



Pacific Sentry LLC

Technology Research & Development
(Ammonia Detection)



Smart Food Storage
capable of detecting food spoilage

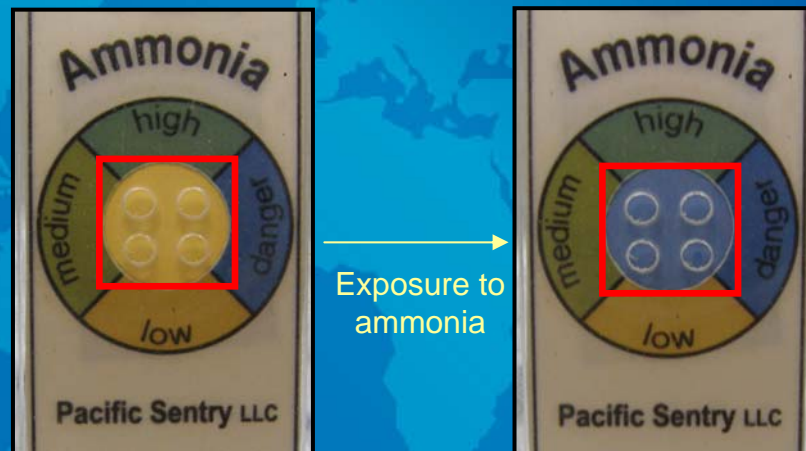


Technology

- Function:

The sensors respond with easily visible color changes corresponding to ammonia concentrations important in aquatic or gaseous environments

Ammonia Gas Sensing

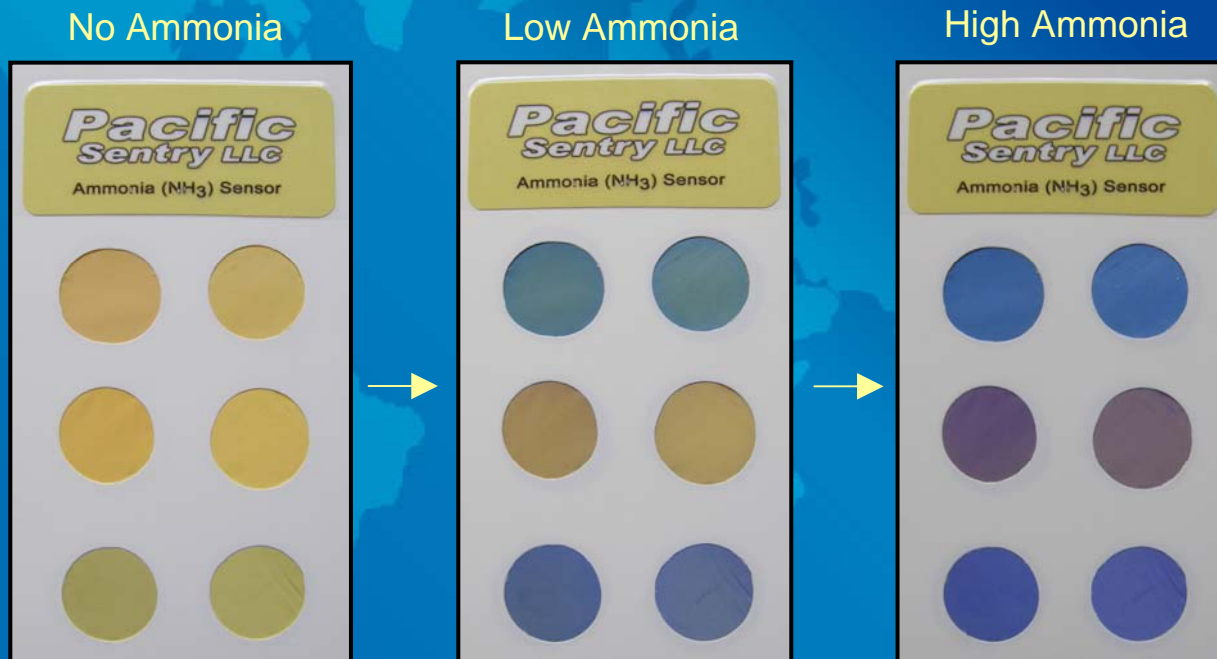




Technology

- Detection:

Range and sensitivity can be customized for optimal surveillance and application-specific requirements



Sensor response to increasing levels of ammonia



Technology

- Testing:

Ammonia (produced naturally by the deterioration of food) is an excellent indicator of the freshness of food

Day 1

Meat not touched. Sensor placed in small slit in plastic wrap. Package was resealed and refrigerated.

Day 4

Three days later, no change.

Day 13

Sensor has turned green. Color corresponds to 0.5ppm ammonia. Not safe to eat.

Day 21

Sensor is maxed out blue. Meat is no longer edible.





Technology

- Incorporation into food packing:





Technology

- Incorporation into food storage products:



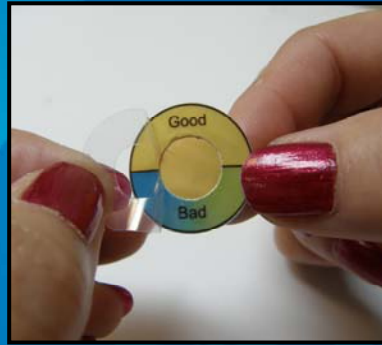


Technology

- Ease of Use:



Own/buy food storage container.



1. Remove plastic cover, exposing adhesive.



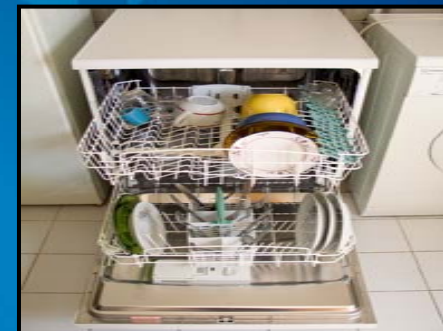
2. Apply sensor to inside of lid.



3. Watch for any color change, indicating food spoilage.



4. Remove sensor when food is thrown out / eaten and lid needs to be washed.



5. Apply new sensor after lid/container has been washed.



Technology

- Incorporation of electronic color monitor
 - “Smart refrigerators” provide alerts when food has spoiled
 - Aqua and gaseous detection compatible
 - Higher sensitivity
 - Quantitative measurements
 - Alert & shut-off/on computer system(s) - commercial application
 - Commercial/regulatory surveillance
 - Data can be recorded, analyzed
- Wireless capability





Technology

- Applications:

Food Storage & Transferring Containers



Spoilage Detection

Smart Commercial Refrigerators



Zip lock Bags



Coolers



Smart Consumer Refrigerators





Markets

- Numerous opportunities exist in the food industry:

Packagers



Restaurants



Retailers



Consumers



Processors



Wholesalers



Distributors





Technology

- Features

- High sensitivity - 0.1 ppm
- Optically based - does not require expensive measuring equipment
- Fast response - ~ 15 minutes
- Continuous monitoring - 24/7
- Reversible - responds to increasing & decreasing levels of ammonia (potential for reusability)

- Reliable

- Not affected by common packaging gases:
 - Carbon Dioxide
 - Oxygen
 - Nitrogen
 - Ethylene
 - Propylene
 - Propane Methane
 - Diesel fumes
- Easy to use - Simple human eye observation
- Shelf life - 4 years



Technology

- Value:
 - Consumers can now:
 - Ensure food has not spoiled in:
 - un-opened packages (prior to purchase, while shopping)
 - smart food storage containers / smart zip lock bags
 - smart refrigerators / coolers with digital spoilage indicators
 - Easily determine food spoilage by observing a sensor color or digital read out, as opposed to relying on smell or sight
 - Avoid the “It looks ok, but smells funny...” decision thought process
 - Have a primary confirmation of food quality; expiration dates will become secondary
 - Manufactures/retailers:
 - Increase customer loyalty
 - Increase brand image for providing health/safety “smart” products
 - Increase B2B brand equity for offering “value-added” product
 - increase margins for guaranteed quality
 - reduce liability and shrinkage



Proposal

- Pacific Sentry seeks to enter into a business relationship for the commercialization of smart food storage products
- Objectives of the relationship:
 - Provide spoilage detection products to the “food storage and packaging” industry
 - Secure a constant revenue stream and market share via patent-granted rights
 - Revolutionize the static “expiration date” standard to a dynamic, real-time, true “quality-of-food” standard
- Relationship structure opportunities:
 - Joint venture
 - License
- Duration, milestones, fees/rates, etc... to be mutually developed



We are Offering

- Opportunity to expand spoilage detection, e.g. ammonia detection into numerous untapped markets with minimal direct competition
- Technically competitive and marketing advantage
 - Detects <1 ppm ammonia - *“Detect food spoilage faster and earlier than the competition”*
- IP regarding optimizing sensors’ detection range and sensitivity
- 1st mover advantage & diversification of product line
- Faster product development cycles of spoilage-indicating products
- Increased positive brand image for providing valuable “smart” safety-products
- Patent-granted protection



Pacific Sentry LLC



“The future of food storage.”

Pacific Sentry LLC
7126 180th Ave NE
Suite C-106
Redmond, WA 98052
Phone: 425.497.8494
Email: sentry@photonicsystems.com