

**Next Policy Framework  
Consultation on  
Food Innovation Capacity**

**Emerging Technologies and Logistics in  
the Food Processing Industry**

**Introduction for  
Dr Rick Green  
POS Biosciences**

# Tensions in Food Process Innovation

**Sustainability vs Least Cost Formulation**

**Boutique Processing vs Economy of Scale**

**Whole vs Fractionated**

**Convenience vs Natural**

**Incremental vs Disruptive**

How are emerging technologies and these tensions likely to shape food innovation in Manitoba?



<http://canadianfoodinnovators.ca/>

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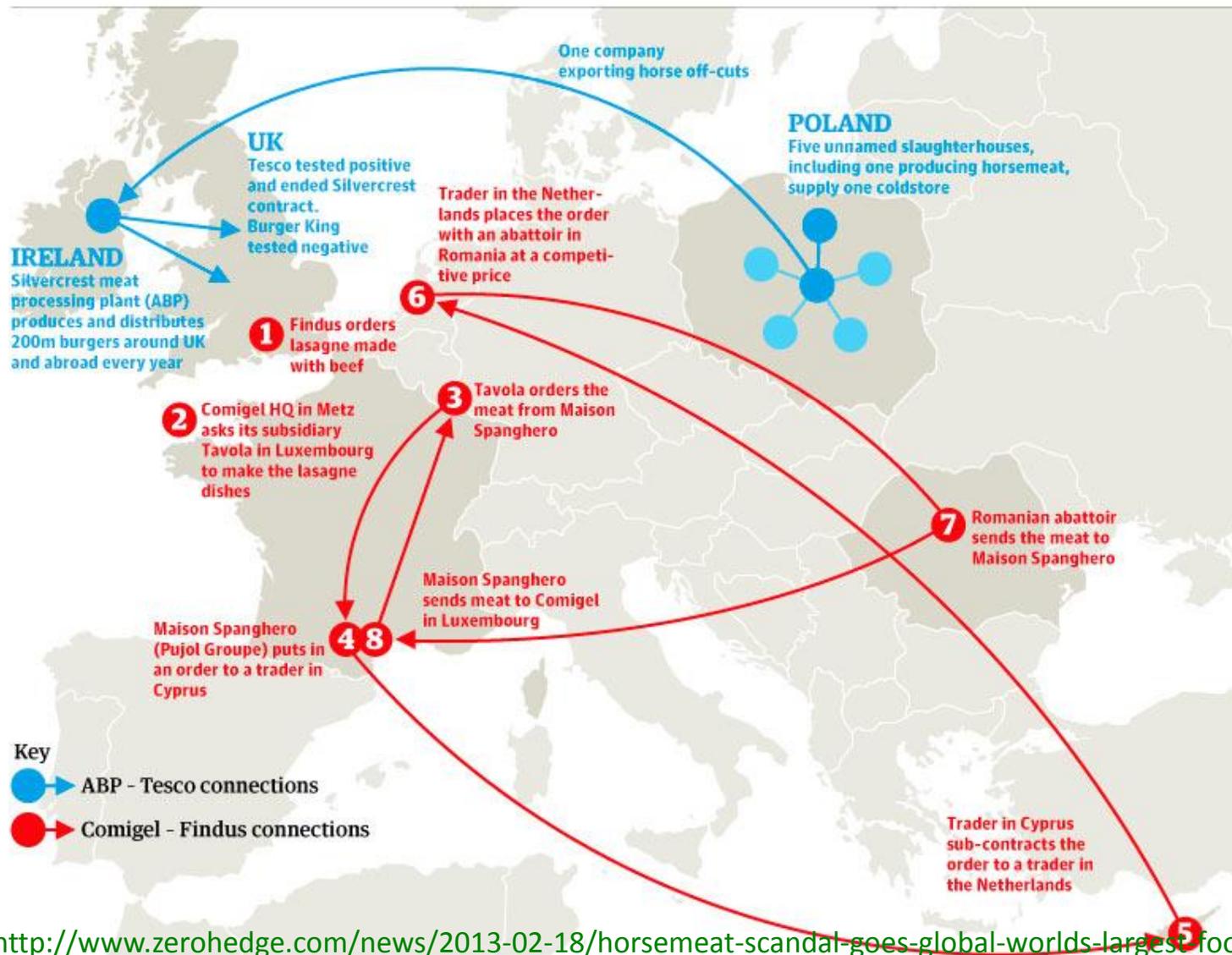
Look to what  
innovation is  
already here



<http://canadianfoodinnovators.ca/>

# Sustainability vs Least Cost Formulation

## Britain's horsemeat The ABP and Comigel connections



<http://www.zerohedge.com/news/2013-02-18/horsemeat-scandal-goes-global-worlds-largest-food-maker-pulls-tainted-pasta-spain-an>

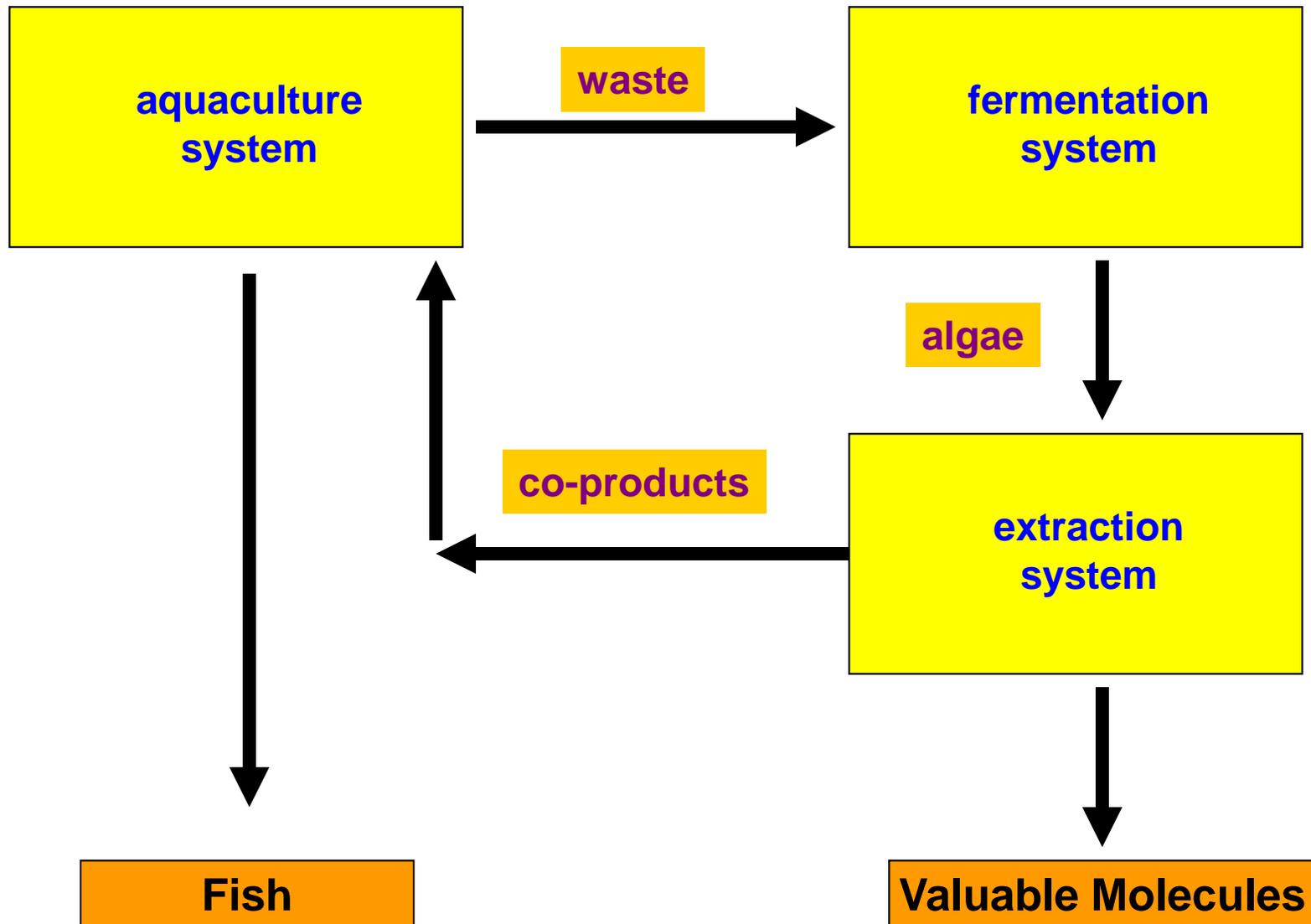
# Sustainability vs Least Cost Formulation

**THE WESTERN PRODUCER** Molecular farming: small scale work nets big results



University of Manitoba researcher Ryan Sestric is testing a system where synthetic fish waste is the primary feed source for specialized algae, which can then be harvested for a variety of uses. | Ed White photo

# Sustainability vs Least Cost Formulation



# Boutique Processing vs Economy of Scale

The image is a screenshot of a web browser displaying a CBC News article. The browser's address bar shows the URL [www.cbc.ca/news/canada/manitoba/pea-plant-manitoba-1.3941631](http://www.cbc.ca/news/canada/manitoba/pea-plant-manitoba-1.3941631). The page features the CBC News logo and navigation menus for TV, Radio, News, Sports, Music, Life, Arts, Local, and More. A live stream for Radio One 89.3 FM is also visible. The article's main headline is "World's biggest pea processing plant coming to Portage la Prairie", with a sub-headline: "France's Roquette to build \$400M vegetable-processing facility, bring 150 full-time jobs to Manitoba". The article is dated January 18, 2017. A large image of a pea pod is featured on the left side of the article. On the right, there are social media sharing options for Mobile, Facebook, Podcasts, Twitter, Alerts, and Newsletter. At the bottom right, there is an advertisement for "CBC MUSIC PRESENTS ADELE LIVE IN NEW YORK CITY".

World's biggest pea processing plant coming to Portage la Prairie

France's Roquette to build \$400M vegetable-processing facility, bring 150 full-time jobs to Manitoba

CBC News Posted: Jan 18, 2017 3:36 PM CT | Last Updated: Jan 18, 2017 5:11 PM CT

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# Boutique Processing vs Economy of Scale

## Smart Vertical Farms for Remote Communities

Korea Agriculture System & Technology in  
partnership with Opaskwayak Cree Nation

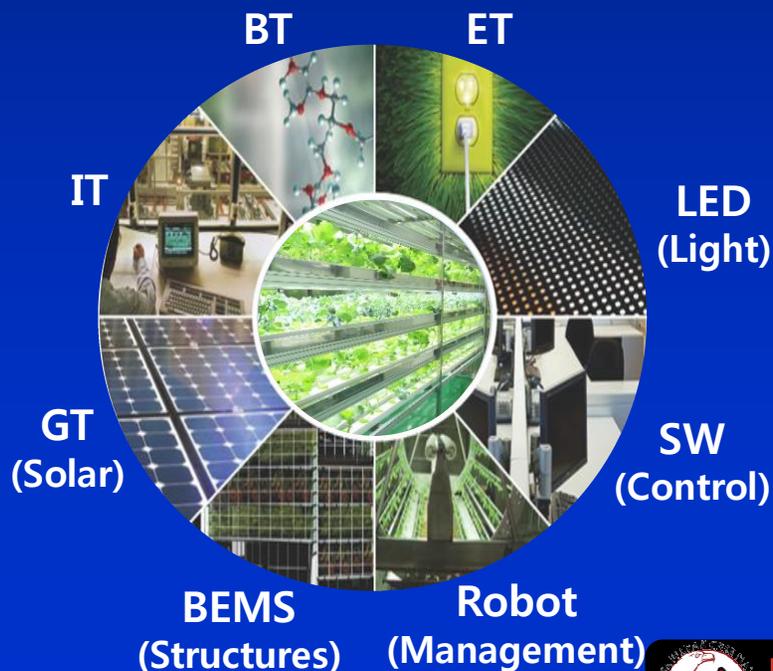
Initial Goal = improve supply of fresh vegetables  
better nutrients

Longer Goal = develop value-added strategies for  
more efficient nutrient delivery

Slides courtesy of:  
Dr Miyoung Suh  
University of Manitoba

# Smart Vertical Farm

- Next generation Agricultural Platform based on the convergence of integrated technologies of IT, BT, ET and more.
- Various plants are raised in a closed environment, controlled by automatic system with real-time monitoring.



# So far OCN demonstrated ~40 different Types of vegetables!!!



- Lettuce, spinach, parsley, broccoli, other leafy vegetables  
Beet, small radish. Kohlrabi.....
- Current trials: Strawberry, Ginseng, Cheery Tomatos,  
Bitter melon etc
- Productivity (example of lettuce)
  - 25days/cycle (~ 200 heads/day)
  - cost ~\$0.75 vs \$1.99 in local vs \$6.75 in Churchill

# Health Benefit Research:

## Stage I

Current  
Vegetables  
grown in OCN



Clinical trials  
&  
Vegetable eating  
Campaign

## Stage II

Functional  
Vegetables

Priority for:  
Diabetes  
Hypertension  
Obesity  
(with KIST,  
Korea)



## Stage III

Nutraceuticals

Value-added  
products  
(functional  
juice/medical  
diet  
components)



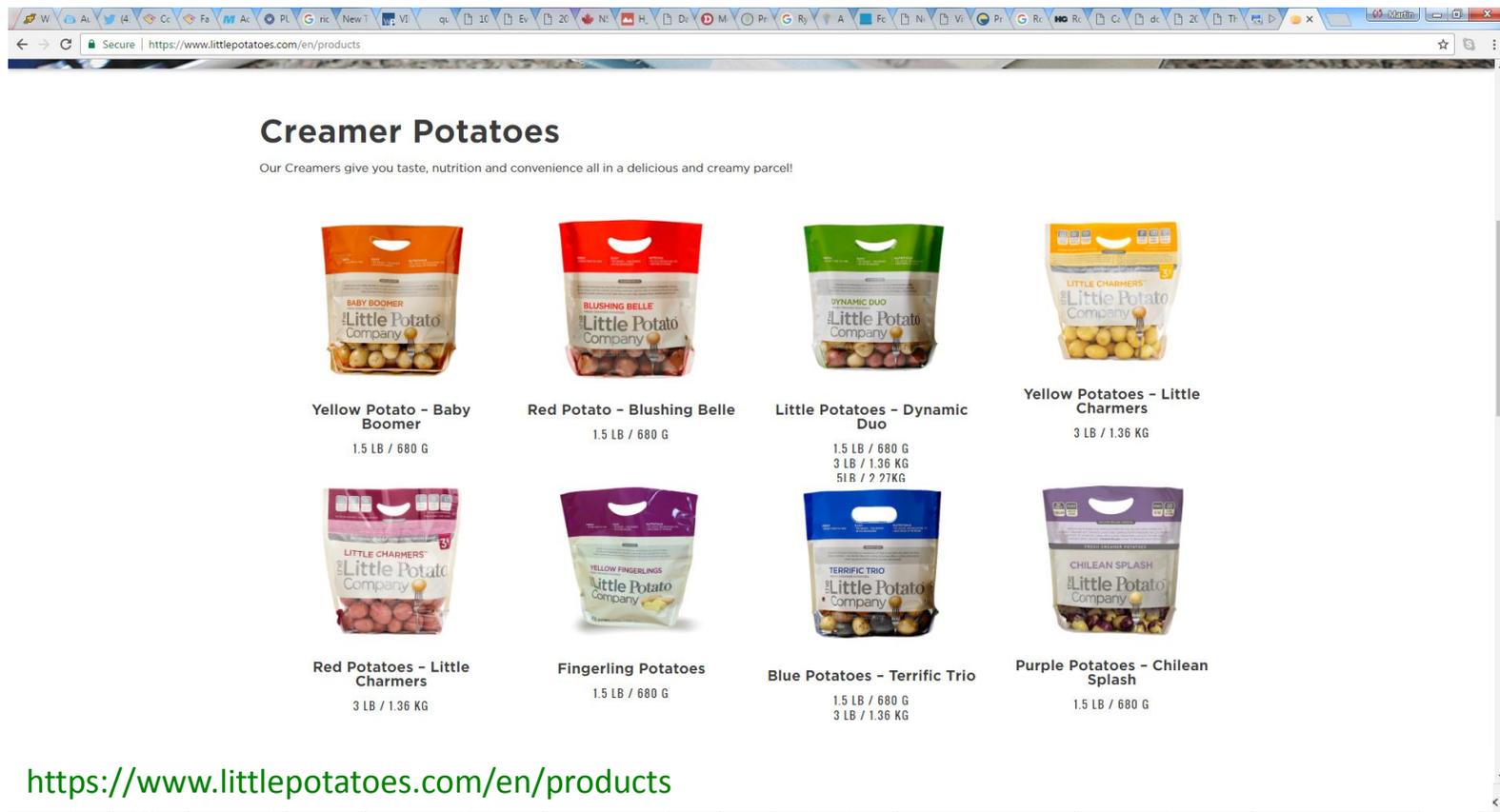
in vitro/in vivo (pre-clinical)/clinical trials



# Whole vs Fractionated

## Rebranding of Traditional Commodities

### Little Potato Company (Edmonton, AB)



The screenshot shows a web browser displaying the Little Potato Company's product page. The page title is "Creamer Potatoes" and the subtext reads "Our Creamers give you taste, nutrition and convenience all in a delicious and creamy parcel!". Below this, there is a grid of eight potato products, each with a bag image, a name, and weight information.

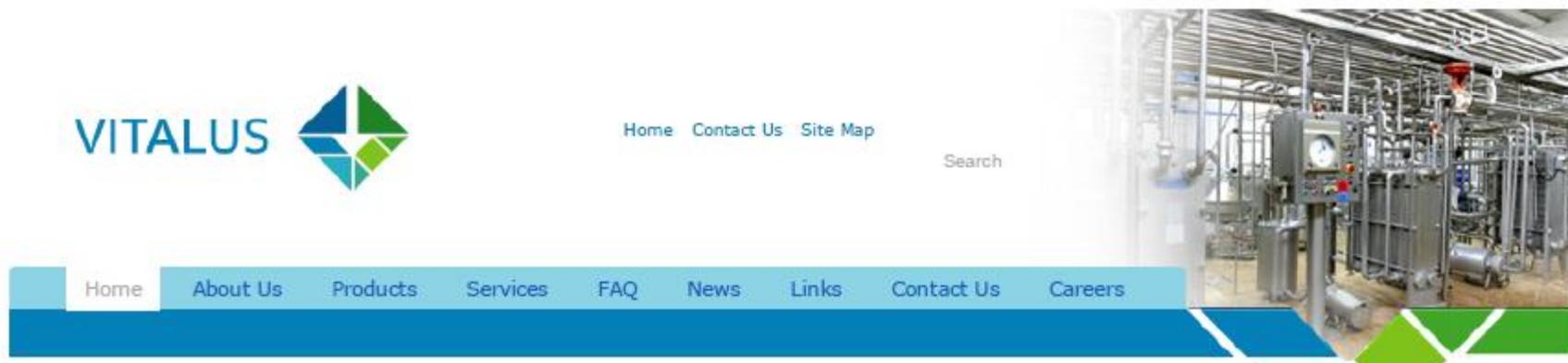
Product Name	Weight
Yellow Potato - Baby Boomer	1.5 LB / 680 G
Red Potato - Blushing Belle	1.5 LB / 680 G
Little Potatoes - Dynamic Duo	1.5 LB / 680 G 3 LB / 1.36 KG 5 LB / 2.27 KG
Yellow Potatoes - Little Charmers	3 LB / 1.36 KG
Red Potatoes - Little Charmers	3 LB / 1.36 KG
Fingerling Potatoes	1.5 LB / 680 G
Blue Potatoes - Terrific Trio	1.5 LB / 680 G 3 LB / 1.36 KG
Purple Potatoes - Chilean Splash	1.5 LB / 680 G

<https://www.littlepotatoes.com/en/products>

# Whole vs Fractionated

## Utilizing Dairy Herd Capacity

Milk → proteins / lipids / carbohydrates / minerals



### Leaders in Nutri-functional Proteins

**Vitalus Nutrition Inc.** is a leading supplier of sophisticated, customized dairy ingredients for the world's food, beverage and nutraceutical industries. Through our advanced facilities and FSSC 22000 certified processing plant, we process milk and whey into various dairy ingredients that are superior in quality, nutritional value and functionality. Our products are

[New Products](#)

<https://www.littlepotatoes.com/en/products>

# Convenience vs Natural

**Providing Customer Friendly Convenience  
while Avoiding Overprocessing**

# Convenience vs Natural

## 1<sup>st</sup> Generation: Traditional Thermal Processing



genius.com

# Convenience vs Natural

## Traditional Thermal Processing



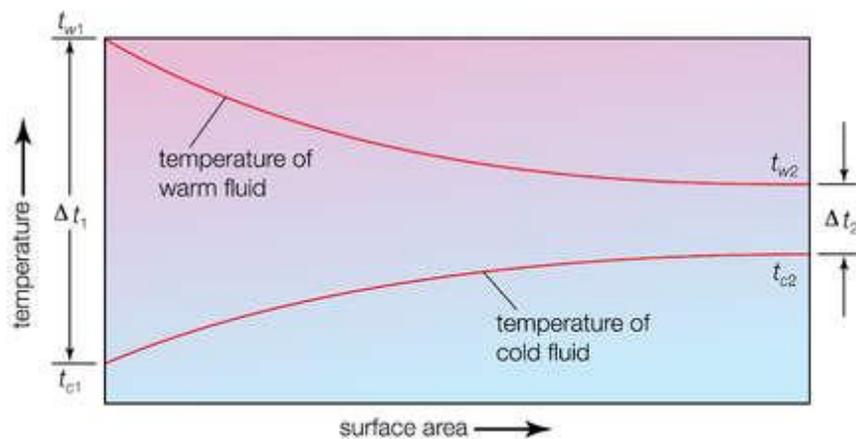
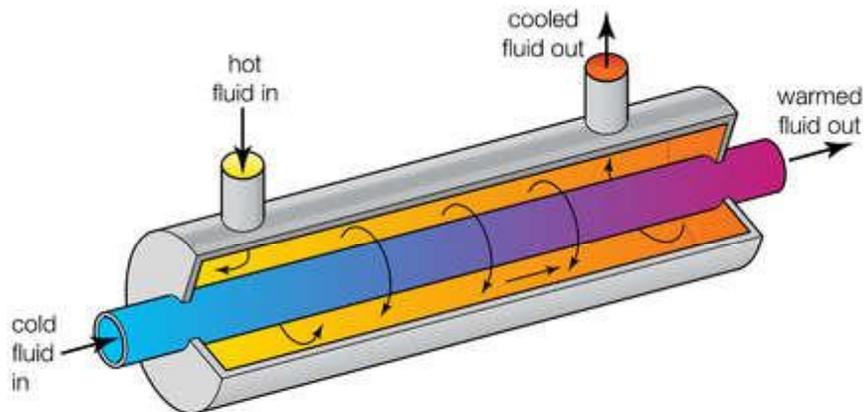
genius.com

Heat has to diffuse inwards to  
coldest point in the can

→ massive over-processing of most of  
the food

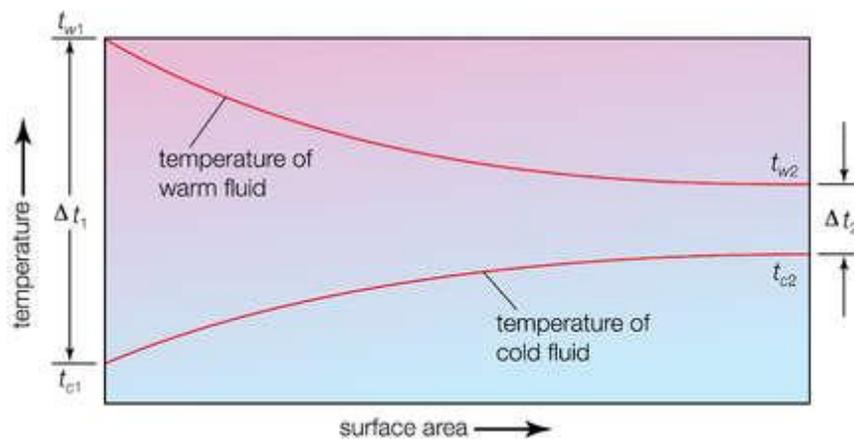
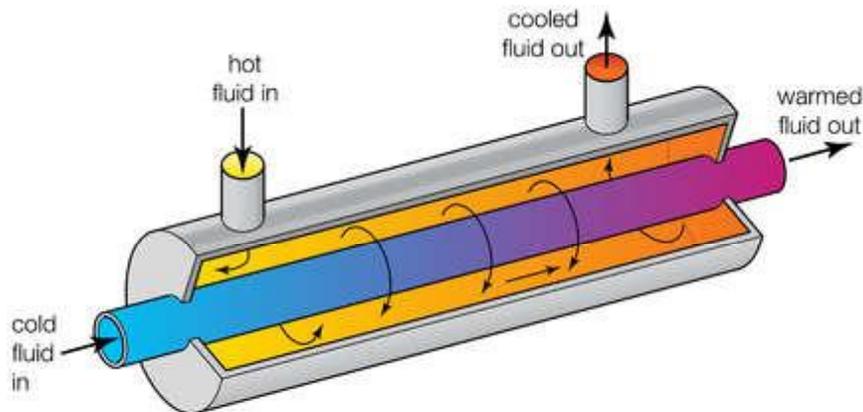
# Convenience vs Natural

## 2<sup>nd</sup> Generation: Aseptic Sterilization Processes



# Convenience vs Natural

## Aseptic Sterilization Processes



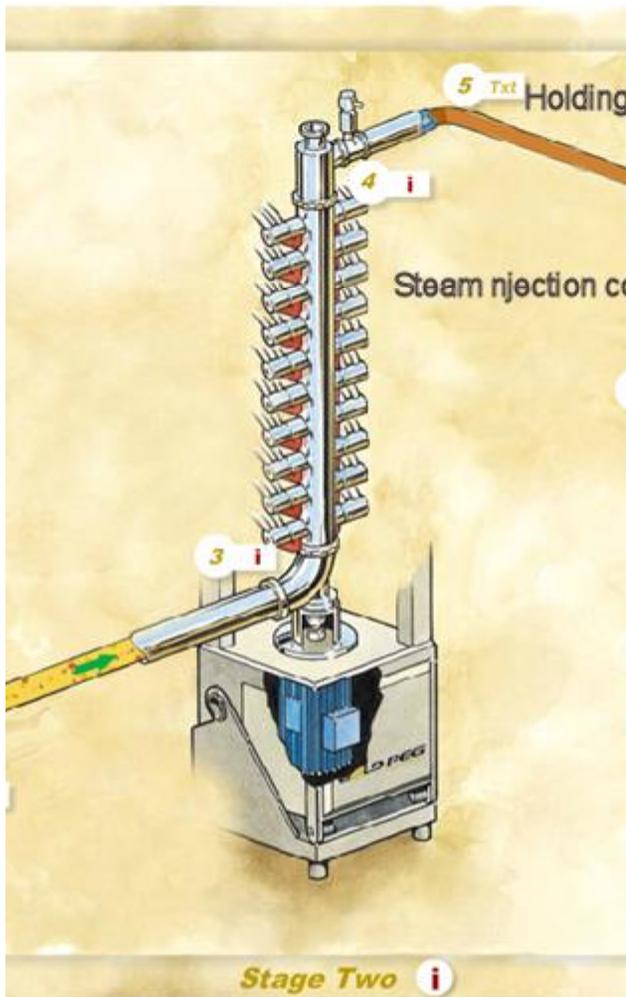
By shortening the path through which heat has to diffuse

→ quicker processing of the food

→ minimal over-processing

# Convenience vs Natural

## 3<sup>rd</sup> Generation: Direct Thermal Deposition in the Food



Direct deposition of thermal energy  
required for sterilization

culinary steam

microwave (pressurized system)

(ohmic heating)

# Convenience vs Natural

## Direct Thermal Deposition in the Food



Direct deposition of thermal energy  
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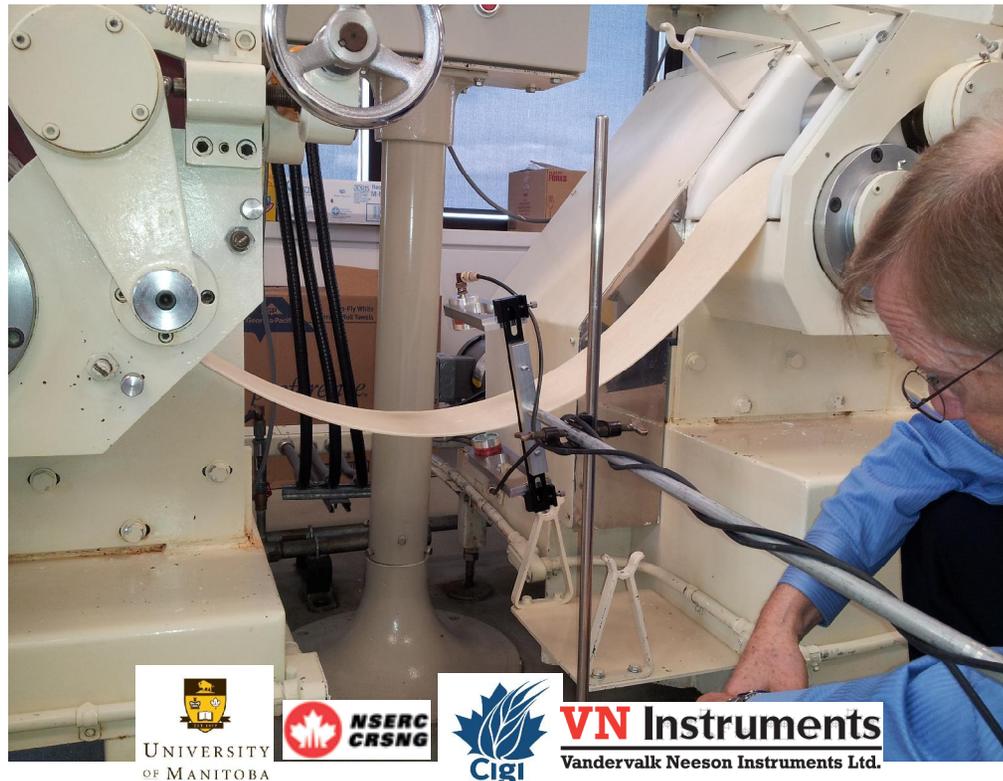


culinary steam  
microwave (pressurized system)  
(ohmic heating)

# Incremental vs Disruptive

## Utilizing Sensors and their Data

Capacity to innovate governed by creative exploitation of real-time arrays of quality, composition and safety data



# Incremental vs Disruptive

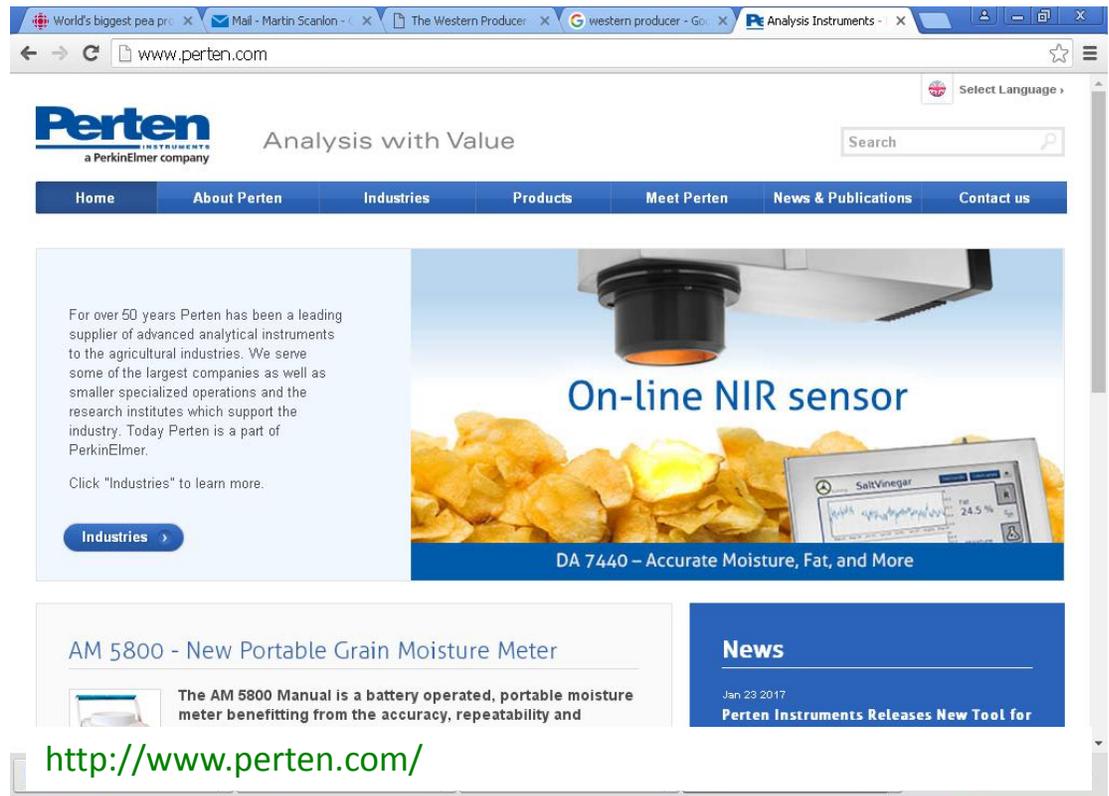
## Utilizing Sensors and their Data

Capacity to innovate governed by creative exploitation of real-time arrays of quality, composition and safety data

Perten Canada

Head Office in  
Winnipeg

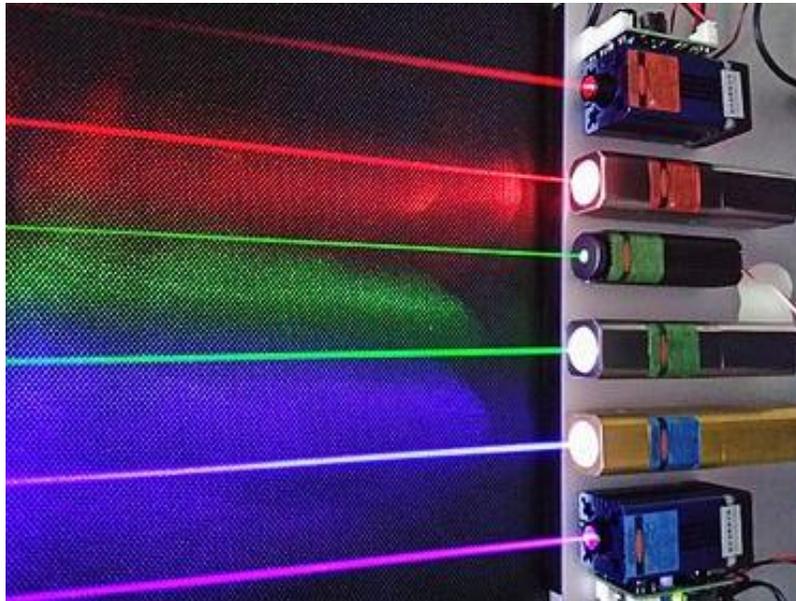
NIR specialists



The screenshot shows the Perten Instruments website. The browser address bar displays [www.perten.com](http://www.perten.com). The website header includes the Perten logo (a PerkinElmer company) and the tagline "Analysis with Value". A search bar is located in the top right corner. The main navigation menu includes links for Home, About Perten, Industries, Products, Meet Perten, News & Publications, and Contact us. The main content area features a large banner for an "On-line NIR sensor" (DA 7440) with a description: "For over 50 years Perten has been a leading supplier of advanced analytical instruments to the agricultural industries. We serve some of the largest companies as well as smaller specialized operations and the research institutes which support the industry. Today Perten is a part of PerkinElmer. Click 'Industries' to learn more." Below the banner is a button labeled "Industries". To the right of the banner is a news article titled "AM 5800 - New Portable Grain Moisture Meter" with a sub-headline: "The AM 5800 Manual is a battery operated, portable moisture meter benefitting from the accuracy, repeatability and". The news article is dated Jan 23 2017 and includes the text "Perten Instruments Releases New Tool for". At the bottom of the page, the URL <http://www.perten.com/> is displayed.

# Incremental vs Disruptive

## Next Generation: NIR laser diode systems



**Intense source of NIR light of narrow spectral properties**

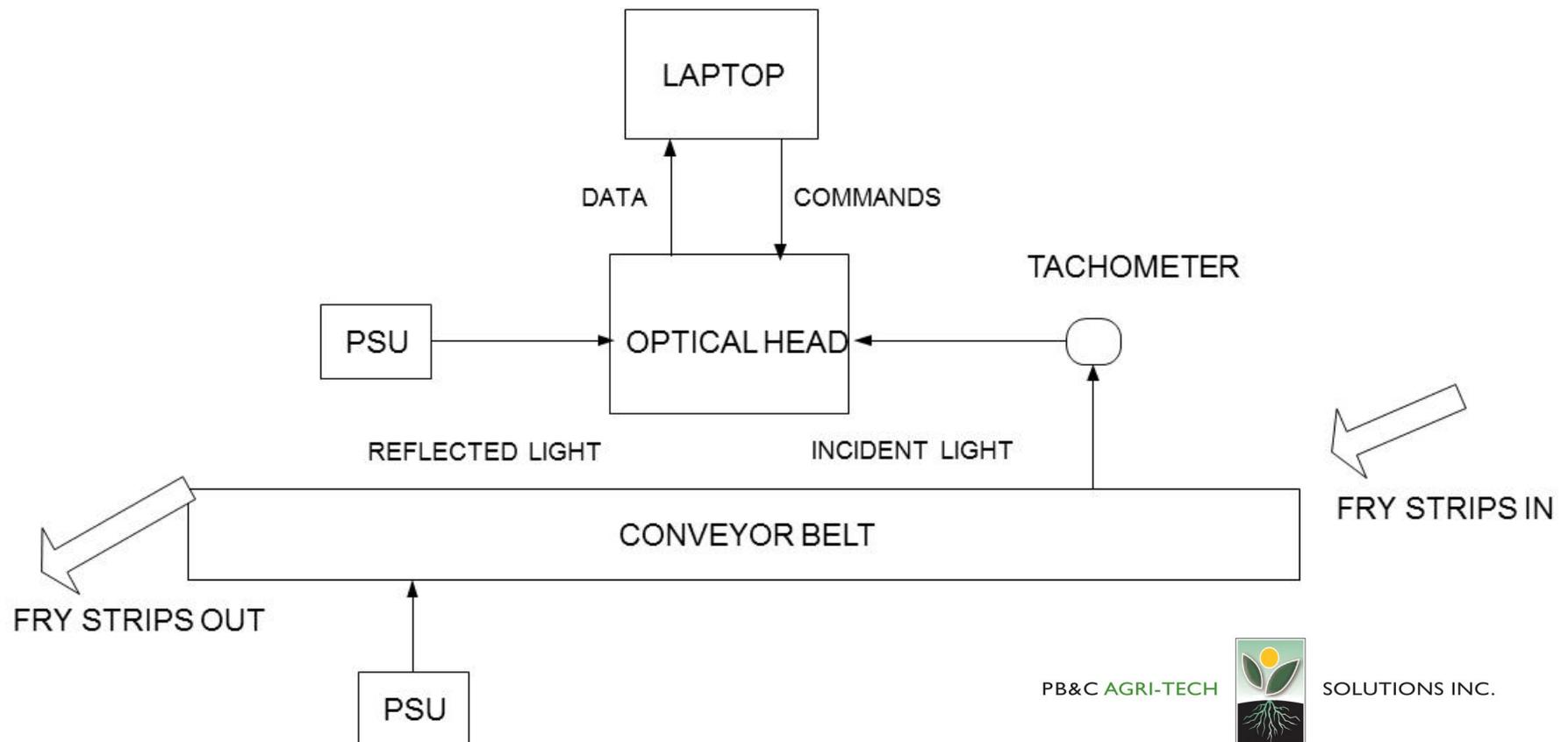
**Light reflected from moving food material altered by species that absorb at laser diode wavelength**

[https://en.wikipedia.org/wiki/Laser\\_diode](https://en.wikipedia.org/wiki/Laser_diode)

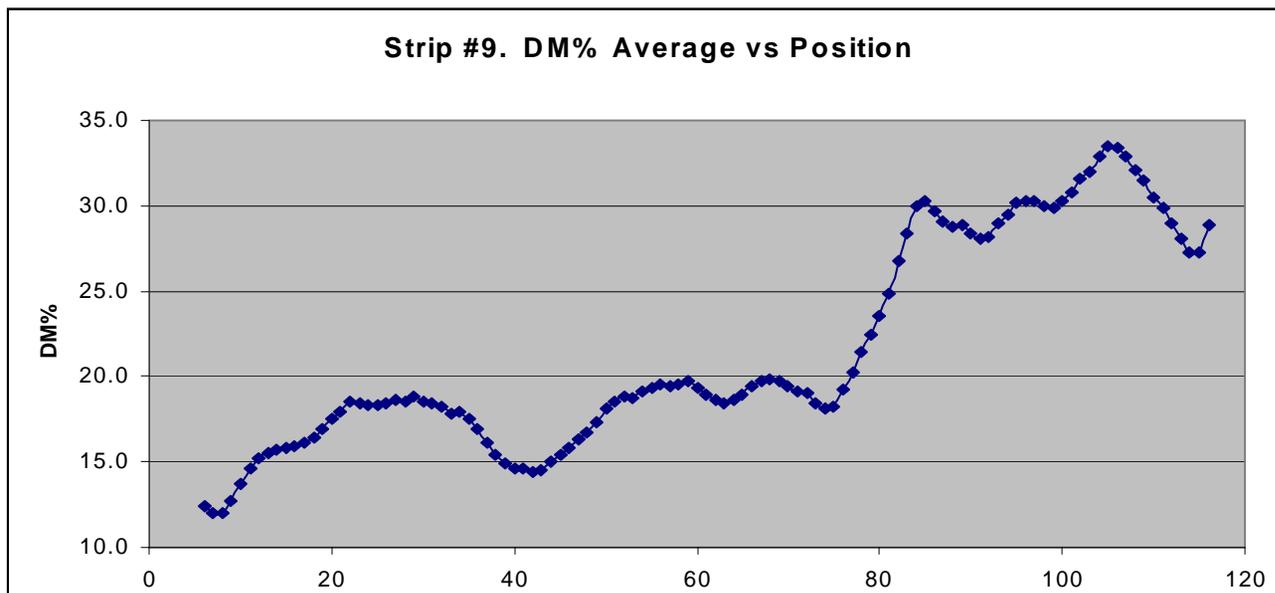
# Incremental vs Disruptive

## NIR laser diode systems

Application on french fry line for measuring solids content at line speeds

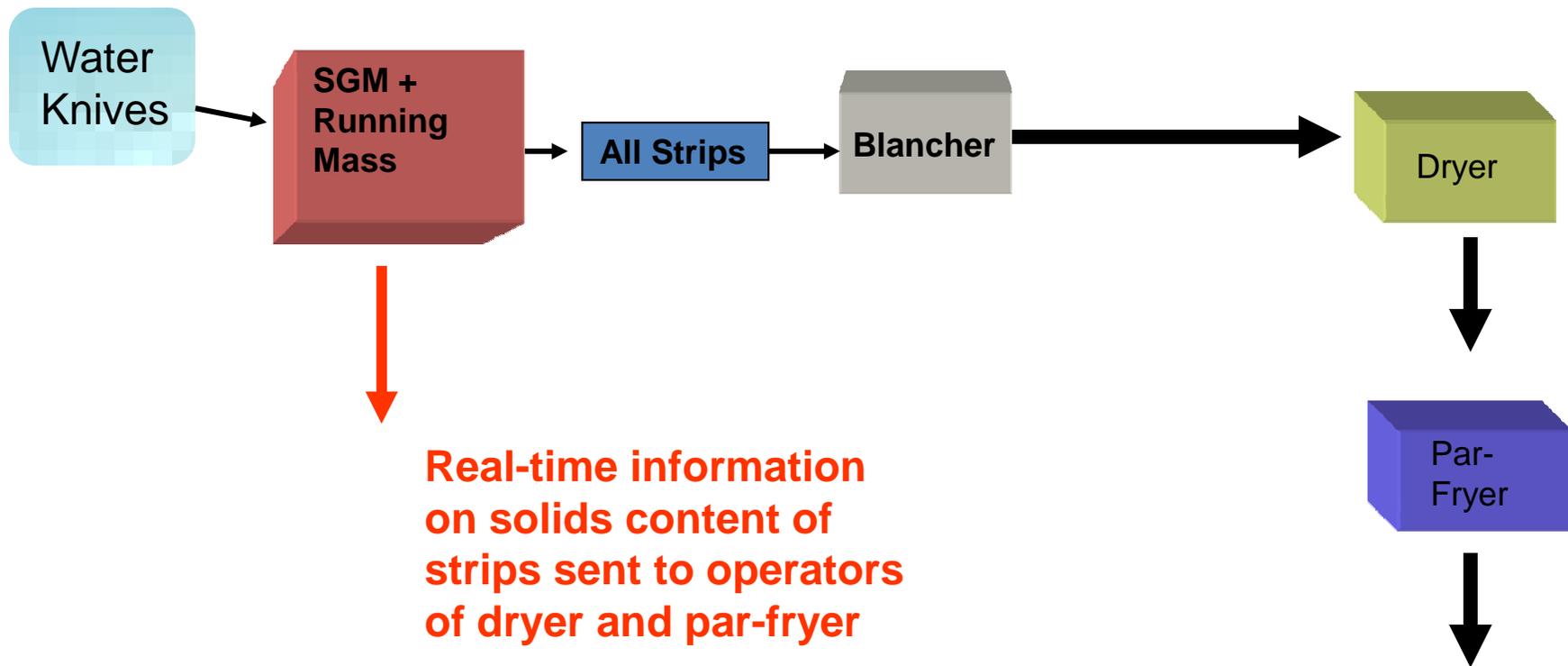


# Incremental vs Disruptive



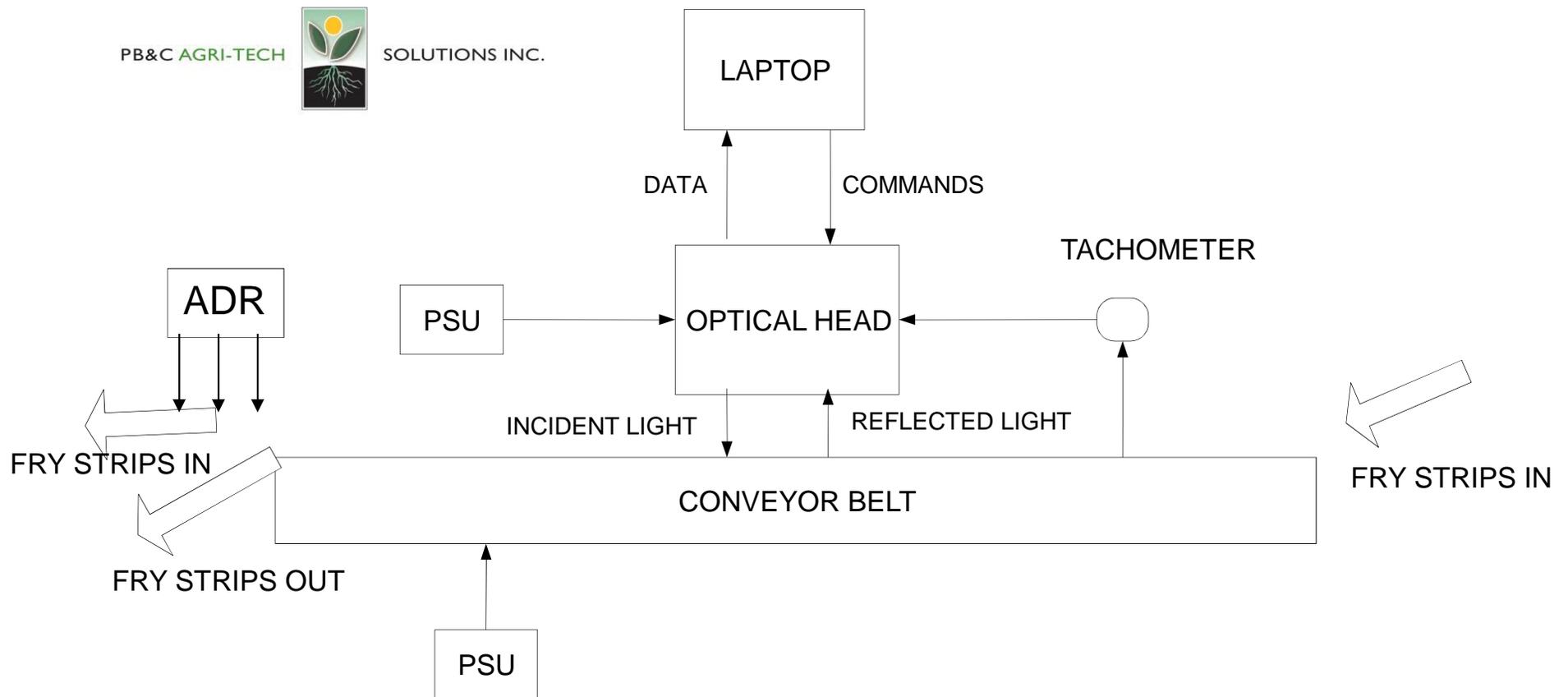
# Incremental vs Disruptive

## Phase 2: using information



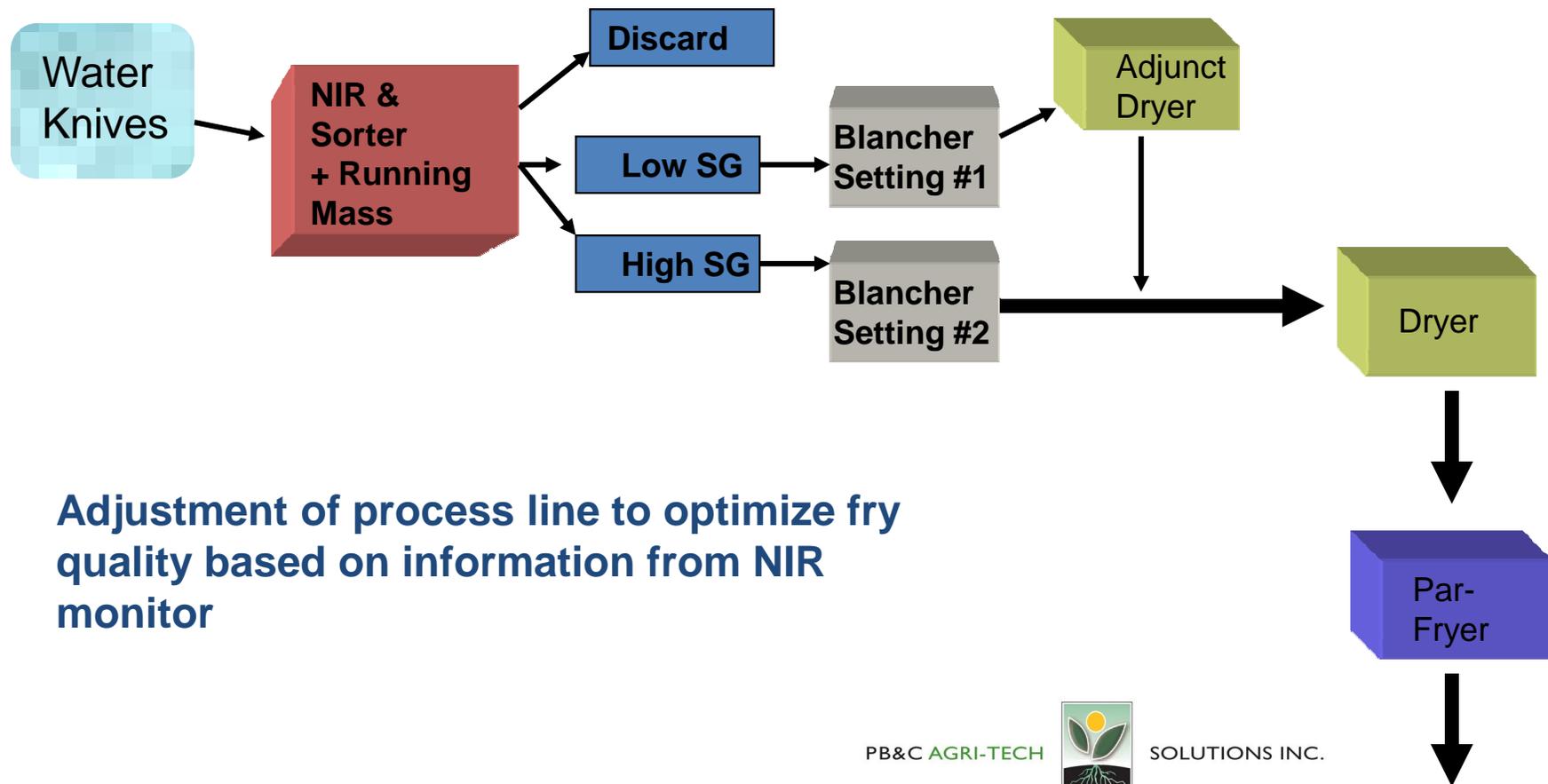
# Incremental vs Disruptive

## Phase 4: transforming process flows



# Incremental vs Disruptive

## Phase 4: transforming process flows



# Dr Rick Green POS Biosciences



**Vice-President Technology**

