

# Design and Development of Pilot Plant for Extraction of Protein from Deoiled Cotton Cake and Value Addition / By-products Utilization

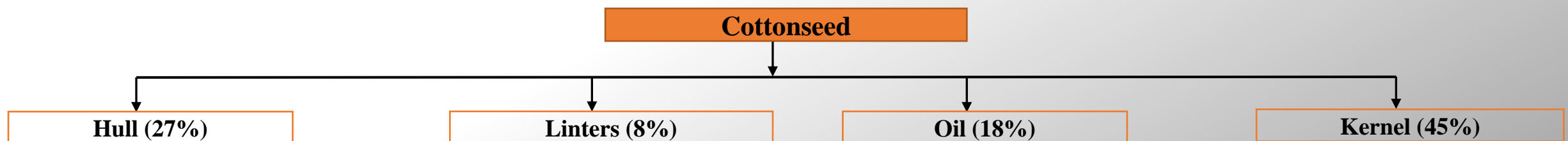


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# Cottonseed

- ✓ Cotton also known as “white gold” is popularly cultivated for its fibre.
- ✓ But the often-ignored fact is that the cotton plant produces **more food for man and feed for animals** than fibre.
- ✓ Cottonseed is considered as the **“Golden Goose”**.
- ✓ Cottonseed, which forms **2/3 portion of the seed** cotton, produces valuable material catering to the needs of indigenous industry as well as the export trade
- ✓ Depending upon the species, cottonseed contains about **14-24% oil** and about **15-26% protein**, thus it is a potential source of fibre, oil and protein.
- ✓ Physicochemical and functional properties of protein isolate obtained from cottonseed meal were studied by Many researcher using Alkaline water etc.
- ✓ Production Study of a Low-Gossypol Protein Product from Cottonseed Meal was reported by Zhuge et al. (1988) by Extrusion method



## ➤ Microwave Treatment



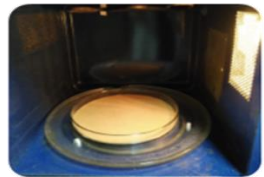
### Procurement

(Phule Dhanwantary delinted cottonseed from MPKV Rahuri, Maharashtra)



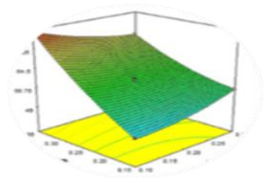
### Conditioning of Meal

The meal was preconditioned to bring moisture content to its desire level.



### Microwave treatment

Microwaved treated meal further analyzed for FG, TG and Crude protein.



### Optimization

Optimization of microwave assisted meal using design expert software (Box Behnken Design)



### Protein Extraction

Alkali salt assisted protein extraction was carried out with optimized conditions

## ➤ Protein Extraction



### Cottonseed Meal



### Alkali Based Extraction



### Centrifugation to collect supernatant to containing soluble protein



### Isoelectric Precipitation (Citric acid & adjust pH)



### Spray Drying

# Developed Product

**Dry Ingredients:** Cottonseed meal protein, whole wheat flour, oats flour, ragi flour, corn flour, salt, baking soda & powder, sugar, milk powder

**Wet Ingredients:** Butter, vanilla essence, water

Sieve dry ingredients.

Mixed it with wet ingredients. Mold it in different shapes.

Baked at 180°C for 30 min.



## Ingredients

Protein Blend, Oats, Rice Crispy, Dry fruits, Dried Cherries, Salt, Cocoa Powder, Sugar Syrup, Soya Lecithin, Honey, Dates Syrup, Water

## Process

Heating of syrup & mixing of dry ingredients into hot syrup

Placing into the mold and allowing it to cool down in refrigerated for 2 hours.

## Protein Bar





## Conclusion



**Scientific processing** and **value addition** of cottonseed and byproducts can open up avenues for rural industries and employment apart from fetching additional income to farmers

# Thank You...



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