

Reducing Loss, Increasing Worth: Post-Harvest Handling and Value Addition in Pulses

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ABSTRACT

Pulses are the edible seeds of legumes; it is very much important in our diet also known as 'protein tablets'. Our country occupies more than one third of total world area for pulse production. It is easy because they grow on a wide range of environments, and also in poor soil. Yet the production is high still it can't fulfill our growing demand, so it is equally important to give emphasis on storage and post harvest management of pulses, because it plays a major role in enhancing its nutritional value and reducing pest effect with quality improvement. In this article we discussed in brief about loss of pulses during post harvest and value addition to pulses through post-harvest processing and technology.

INTRODUCTION

Pulses are main source of protein primarily in vegetarian diet, contain vitamins, minerals Omega 3 fatty acids, dietary fibres and polysaccharides with digestibility of about 69 to 90% and protein value of 18 to 31.6% (Boye et al., 2010).

Then about production our country is among one of the major pulses producing countries production of 24.48 million ton in year 2023-24. Though our country comes first in pulse production, still India imports 20% from abroad which signifies the shortage between

the demand and supply and the reason most lies somewhere between production and distribution that is in post harvest handling.

According to the survey conducted by directorate of marketing inspection in 1996-97, post harvest losses at farm level ranged 3.4% in pigeon pea and 7.14% in lentil.

In India lossof pulses after harvest is 10-30% which is large as compared to other developing countries. These losses include losses due to farming machineries storage facilities, insects pests, poor technologies, improper threshing equipment, etc.

Why post harvest handling is important for pulses

Since 70% of India's pulse production is processed, post-harvest technology is crucial to per capita availability. Due to a variety of socioeconomic circumstances, industrial development, urbanization, etc., value addition to pulses after harvest is becoming more and more significant in our nation. In addition to providing a high financial return to growers or processors, it also aims to improve taste and nutrition.

Post harvest handling includes harvesting, threshing, cleaning, drying and storage etc. Which are then followed by Dehulling, splitting, milling, grading and packaging.

Losses during post harvest stages

Late harvest	Shattering losses, losses due to birds and pestsattack
Insufficient drying of grains	Losses due to development of moulds and insects
Improper threshing	Broken grains and threat of insects
Poor storage	Losses happen due to combined attacks of insects, moulds, rodents etc.

Improper milling	Broken grains and powdering loss
Transport	Quantitative loss
Defective packaging	Quantitative and qualitative loss

(Source: Lal and Verma, 2007)

MANAGEMENT OF POST HARVEST LOSSES

1. Harvesting at the right stage and maturity will minimize losses.
2. Harvest using the right technique.
3. Use contemporary scientific mechanical techniques to prevent threshing and winnowing losses.
4. Employ better processing methods.
5. To prevent financial loss, use cleaning and grading at competitive costs.
6. Make use of high-quality packing materials, such as HDPE or B-Twill Jute bags, for both storage and transportation.
7. Use the right storage technique.
8. To prevent pests like the bruchid beetle, use pest management techniques when storing.

PULSES PROCESSING TECHNOLOGIES

Cleaning: It is the first step in processing done through screen cleaner and aspirator. Round or slotted hole sieves are used to separate impurities.

Calibration: it is very essential to differentiate between inner and outer market products. Calibration gives us homogenous and standardised products that improve quality of pulses. It plays an important role in price determination.

Dehulling: It is practised in mills, this involves spreading out seeds in Sun and mixing with a bit of water for followed by

winnowing the hulls. This process results clean cotyledon which improve the texture and cooking quality (Boye et al., 2010).

Splitting: It is a mechanised process which involves splitting of cotyledon who is then separated by sieving.

Milling: Process of pulses production involves attrition milling, knife direct pressure milling (Ali and Srivastava, 1993).

Packaging: Maintenance of proper moisture and humidity is important while packaging it also prevent insect attack like bruchids, weevils and improve shelf life. Paper, foil, and PE spectacle packaging materials are new, increasingly popular packaging solutions (Ali and Srivastava, 1993). Pulses are often packaged using vertical type packaging machines and volumetric automatic filling systems.

Value addition to pulses

Value is added to the product at every stage of processing. Estimated value additions to the raw food materials through primary and secondary/tertiary processing in India are 75% and 25% respectively. Primary processing having the greatest share clearly shows that it has a gigantic role to play in aiding the economic conditions of the farmers. Value addition can play a game changer in market with scope of employment.

❖ **Value added product of pulses:** Pulses can be enhanced in value through both primary and secondary processing. Products that replace eggs include the development of fresh and dry gluten-free pasta, the development of gluten-free baked goods, snacks, and breakfast cereals, the improvement of the texture and colour of gluten-free breads and batter, the production of gluten-free soups, sauces, and gravies, the addition of protein to fruit smoothies and vegan protein drinks, etc.,

are all examples of opportunities for value addition (Agarwal, 2016a).

In the nations of the region, people frequently eat foods made from besan (dal flour), split chickpeas (dal), and other pulses. Examples include “Phutana” which are roasted grains; “Pakora” which are oil-fried; “Kadi” which is boiled in buttermilk; “Roti” which is chickpea flour combined with wheat flour; “Dhokla” (Agarwal, 2016a) which is a fermented pulse-based food; and “Satu,” which is roasted chickpea flour combined with cereal flours³¹. Of all the pulses, soy beans have been most effectively used to create a variety of novel, high-value products. The following meat substitutes are created from soy beans: tempeh, tofu (sometimes called soy curds or tahoe), and soy nuggets.

❖ Value addition through fractionation:

Commercial facilities have started concentrating on extracting protein concentrates from pulses through a process known as fractionation (Tosh and Yada, 2010) which enables researchers to separate out component ingredients to achieve the needed concentrates and isolates. This approach is part of the hunt for new food protein and fiber supplies. Usually, fractionation is accomplished by either a wet or dry process, such as wet milling or air classification.

Wet method involves removing the seeds' hulls before grinding or milling them into flour. The protein is extracted from the bean by pulping it with a disintegrating agent, such as an alkaline solution, and then drying it. To recover the starch, the solid material that remains after the protein has been separated is passed through a number of sieves. For chickpeas and dehulled split yellow peas, the starch fractionation procedure involves steeping the seeds in warm water with toluene (Tosh and Yada, 2010). The dry method breaks down the dehulled seeds and separates



the protein and starch fractions using a mill and air classification process. Compared to other legume kinds, grain legumes have shown greater performance when processed using dry methods.

❖ **By product utilisation:** Husk, dust, powdered grain fragments, and small broken pieces are among the leftovers of dal milling that are typically offered as animal fodder. Due to its low bulk density (B.D.), the husk of pulses has historically been used as calf feed, accounting for 10–12% of the raw material and being sold for less (TNAU Agritech Portal). However, small brokens and dal powder, which are also used as bovine feed and are discovered to be higher in nutrients, are sold for more money.

❖ **Value addition during storage:** Due to losses brought on by pest infestation, pulse storage has been regarded as the most important aspect of all post-harvest processes. Just storage accounts for 7.5 percent of post-harvest losses, which add up to 25–30% overall (TNAU Agritech Portal). Jute bags, Thekka, mud, and metal containers are used for storage in the past, along with pesticides, fumigation, and aeration. Although controlled or modified storage structures in the form of airtight structures have been utilized for a long time, scientific research on them has recently accelerated.

CONCLUSION

Since the beginning of industrialization, the majority of processing operations have moved to cities with access to infrastructure. Reversing this trend and developing strategies to raise rural residents' incomes and create jobs in rural regions are urgently needed. Value addition and processing can be very effective strategies to accomplish this. This presents a significant potential for marketers to develop

powerful brands in pulses and cultivate brand loyalty by focusing on brand image building. 2016 has been designated as the "**International Year of Pulses**" (FAO (2016) by the UN General Assembly, making it the ideal time to choose and implement the best interventions.

Many government initiatives in India focus on enhancing pulse production, post-harvest management, and value addition. For oilseeds, copra, and pulses, the Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA) offers price security (GOI). The Accelerated Pulses Production Programme (A3P) aims to increase pulse production and improve productivity. Additionally, the Ministry of Food Processing Industries provides several initiatives to support cold chain infrastructure and pulse value addition.

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