

## Mechanization in Value addition of Banana

Maddali Anusha

Assistant Professor, Department of Applied Engineering, VFSTR, Vadlamudi, Guntur

### SUMMARY

Following rice, wheat, and corn as the fourth most important food crop in the world, the banana (*Musa* spp.) is the fruit with the biggest trade volume. It is mostly grown in tropical and subtropical regions between latitudes 30° north and 30° south in the eastern and western hemispheres [1,2,3], where planting areas and yields have been rising recently [4]. Young laborers are moving from the rural to the metropolis at an increasing rate as society develops and urbanization is built. The population is ageing, labour expenses are increasing, and human resources for banana production are rapidly declining, especially in steep banana orchards. As a result, the banana business must quickly switch from its outdated conventional method to a cutting-edge modern style. The labor-intensive tasks of selecting and transporting bananas are a need in all banana post-harvesting businesses. However, it is highly challenging to accomplish automation and intelligence in banana harvesting and transportation because banana fruits are prone to mechanical damages and because of the geographical environment of banana fields, etc.

### INTRODUCTION

Each and every plant may be used in a variety of ways for different reasons, which is why banana is referred to as "kalpatharu" (a plant of all qualities). Banana contributes 32% of total fruit production. India contributes 28% of world banana production. Banana alone contributes 2.8% to the agricultural GDP export 2019-20 with quantity 1,95,746 MT with value Rs. 659 crores.

#### Nutritional content of Banana:

- Excellent source of potassium.
- A single banana provides 23% of the potassium that we need on daily basis.
- Potassium benefits the muscles, helps to reduce the blood pressure in individuals who are potassium deficient and also reduces the risk of stroke.
- Excellent source of vitamins A, B6, C and D.
- High content of carbohydrates.

#### Value added products from banana:

##### Unripe banana-based products

- Chips
- Flour
- Pickle

##### Ripe banana-based products

- Banana puree
- Fig
- Jam/Jelly
- Fruit bar
- Chutney
- RTS
- Beer
- Wine
- Vinegar

##### Banana flour-based products

- Starch
- Baby food
- Health mix drink

- Soup mix
- bakery and Extruded products

**Key elements in mechanization in processing**

Phases in mechanization

- Manufacturers of equipment
- Processors of produce
- Value addition and product development

<b>The different operations of banana processing which could be mechanized are</b>		
Cutting	Pulping	Microencapsulation
Blanching	Pulverization	Minimal processing
Frying	Extrusion	Fiber extraction
Flavoring	Coating	Rope making
Packaging	Drying	Vermicomposting

**Banana chips processing line (100-100kg/h)**

<b>Operation</b>	<b>Machine</b>	<b>Function</b>
Banana slicing	Banana cutting machine	Cuts banana into pieces
Banana chips blanching machine	Blancher cum dryer	Blanched banana and retains color of banana chips
Dewatering machine	-	Removes the water from banana chips
Banana chips frying machine	Vacuum frying machine	Fries the banana to get crispy chips
Deoiling machine	-	Removes extra oil from banana chips
Flavoring machine	-	Season the fried chips as per the requirement
Packaging machine	Vacuum packaging Box packaging Active packaging Individual fruit packaging Linear shrink-wrapping machines	Packs the banana chips

**Mechanization in banana processing and generation of wealth from banana pseudo stem**

After harvest of banana, about 60-70t/ha waste material is generated. Farmers spend Rs. 15000-20000/ha to remove waste. Hence mechanization for technology development to be covered for the given problems.

1. Mechanization of fiber extraction
2. Post-harvest mechanization package for banana central core
3. Mechanized package for rope making from outer sheath of banana pseudo stem
4. Plate making from outer sheath of banana pseudo stem
5. Briquetting
6. Chipper shredder
7. Alternative to plastics

**CONCLUSION**

At the moment, people often use basic tools to do the tasks of harvesting, moving, and de-handling bananas in banana plantations all over the world. Some banana plantations in the majority of developing nations with considerable banana production, including China, Brazil, India, Ecuador, the Philippines, etc., use semi-mechanized banana harvesting and transportation equipment. The level of mechanization for banana post-

harvesting has a significant impact on banana storage, freshness, selling price, and market competitiveness, even though scientific researchers are increasingly applying new technologies to agricultural engineering fields, such as banana picking and transportation, in some developed regions, such as Europe and Australia. It is possible to vigorously promote the banana industry towards mechanization and intelligence, which is also an inevitable developing trend in the future of banana picking, transportation, and de-handing, by supporting scientific researchers in their efforts to research and develop banana post-harvesting technologies and actively producing practical devices for those tasks. In order to give references for the development of high-tech and mechanized devices in the banana business, we analyse and explain the existing mechanized research state and future growing tendency of banana picking, transportation, and de-handing activities.

## REFERENCES

- Massachusetts Institute of Technology. Banana Harvester. Available online: [http://web.mit.edu/2.009\\_gallery/www/2005/Banana/2005\\_Banana\\_Assembly.html](http://web.mit.edu/2.009_gallery/www/2005/Banana/2005_Banana_Assembly.html) (accessed on 22 December 2019).
- Xie, J.H. 70 years of fruit science research in new china-banana. *J. Fruit Trees* 2019, 36, 1429–1440. [Google Scholar]
- Yang, Z.; Yan, L.L.; Li, J.; Wang, W.Z.; Wang, L.Y. Orchard mining and transportation mechanized equipment and technology. In Proceedings of the 2011 Annual Conference of the Chinese Academy of Agricultural Engineering, Chongqing, China, 22 October 2011; pp. 167–174. [Google Scholar]