



Importance of Usage of Machinery in Millet Processing

P Babu, N Raja Kumar, N Sathi Babu, N Kishor Kumar, PVS Ramu naidu, K.Sankar Rao, A Sowjanya, Ch MahaLakshmi, Y Sravanthi and P Rajesh
Krishi Vigyan Kendra, Kondempudi, Anakapalli

INTRODUCTION

Millets refers to a group of annual grasses mainly found in arid and semiarid regions. Millets belong to five genera: Penisetum, Eleusine, Setaria, Panicum and Paspalum. These grasses produce small seeded grains and are often cultivated as cereals. Millets are climate resilient crops as they are resistant to various pests and diseases and can sustain well in arid and semiarid regions of Asia and Africa. Whole grains like millets have health promoting effects equal or even in higher amount than fruits and vegetables and have a protective effect against insulin resistance, heart disease, diabetes, ischemic stroke, obesity, breast cancer, childhood asthma and premature death. Because of these benefits millets, millets can be used in functional foods and as nutraceuticals. Hence, they are also called as 'nutri cereals'. The machinery involved in the processing of millets was discussed in this paper. The main aim is to create awareness on millet processing techniques to millet farmers and thereby establish their own primary processing unit at farm gate.

CLASSIFICATION OF MILLETS

Millets are small-seeded grains that are classified into Naked and Husked grains. Naked grains include three popular millets Ragi, Jowar, and Bajra (Major millets) as they don't have hard, indigestible husks and hence require no processing after harvest. On the other hand, husked grains/minor millets have an indigestible seed coat that needs to be removed before consumption through processing of grains. The husked grains include Proso millet, Foxtail millet, Little millet, Barnyard millet) and Kodo millet.

WHY MILLETS TO BE PROCESSED?

After harvesting, grains of cereals or coarse cereals are not eaten as uncooked whole seeds in any human society. Millets are good sources of calorie and nutrients. There is raising demand for millets is leading to higher prices and requirement of quality grains, can make their cultivation profitable and sustainable. Millets are typically processed before eating in order to remove the undesirable components, enhance the shelf life, and enrich the nutritional and sensory qualities. Processing involves partial separation and/or modification of three major constituents of millets-germ, starch containing endosperm and protective pericarp. To make millets fit for consumption, primary processing methods such dehulling, soaking, germination, roasting, drying, polishing, and milling (size reduction) are used. Simultaneously, millet-based value-added processed food products are manufactured using modern or secondary processing techniques as fermentation, parboiling, cooking, puffing, popping, malting, baking, flaking, extrusion, etc. Although many millets processing machinery innovations exists in market but the millet growers are facing constraints in processing millets and to aware of these techniques an attempt has been made in this paper to address various new innovations in millets processing.

MILLET PROCESSING MACHINERY

1. Destoner Cum Grader Cum Aspirator:

Destoner is suitable for removing stones and other impurities from grains. The grains are separated based on their weight. This machine can be used for multiple grains by adjusting the air flow and the operating angle of the destoning deck. Aspirator is used for removing light weighted impurities. Grader to separate the cleaned grains based on size. Specifications: Suitability : Millets (Little, Kodo, Foxtail, Proso, Barnyard, Finger, Pearl Millet & Sorghum): Capacity: 500 kg/h; Power Requirement : 2HP and 1 HP/0.5 HP

2. Dehuller –

Dehullers are the machinery employed to perform dehulling and works on various principle such as shear abrasion, centrifugal impact (single and double time), and roller mills etc. In small millets, dehulling is an imperative concern as the grain's sizes are very small and their cohesiveness with outer husk is greater, which makes it very

difficult to dehull with higher recovery. Millet Dehulling classified into two Types: 1. Millet dehuller- Single Stage : Purpose: Removing the husk of little & foxtail millets; Capacity:100 kg/hr; Power Requirement :3HP -Electric Motor.2.Millet dehuller- Double Stage: Purpose: Removing the husk of little, kodo, barnyard, foxtail and proso millets ; Capacity: 300 kg/hr ; Power Requirement: 7.5HP -Electric Motor.

3. Dehusking:

It is the process of removing the outer layer of the millets. In 'millet dehusker'- Pearl Millet, Jowar, and Finger Millet could be processed in order to remove the light outer layer. Whereas, the hard coated millets such as, Brown Top, Kodo, Barnyard and Proso millet requires husk conditioning/scratching/softening. Specifications: Purpose: Removing the husk of Major Millets / Softening the hull of Minor Millets;



TYPES OF MILLET PROCESSING:

- 1. Primary processing:** It is the processing to clean the grain through grading (depend on size of the grain), destoning (removal of stones) and dehulling (polishing).
- 2. Secondary processing:** It is a process converting primary processed raw material into product which is suitable for food uses or consumption such as ready-to-eat (RTE) and ready-to-cook (RTC) products, minimize cooking time and make it convenient foods.
- 3. Tertiary processing:** It involves use of the secondary processed raw material to produce commercialized products. Tertiary processing leads to a high value-added, ready to cook and ready-to-eat products like extruded products (vermicelli and pasta), roti and all recipes prepared.

Unit Operations Involved In Primary Processing of Millets

- 1. Cleaning** – Destoner Cum Grader Cum Aspirator is the machine used for this work. Procured grains from farmers comes as a mixture of Grains, Stones, Dust, Grasses etc. So, the first step will be to remove all these impurities.
- 2. Dehulling** – Dehuller/Dehusker is the machine used for this step. Cleaned raw grains are then subjected to dehulling, “which is the procedure to remove outer indigestible husk layer from the grains, thus improving its overall digestibility”
- 3. Separation** – In this step each constituent of the mixture is separated. Output from the dehuller is a mixture of dehulled grains, unhulled grains and brokens.

Capacity: 350 kg/hr ; Power Requirement: 7.5 HP Electric Motor.

4. Post Hull Millet Rice Separator:

Post Hull Millet Rice Separator is used for removing the left over husk and broken millet rice from the whole good quality processed millet rice. Specifications: Capacity: 300 kg/hr Power Requirement : 5HP and 0.5HP



5. Grain Polisher : Grain Polisher is used for semi polishing millets like Little, Kodo, Foxtail, Proso, Barnyard, Finger, Pearl Millet & Sorghum. The degree of polished is based on the amount of time the grain is withheld inside the polishing chamber. Specifications : Capacity : 350 kg/hr; Power Requirement : 3HP Motor.



CONCLUSION:

In order to increase millet consumption, there is a strong need in development of prototypes for mechanization of millet production, processing and value added technologies through proper designing, fabrication, testing and ease in handling of machinery to farmers. There is also a pressing need and fine tuning of primary processing machinery of small millets for higher efficiency and creating awareness on usage of machinery to the farmers and establishing the more primary processing unit of millets at farm gate and which in turn promotes the consumption of millets and thereby creating the more demand to millets.

