BY-PRODUCT MANAGEMENT IN SEED PROCESSING AND TREATMENT PLANTS

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Introduction

- In a seed processing and treatment plant, the primary product is dry treated seed of the highest possible quality.
- This quality is largely determined at the farm.
- However, even within one farm there will always be defective plants that cannot produce seed of the desired quality.
- These inferior or defective seeds are often mixed with the good seed at harvest and have to be sorted out in the factory.
- They are a byproduct since they can be used for other purposes.

- It also happens that in the process of manufacturing good seed other components are separated from it.
- Some of these separated components can find use either in the same plant or elsewhere and thus form part of the byproducts from the factory.
- In this presentation we concentrate on the management of byproducts of maize seed processing.

2. By Products of Maize Seed Processing

- **2.1. Sorted out off-spec maize**
- This is maize that is not suitable for use as seed but is otherwise in good condition.
- It is separated from the rest of the raw material during sorting on the conveyor belt before drying of the unshelled maize.
- It should be dried separately, shelled, cleaned and sold as a by-product to be used for food or feed or any other purpose.

2.2 Surplus Maize Cobs

- These are maize cobs over and above what is required as fuel for heating the drying air. It can be managed in a number of ways.
- It can be sold as it is without any processing for use as fuel or for conversion to other products.
- It can be used to generate electricity that is used to provide power and lighting in the factory and the surplus sold.
- In this way there will be saving in the electricity bill as well as generation of extra income.
- It can be converted to higher value products by treatments such as pyrolysis, gasification and composting

2.3 Shelling and aspiration dust

- This can be collected by passing the exhaust air through a cyclone

- Can be sold for use as an ingredient in animal feed manufacture.

3. **Byproducts of other seeds**
   - Sunflower screenings:
   – Light and blank sunflower seeds, chaf, etc.
   – Used as livestock feed. High in oil and is an excellent fibre source.
- **Bean culls:**
  - Split and damaged beans.
  - Approximately 20% protein.
  - Used as livestock feed.
- **Sunflower Seeds:**
  - Seeds that are too small for seed planting purposes:
  - Recleaned and used as bird seed for birds such as parrots.

- **Others:**
  - Cotton Seed hulls
  - Cotton seed screenings
  - Barley screenings
  - Sunflower hulls
  - Peanut hulls

4. Concluding remarks

- Seed manufacture inevitably leads to production of components other than the desired seed.
- Some of these components can be used directly, others can be used after further processing or conversion to other products.
- Efficient utilization of byproducts can go along way towards improving the profitability of seed processing and treatment plants.

WASTE MANAGEMENT IN SEED PROCESSING AND TREATMENT PLANTS

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1. WHY WASTE MANAGMENT

- Seed processing and treatment produces solid, liquid and gaseous wastes.

- Each of these has its problems. We focus on maize seed.

1.1. Solid Waste

- The main solid waste is excess maize cobs from the maize shelling process.

- It, as often happens, it is simply dumped on land in the vicinity of the factory it causes a number of problems.

- It lowers the aesthetic appeal of the environment.
- It is a source of obnoxious smell
- It harbors rodents that are a health risk in addition to being a nuisance
- It promotes proliferation of insects such as flies and mosquitoes that are known to be disease vectors.
- It is a fire hazard.
- It occupies valuable space

1.2 Liquid Wastes

- Liquid wastes in seed processing and treatment plants include:
- waste water from cleaning operations and sewerage from washrooms and kitchens.
- If not properly treated and disposed of waste water causes a number of undesirable effects.

- It lowers the aesthetic appeal of the environment.
- It causes obnoxious smells
- It promotes proliferation of insects that may be disease vectors.
- It lowers the quality of receiving water such as rivers and groundwater
- It lowers the level of dissolved oxygen in the receiving water and therefore adversely affects aquatic life such as fish.
- It may contain toxic chemicals that harm aquatic life, human beings and animals.

1.3 Gaseous Wastes

- Gaseous wastes from seed processing and treatment plants include:
- Flue gases from boilers, furnaces and standby generators as well as exhaust gases from aspiration, aeration and drying processes.
- Gaseous emissions cause a number of undesirable effects.

Effects of gaseous emissions

- Eye and skin irritation
- Allergic reactions
- Lowered aesthetic appeal of the environment
- Lower visibility
- Increased green house gases such as carbon dioxide
- Increased acidic gaseous emissions such as sulphur dioxide

2. Waste Management

- **2.1 Solid Wastes**
- Maize cobs are often used as fuel for air heating in drying operations.
- This may involve direct mixing of incoming air with the hot products of combustion.
- This leads to a load of suspended particulate matter in the drying air that finds its way to the drier exhaust gases.
- There is however, always excess maize cobs to be disposed of. Dumping on land is not recommended. It could be sold as a by-product or converted to other higher value by-products.

- One such by-product is electricity that can be generated by burning all the maize cobs in a high pressure boiler and using the steam to generate electricity as well as provide process heat such as drier air heating.
- Ash from the furnace can be given out or sold as a sold conditioner or dumped in a landfill.
- Dust from seed cleaning operations should be collected and sold as a by-product to be used in feed manufacturing.

2.2. Liquid wastes

- Waste water can be discharged to the municipal/city waste treatment plant or an in-house waste treatment plant.
- Sewerage can be discharged to the municipal/city waste treatments plants or suitably designed and constructed septic tanks
- Wash waters containing treatment chemicals should be incinerated.

Gaseous Emissions

- Boiler/furnace and generator flue gases should be managed by ensuring that there is efficient combustion and by designing and constructing the chimney correctly.
- Exhaust gases from aspiration, aeration and drying operations should pass through cyclones to minimize dispersal of particulate matter to the environment.

THANK YOU