Novel Use of Infrared in sprout process

New Generation Emitters – reducing, cost, time, energy & process footprint.
Irtech have developed emitters that can use the whole infrared spectrum of wavelengths or select within the band to achieve customers specific outcomes.
How Infrared Works

- Infrared waves not only strike the surface they also penetrate depending on matrix 4-6 mm
- The absorption of the waves at the surface or within the matrix creates thermal conductance that radiate out.
- This results in a rapid temperature rise of the product

Note: Heat moves from outside of grain into the middle with outer surface

Note: The infrared energy is transferred directly to and within the product.
What Benefits IR Offers

Lifting temperature very quickly and focusing of energy direct onto the product has a number of immediate benefits

- Less energy for thermal processing
- Lower temperature
- Reduce in time and exposure to thermal process
- Foot print of equipment

Note: Penetrates through grain surface to raise the kinetic energy of water molecules heating throughout grain at lower temperature
What the Potential

- Reduce micro loads using thermal process
- Have a process that is cleaner
- Assures treatment of entire grain not just surfaces
- Reduce chemical usage
- Potential to be used at seed stage, primary as well as sprouting operation

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Application Points

Seed Cleaning and packing
- Use IR in dry cleaning to reduce
  - Hard Seed
  - Disinfection
  - Reduction in microorganisms

IR Treatment before Sprouting
- Use as a CCP that can be validated for specific log reduction and controlled on temperature and time

Sprouting
- With Pathogen control prior
  - Chlorine level becomes control point for maintaining pathogen free environment

Packaging
- FM CCP unchanged

Distribution
- No Change
How it fits into a Food Safety Plan

- Use of a rotating drum passing product under a the emitters gives a controllable process that assures 100% treatment.
- Work as QCP and CCP
- Validated parameters are easily controlled and data recorded.
- As clean process less risks from to be managed in other ways.
  - Chemical
Results to Date

Feasibility Trials So Far

• Soy and Mung bean treatment to improve sprouting (temperature Below 70-90C)
• Treated Mung Beans Pilot amounts 50Kg at 70 -90 C and 45 -60 Sec
  • Sprouted through commercial plant in line with standard
• Treatment of Lucene seed to 50 Kg 45- 60 sec
  • Sprouted through commercial plant in line with standard
• Treatment of rice achieving 2-3 log reduction of Coliforms
  • 80-90 C retention time extended
• Various drying and micronisation of grains for food and feed industry
Our Next Steps

• Working with 3rd Part on Standardised method of Validation for Grains and Seeds
  • D value Confirmation
  • Z value
  • Process to optimise time and temperature for desired material and log reduction that will achieve.

• Use this information to get approval of process as valid and accepted kill step
Pilot Machines

- Clean process.
- User friendly.
- Efficient.
- Low maintenance.
- Practical.
- Unique.
- Environmentally safe.
- Maximum operational safety.

Larger Pilot model
Infra Red Light Source Assured
The power of next generation emitters