	Harvesting	Collection	Threshing	Sorting	Drying	Total Loss
1	Ground Nut	5.1	0.7	2.4	0.1	0.6	8.9
2	Soya bean	3.6	0.7	1.6	0.3	0.7	6.9
3	Cotton Seed	0.6	0.9	--	0.8	0.2	2.5
4	Safflower	0.7	0.6	1.8	0.3	0.5	3.9

5	Sunflower	1.3	0.4	1.2	0.2	0.2	2.3
6	Mustard	4.9	1.6	1.9	0.2	0.2	8.8

Table No.3 : Recommendation for effective Post Harvest Handling of Oil Seeds

Summary of recommendations for effective post-harvest handling of seeds

Seed Maturity Stage	Seed Moisture Status	Ambient Conditions	
		"Dry" (daytime RH < 50%)	"Humid" (daytime RH > 50%)
Immature	85 - 100% eRH	Hold intact fruits under shaded, ambient conditions for 1-2 weeks*	
Natural dispersal	"Dry" < 50% eRH	Hold in loosely packed bags in a well ventilated, shady location. Minimise moisture absorption at night.	Transfer to seed bank as soon as possible OR Dry with desiccant OR Place in air-conditioned room
	"Wet" > 50% eRH	Dry in thin layer, in well ventilated location. Minimise moisture absorption at night.	

* Remove seeds from fleshy fruits as soon as morphological signs (e.g. fruit colour) indicate that they are fully ripe. Allow to dry slowly under ambient conditions before transferring to a cool dry-room.

Graph-1

Effect of Post Harvest Oil Seed Moisture Status on Seed Quality

Graph No.1.

Below: Effect of post-harvest seed moisture status on seed quality. The dotted line shows typical fluctuations in equilibrium relative humidity with ambient conditions.