



Jay Grimes
Storm Lake High School
Physics and Engineering
2021 Extern



Foundation
Analytical Laboratory
Cherokee, Iowa

Foundation Analytical Laboratory

While scientific excellence is our backbone, the art of human relationships is our life blood.

History

- 2009: Founded with 2 employees & an intern in a small building.
- Remodeled numerous times.
- 2019: Moved into to a newly built facility with room for expansion.
- 2021: 27 employees

Business

- Wet chemistry and microbiology contract laboratory serving clients in the food, ethanol, feed, and environmental industries

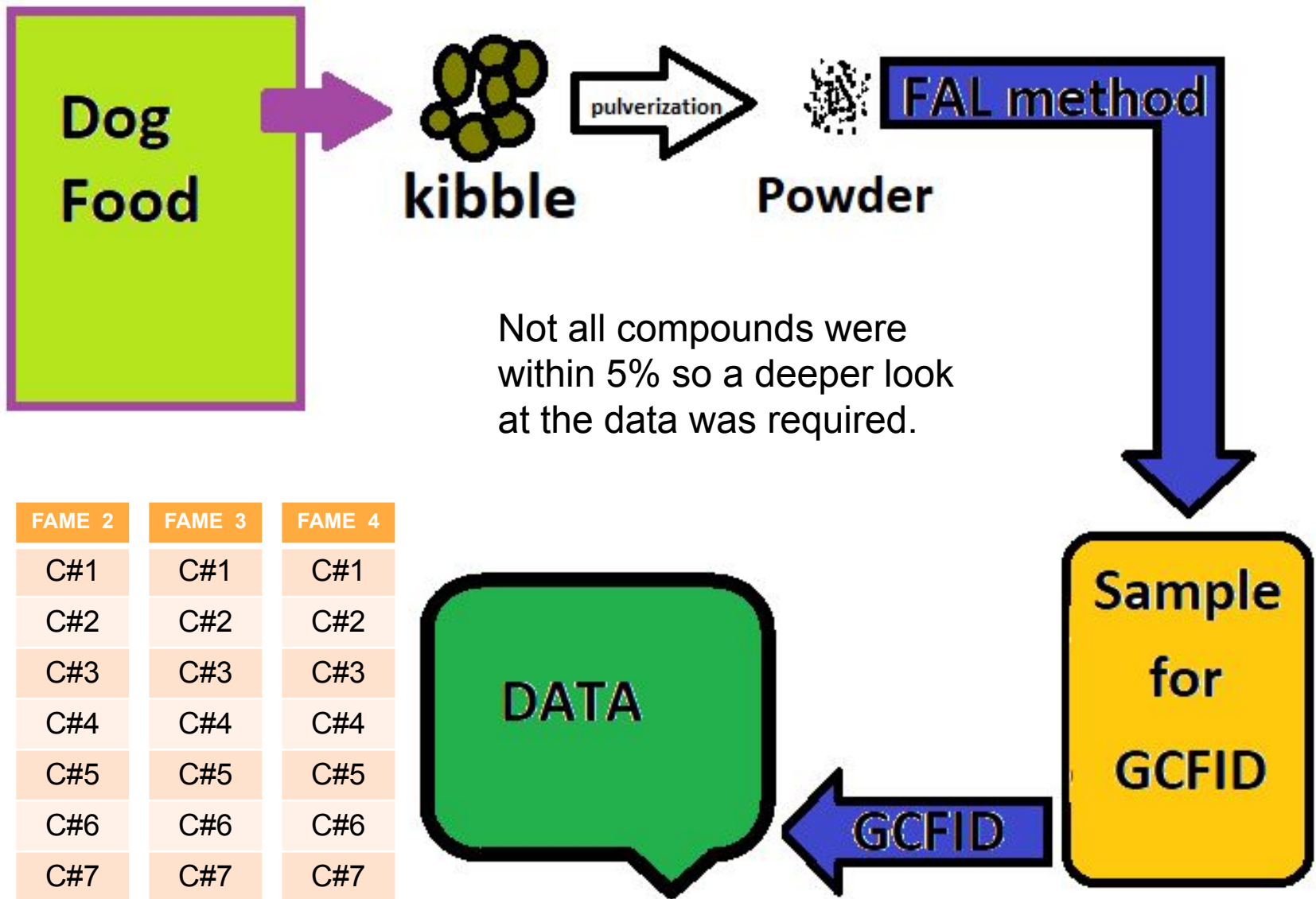
Certifications

- ISO 17025 accredited
- Iowa Department of Natural Resources (DNR)
- United States Department of Agriculture (USDA)
- United States Environmental Protection Agency (EPA).

Workplace Focus

- ❖ FAL desires certification in testing Fatty Acid Methyl Esters (FAME).
- ❖ **Certifying agencies require all methods used by FAL to be precise and repeatable.**
- ❖ Based on general guidelines, FAL researchers/analysts develop a very specific (proprietary) test designed to extract and quantify FAME from foods.

My part was to prepare these samples using the designed method in an exact and consistent manner so when that sample is tested using a gas chromatograph with flame ionization detector (GCFID), the FAME values of the samples of identical materials are within 5% of each other. **This shows that the proprietary method developed by FAL is both repeatable and precise.**



The Problem (PBL Engineering Class)

- Students ferment corn to produce fuel-grade ethanol and determine how much ethanol, among other substances, their fermentation sample produces (or loses) over time.
- Minimum of 2 fermentation samples
- Samples will be delivered to Foundation Analytical Laboratory, Cherokee, where the samples will be analyzed by the High Performance Liquid Chromatograph (HPLC)
- Students examination of quantitative data, the determination of any data not consistent with the majority of other groups' analytes, and the possible reasons thereof.

Standards

- HSPS3-3 Energy
- The 8 SEP's (most important)

Driving and Essential Questions

How/why is ethanol important to Iowa? to the nation? to the world?

How can I favorably impact the economy using Iowa agricultural products?

FAL's Classroom Role as Externship Host

- FAL will host a class trip so students can get a look at the lab, see science in practice, and ask questions of the scientists.
- FAL will be our consultant during the process of producing fuel-grade ethanol in the classroom.
- FAL will test all analytes of interest produced in this process, share the results, and offer feedback.
- FAL may consider an internship for any qualified individual.

Diane Young
Director
dyoung@foundationanalytical.com

Molly Lundsgaard
mlundsgaard@foundationanalytical.com

Brittany Erickson
bericson@foundationanalytical.com

JJ Nitz
jnitz@foundationanalytical.com

Ryan Turnquist
Senior Analyst
rturnquist@foundationanalytical.com

Student Learning

- Students will research and choose variable levels in method for fuel-grade ethanol production.
- Students will reflect daily in Engineer Logbook. (This is separate from student notebook.)
- End of Unit EXAM (undecided)