

01. Experiment No. and Title : Experiment No: **19.5.3.37**
Design and Development of Tender Green Sweet Sorghum Grain (*Paunk*) Roasting machine.
02. Budget Head : 12940
03. Collaborative department, if any : Centre of Excellence on Post Harvest Technology, NAU, Navsari
Department of Agril Engg, CoA, Waghai
04. Background information:
Sorghum (*Sorghum bicolor* L. Moench) is the most important food, fodder and industrial crop of dry land as well as poor soil agriculture. In the world, sorghum is cultivated over 43.93 million hectares in 98 countries with an average yield of 1.4 MT/ha. Among the cereals in India, sorghum ranks third, next to rice and wheat with area under this crop 6.08 million hectares and 0.70 MT/ha of productivity during 2015-16 (USDA, March, 2018). Maharashtra, Karnataka, Andhra Pradesh, Gujarat, Tamilnadu and Madhya Pradesh are the major sorghum growing states. In Gujarat, it occupied an area of about 1.03 lakh hectares with a productivity of 1340 kg/ha during 2015-16 (www.indiastate.com). The sweet and tender green seed of sorghum at soft dough stage i.e. before physical maturity are known as *Pauk* or *Hurda*. The reported '*Hurda (Pauk)*' purpose sorghum varieties are *Wani*, *PKV Ashwini*, *Phule Amruta*, *SGS 8-4* and *Sakkari Mukkari Jola* under AICSIP. (Patil, et al., 2013). The sorghum is planted normally in the month of July-October and harvested during January-March (Madhusudhan, et al., 2017).
The cleaned tender green sweet sorghum seed are used to consume in various way in Gujarat, Rajasthan and Maharashtra (Patil, et al., 2013 and Chavan, et al., 2013). Small and marginal farmers as well as small to medium entrepreneurs are involved in *Pauk* processing during winter season. One can find, *Pauk* processing hunts at high way or road side particularly between Bharuch to Dangs district of Gujarat. These *Pauk* processing hunts are known as *Pauk* centers. Tender grains are being roasted in hot sand grit and generate tedious environment so it is necessary to develop roasting machine with following objectives.
05. Objectives:
1. Identify the parameters for Tender Green Sweet Sorghum Grain (*Paunk*).
2. Study of presently available Tender Green Sweet Sorghum Grain (*Paunk*) threshing methods.
3. Design of Tender Green Sweet Sorghum Grain (*Paunk*) roasting machine.
4. Performance evaluation of Tender Green Sweet Sorghum Grain (*Paunk*) roasting machine.
06. Principal investigator and associates : Er. P. S. Pandit and Dr. Vineet Sharma, Vibhuti Patel
07. Location and Agro-climatic sub-region : Centre of Excellence on Post Harvest Technology, NAU, Navsari
08. Year and Season : 2022-23
09. Crop and Variety : Tender Green Sweet Sorghum Grain (*Paunk*) *Wani*
10. Experimental details : Fabrication
(a) Treatments (For Performance Evaluation and Comparison) : T1-Machine; T2-Manual
(b) Experimental Design : Performance analysis
(c) Repetitions : 15
11. Observations to be recorded:
Grain parameters: Grain dimensions, Pod length, sorghum stalk.
Machine parameter: Parts dimensions, Electrical current, power, etc., Capacity,
Performance: Damaged Sorghum seed, Roasting performance. Other quality parameters, etc.
Economics: Cost economy

12. Methodology (if necessary):
- Sorghum pod/stalk / grain parameters
 - Electrical load calculation
 - Designing the machine parameters
 - Fabrication of machine parts
 - Assembling of machine parts
 - Development of cutting mechanism
 - Performance evaluation and testing of machine