



Private Company

# Measuring lipid oxidation (hexanal) in dry animal proteins

Food & nutrition

## Background

Lipid oxidation is a leading cause of food spoilage, resulting in significant product rejection, waste, and consumer dissatisfaction. Hexanal, a volatile organic compound formed during lipid oxidation, is a key indicator of this spoilage and plays a critical role in monitoring food quality. Unfortunately, current methods for testing hexanal are often time-consuming, inefficient, and not suitable for use at the manufacturing plant level. Our current setup, for instance, depends on highly sensitive equipment that requires a skilled technician for maintenance, takes anywhere from half a day to a full day to complete testing, and requires several more hours to generate results. These challenges directly impact productivity, increase operational costs, and undermine customer trust in product quality.

## What we're looking for

We are looking for innovative, economical, and effective technologies capable of accurately and efficiently quantifying hexanal levels in dry materials such as animal protein. By implementing the potential cutting-edge solutions, our goal is to improve quality control efficiency for both incoming raw materials and products, ensuring product quality and minimizing waste. The ideal solution should provide precise hexanal quantification with minimal preparation and quick analysis, while being affordable and user-friendly for implementation at the manufacturing plant level.

### Solutions of interest include:

- Atmospheric pressure chemical ionization mass spectrometry (APCI-MS)
- Ion mobility spectrometry (IMS)-hyphenated technologies (e.g., GC-IMS)
- Selected ion flow tube mass spectrometry (SIFT-MS)
- Proton transfer reaction mass spectrometry (PTR-MS)
- Portable GC-MS or HPLC
- Direct analysis in real time (DART-MS)
- Ion mobility mass spectrometry (IMS)
- Technologies that quantify other key lipid oxidation derivatives for quality control

### Our must-have requirements are:

- Measures hexanal in dry animal proteins, ranging from 3 -10 ppm, with a Limit of Quantification (LOQ) of  $\leq 3.0$  ppm
- Supports testing of at least 10 samples daily
- Completes the measurement in 60 mins or less, from sample preparation to final result
- Cost-effective, ideally within \$50K-100k USD for equipment and consumable costs below \$30 USD per test

### **Our nice-to-have's are:**

- Achieves a Limit of Quantification (LOQ) of  $\leq 1.0$  ppm
- Consumables ongoing cost < \$15 USD per test
- Accurately quantifies hexanal in other dry materials
- Supports testing of at least 30 samples daily
- Does not require the use of solvent or gas besides air or nitrogen
- Required daily preventive maintenance  $\leq 15$  mins
- Commercially available for immediate deployment

### **What's out of scope:**

- Technologies involving complex analysis steps, such as sample purification, distillation, and derivatization
- Technologies that require the use of toxic or CMR (carcinogenic, mutagenic and reprotoxic) reagent

### **Acceptable technology readiness levels (TRL): Levels 4-9**

1. Basic principles observed
2. Concept development
3. Experimental proof of concept
4. Validated in lab conditions
5. Validated in relevant environment
6. Demonstrated in relevant environment
7. Regulatory approval
8. Product in production
9. Product in market

## **What we can offer you**

### **Eligible partnership models:**

Supply/purchase  
Co-development  
Sponsored research

### **Benefits:**

#### **Sponsored Research**

Research funding is available for validation and to advance the proof-of-concept to a deployable solution. The budget will be based on the scope of the work. A Supply/Purchase agreement will be executed for solutions capable of immediate implementation across the company's global footprint, encompassing up to 30 sites.

#### **Expertise**

Partners will gain access to the internal teams and experts for co-development, mutual learning, and broader business collaboration opportunities.

#### **Compounds and Reagents**

The valid solution will have access to any required materials for technology validation.

#### **Facilities and Services**

Partners may have access to pilot and production scale equipment for solution implementation.

Please contact the University of South Florida Technology Transfer office representative for submission –  
Roisin McNally at [rmcnally@usf.edu](mailto:rmcnally@usf.edu)