

## SORTING AND GRADING

Sorting and Grading: Sorting is a operation in which culled, unmarketable and diseased fruits are removed from the lot. This will provide the better return to the growers by checking the spread of disease and catagorising the lot for different use. Grading is also an important operation required for better return by efficient marketing. It is generally done manually in our country on the basis of colour, size (weight/diameter). But now mechanical graders have been developed for apples and citrus fruits mainly for Nagpur oranges by some agencies. These operations help the grower/contractor for better returns. Generally harvested fruits are transported to local/distant market for the dispose off without processing. This results into high cost of packing and transportation on one hand and on the other hand it creates garbage at the disposal point causing pollution.. Therefore before transportation the fruits must be processed which includes removal of unwanted material to reduce the quantity to be transported for reducing the cost transportation and easier handling.

### **Sorting**

Sorting is the separation of foods into categories on the basis of a measurable physical property. Like cleaning, sorting should be employed as early as possible to ensure a uniform product for subsequent processing. The four main physical properties used to sort foods are size, shape, weight and colour.

The effectiveness of a sorting procedure is calculated using

$$\text{effectiveness} = \frac{P \cdot x_p}{F \cdot x_f - R \cdot x_r}$$

where  $P$  (kg s<sup>-1</sup>) \_ product flow rate,  $F$  (kg s<sup>-1</sup>) \_ feed flow rate,  $R$  (kg s<sup>-1</sup>) \_ rejected

food flow rate,  $x_p$  \_ the mass fraction of desired material in the product,  $x_f$  \_ the mass

fraction of desired material in the feed and  $x_r$  \_ the mass fraction of desired material in

the rejected food.

Shape sorting:

- Manually

- Mechanically
  - Belt and Roller sorter
  - Disc sorter
- Image processing
- **Size Sorting**

Size sorting (termed *sieving or screening*) is the separation of solids into two or more fractions on the basis of differences in size.

Important when the food is to be heated or cooled as the rate of heat transfer is in part determined by the size of the individual pieces and variation in size would cause over-processing or under-processing.

- **Equipments:**
- Screens with either fixed or variable apertures
- The screens may be stationary or most commonly rotating or vibrating.
- **Fixed apparatuses screens**
- Flat bed screen
- Drum screen (rotary screen or reel)
- Grading is assessment of a number of attributes to obtain an overall quality
- Classification into different quality fractions based on commercial usage
- Sorting may thus be a part of grading.
- Grading by trained operators
- More expensive than sorting

- Buying is based on Grade

#### Parameters of grading

- **Size**
- **Shape**
- **Cleanliness**
- **Maturity**
- **Colour**
- **Weight**
- **Surface roughness**
- **Free from disease, mechanical, insect damage**