Converting Retired Poultry Houses Into Indoor Vegetable Growing Facilities – Growing Strawberries

Gordon Johnson Department of Plant and Soil Sciences And Cooperative Extension University of Delaware



Situation



- Over 2400 empty poultry houses on Delmarva
 - Over 1000 houses in DE
 - 2x in 20 years

- More modern houses that are clear span would be preferred over houses with interior posts. Houses should not have curtains.
- Houses should have an intact well-maintained roof with no leaks.
- Ceilings and walls in the house interior should be in good condition with no holes and should be well insulated.
- Houses should not have areas where water collects or have floors that stay wet.?

Appropriate houses for conversions



Not a good choice



Some potential but not ideal



Good Potential



Current Modern House





Conversion to Greenhouse

Can you convert to this



Conversion Process

- Determine type of production
 - Greenhouse
 - Lighted warehouse
- Test for Salmonella
- Remove litter
- Remove unnecessary
 equipment
- Clean and sanitize

- Make modifications
 - Floors, ceilings, walls, doors, fans, heating
- Install growing equipment
 - Lighting
 - Benches
 - Growing units
 - Water/nutrient systems
- Establish a monitoring program

Testing

- Because these facilities were used for poultry production there is some concern of the facilities harboring pathogens that are of concern for produce food safety and food borne illness.
- In most cases, the houses have been out of production for a significant period and therefore pathogen loads should be low or non-existent.
- The one pathogen group with ability to survive in the environment for a longer time are the Salmonella species. Pre and post testing for Salmonella is recommended (floors and surfaces).
- Take floor samples paying attention to any wet areas and entrance areas. Swabs should be taken from ceiling and walls.
- Another issue is rodents. Rodents can also carry pathogens of concern. Active rodent infestations must be controlled prior to any conversion.

Converted house



1) Prior to renovation

- Remove all feeders, brooders, and waterers and associated cables and pulleys
- Determine what wiring will be kept and remove any that will not be used.



2) Floors

 Poultry house floors are of concern for several reasons. During poultry production ammonium, nitrate, potassium, sodium, and other salts migrate into the floor. This results in a very caustic condition that damaging to equipment. In addition, ammonia can be released from the floor when wetted that can be damaging to plant health and worker safety. A third issue is the possible persistence of microbes that are of concern for produce food safety and food borne illness (Salmonella specifically)

2) Floors

- Remove all litter completely with attention paid to sides
- Then remove the top 2-6 inches of fill soil
- Apply ammonia control gypsum or alum
- Then cover with the floor area with 2-6 inches of clean fill
- Then cover the whole area with impervious geotextile fabric
- Pouring cement floor is another option but expensive







3) Ceiling

- Evaluate current ceiling
- Using commercial grade vacuum remove all loose dust, cobwebs, and other loose materials or power wash
- Sanitize with dry sanitizers
 - Liquid possible if it is intact and wettable
- Cover the ceiling with 6 mil poly plastic
- Run new wiring in plastic conduit (optional)

Ceilings – Clean, Cover?



4) Walls, doors

- Evaluate current walls
- Using commercial grade vacuum, remove all loose dust and other loose materials or power wash
- Sanitize with dry sanitizers
 - Liquid possible if intact and wettable
- Cover walls with 6 mil poly plastic or seal in another fashion
- Doors should be replaced or boarded over if not being used

Evaluate Walls







Poultry house mid conversion. Floor has been excavated and replaced with sand/clay mix. Walls and ceilings have been cleaned. Walls are being covered with 6 mil white poly plastic. Note that the house is clear span without curtains, intact ceiling in good repair. Walls are in fair-good condition. All poultry equipment has been removed.



Ceiling being covered with white poly plastic.

5) vents, fans, and heaters

- If side vents are to be used, vacuum and dry sanitize vent boxes, cables, and pulleys
- If retained, cool pad vents should be replaced with new pads and water systems should be sanitized by running sanitizer in the water
- If retained, fans and fan housings should be cleaned completely and then dry sanitized
- Heaters should be removed and replaced with new vented heaters or other alternative heating, if reused should be cleaned and sanitized

Replace Heaters?



Fans, Clean or Replace, Side Vents Clean or Seal



Replace or Remove



6) Other Treatments

- Heat house to high temperature above 120 F if possible
 - 4-7 days
- Fumigation???

Costs

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Estimates for house conversion according to University of Delaware Guidelines: 40'x550' house

- Cost for removal of current heaters and cost for removal and disposal of all old poultry equipment \$3,000
- Litter removal and cost of excavation for top 2-6" of house floor \$5,000
- Cost for alum or gypsum to apply to floor after excavation \$1,000
- Cost for 6" of replacement fill dirt, applying and packing \$8,000
- Cost for impervious Geo textile fabric and application \$4,000
- Cost for cleaning ceiling and sanitation of ceiling \$3,000
- Cost for white poly for ceiling and covering ceiling \$25,000
- Cost for cleaning walls, repairing walls, and covering with white poly \$10,000
- Cost for new doors and vents and installation \$5,000
- Cost of removal and replacement of cool cells \$3,000
- Salmonella testing \$2,000

Total \$69,000

This cost can be reduced significantly if existing family farm labor is used to excavate and replace fill, apply geotextile, <u>clean</u> and disinfect where needed, cover walls, cover ceilings, and replace doors and vents

Growing system

Hydroponic facility costs

Air Circulation System \$7,000 **Overhead Vented Unit Heaters \$15,000** Environmental Controls \$5,000 NFT Growing System \$60,000 (tank type systems would be less expensive) Growing Supplies (approx. 1 year) \$14,000 Grow Lights \$150,000 Total \$251,000

Current conversions

- Spirulina
- Greens
- Baby Ginger
- Medical Cannabis
- Future Strawberries

Open House - First Farm Cultivating Spirulina in Maryland

Schedule Fri Apr 22 2022 at 01:00 pm to 04:00 pm

Location

Farm To Fork Fresh Herbs & Veggies | Ridgely, MD



OPEN HOUSE With Pelaton Pharma & Farm to Fork Fresh

SEE HOW WE'VE CONVERTED A CHICKEN HOUSE INTO A SPIRULINA PRODUCTION FACILITY. WATCH THE CULTIVATION, COLLECTION & PROCESSING OF SPIRULINA. THEN IF YOU'RE BRAVE... TRY A TASTEI





http://croppers.farm/converting-poultry-houses-into-indoor-growing-facilities/



- Indoor lighted production, hydroponics
- Growing propagation tips currently
- Yield study Strawberry Varieties
 - Day neutral Albion, San Andreas, Cabrillo, Sweet Ann, Royal Royce, Monterey
 - June Bearer Keepsake, Camarosa, Fronteras, Ruby June, Camino Real, Flavorfest
- Lighting study different light levels
- Vision multiple growers with converted poultry houses growing strawberries





Gutter production, hydroponics, LED lights





College or Department name here



Tip Production and Rooting







Questions??

Gordon C. Johnson, PhD **Extension Fruit and Vegetable Specialist Department of Plant and Soil Sciences** University of Delaware **Carvel Research and Education Center** 16483 County Seat Highway Georgetown, DE 19947 gcjohn@udel.edu Office: (302) 856-2585 ext. 590 Cell: (302) 545-2397

Thank you!!

- I will be retiring in June
- Programs will continue Dr. Emmalea Ernest will be your Fruit contact.
- Wish you all good fortune.

It has been a privilege to serve you for the last 12 years as Extension Fruit and Vegetable Specialist!

