APPLICATION OF ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS

Lecture 02

PFE-2.4.5

By:

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PHYSICAL PROPERTIES

- Design of various separating, handling, storing and drying systems

- Size and shape - fruit participating, electrostatic separation, development of sizing and grading machinery

- Bulk density, true density, and porosity - sizing grain hoppers and storage facilities

FRICTIONAL PROPERTIES

- Designing equipment for solid flow and storage structures and the angle of internal friction between seed and wall in the prediction of seed pressure on walls - Designing storage bins, hoppers, chutes, screw conveyors, forage harvesters, and threshers.

AERO AND HYDRO-DYNAMIC PROPERTIES

- Terminal velocity and drag coefficient - Designing of air/ hydro conveying systems and the separation equipment.

THERMAL PROPERTIES

- Specific heat capacity (Cp), thermal conductivity(k), and thermal diffusivity-

  Heat transfer or energy use, such as in extrusion cooking, drying, sterilization, cooking etc.

OPTICAL PROPERTIES

- of hyperspectral, multispectral, infrared imaging and computer vision system - Used for sorting, grading, maturity, surface colour and blemish determination

DIELECTRIC PROPERTIES

- Dielectric heating or volumetric heating occurs due to polarization and ionization of molecules - Drying, sterilization, pasteurization and other thermal processing operations.

ACOUSTIC PROPERTIES

- Biological cell recats to sound waves - detecting the imperfections in agro commodities, homogenizing liquid sample, extraction of plant materials and as pretreatment for drying and dehydration process.

ELECTRICAL PROPERTIES

- Determining the moisture content of grain
- Ohmic heating has been in use for drying, pasteurization, blanching and other thermal processing of foods, based on resistance heating

RHEOLOGICAL PROPERTIES

- Design of flow processes for quality control
- Predicting storage and stability measurements
- Understanding and designing texture.

TEXTURAL PROPERTIES

- Quality characteristics of foods
- Differences due to the variety difference, differences due to maturity, and differences caused by processing methods