



Letter from the Director

Aloha,

This month marks the one year anniversary of the Honolulu Harbor Molasses Spill, when 1,400 tons of molasses leaked into the harbor, killing thousands of marine animals and damaging various species of coral and other wildlife habitat. This accident might have been avoided if our islands were utilizing the plentiful byproducts of local agriculture production, such as molasses, instead of shipping them to other locations.

CTSA supports the idea that waste from one industry can be a resource for others. Previous and ongoing CTSA research is discovering that Hawaii and other Pacific Islands are home to many nutrient-rich agriculture byproducts that can be effectively used as alternative ingredients in the development of sustainable aquatic feeds. NIRS ingredient analysis technology, which is described in an article in this issue, is one of the tools helping researchers analyze the nutrient content of products, and will be utilized in the development of local feeds going forward.

One of the projects currently under review to be included in our FY14 Plan of Work is investigating the potential to use molasses as an alternative aquatic feed ingredient. If successful, this project will not only minimize the risks associated with exporting valuable nutrients, but will also maximize the contribution of our agriculture byproducts, and consequently our conservation of wild-caught fish and fishmeal for agriculture feed.

Since its inception, CTSA has supported environmental conservation through funding of aquaculture research and demonstration projects. It is my belief that our industry can both feed people and protect the environment at the same time, and I am proud of the continued innovative work of our sponsored researchers to achieve this goal.

Mahalo,

Cheng-Sheng Lee

Executive Director, CTSA

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Partnership for Success: Upcoming Strategic Meeting in Guam

On Monday October 6 from 1-5pm, the Center for Tropical and Subtropical Aquaculture (CTSA), together with the University of Guam and the College of Micronesia, will host a workshop at the University of Guam to discuss the potential for aquaculture in the Western Pacific region. Local farmers, entrepreneurs, or other interested parties are invited to attend this FREE half-day event to share their vision for a robust local aquaculture industry.



The workshop is part of a three-day meeting "Partnership for Success: Strategic Planning for Aquaculture Development in the Western Pacific Islands," and will be led by CTSA Executive Director Dr. Cheng-Sheng Lee, UOG College of Agriculture Dean Dr. Lee Yudin, and College of Micronesia Dean Dr. Singeru Singeo. The purpose of the workshop and subsequent closed meeting is to bring together researchers, government officers, and other industry stakeholders to identify opportunities for aquaculture development in the region, with an overall goal of generating revenue for local economies. The anticipated primary output from this meeting will be an action plan to enhance collaborative efforts in the region.

If you have any questions, please contact mbrooks@ctsa.org.

Near-Infrared Spectroscopy System (NIRs) for Local Ingredient Analysis: A Preliminary Calibration Library

By Da-Yan Lieu, Tod Nakahira, Zhi Yong Ju and Dong-Fang Deng

Introduction

Investigation of nutritional information by traditional analytical methods is expensive, time consuming, and requires multiple skills for analysis on each sample. This approach is not affordable and is challenging for remote regions lacking infrastructure or well-trained laborers. Near-infrared spectroscopy (NIRS) is a rapid, non-destructive, and economical analytical technology (Figure 1). This technology has been widely accepted and routinely used in the feeds industry to obtain fast and multi-parameter results (such as, protein, lipid, ash and moisture) by a single scan. However, a reliable calibration library has to be established for the target ingredients based on data obtained from chemical analysis of the ingredients. An objective of our ongoing CTSA-funded project "Development of Practical Local Feeds to Support Sustainable Aquaculture in Hawaii and Other Pacific Islands" is to develop this calibration library in the NIRS for local or tropical ingredients based on analysis from traditional chemistry at the Oceanic Institute. The library will enable NIRs, as a fast and powerful tool, to measure the basic nutrient levels of feeds and ingredients in the Pacific regions.

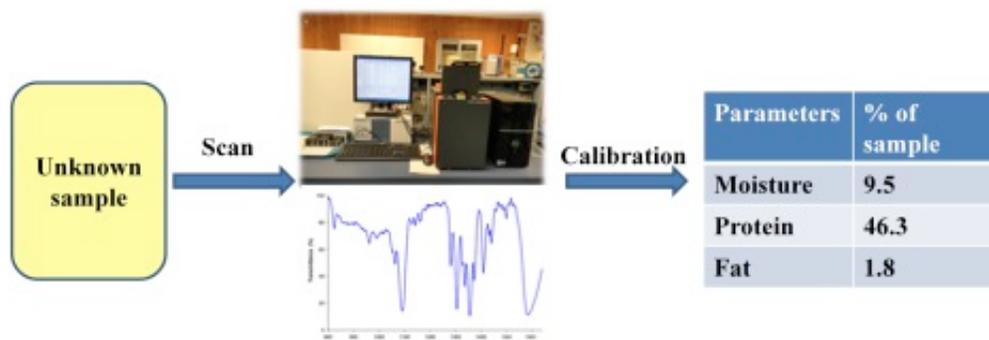


Figure 1. Flow chart of NIRs

Progress

Thirteen ingredients were collected from Oahu and two were collected from Marshall Island (Figure 2). The ingredients were first analyzed using Official Methods of Analysis of AOAC International. By using NIRs scanning, a target ingredient was tested against the existing prediction model, which provides estimation on the target parameters of the testing ingredient. By comparing the results based on AOAC and NIRs methods, calibration is carried out to modify the Prediction Model for the testing ingredient until there is a good fit based on the AOAC method. Finally, the calibrated Prediction Model can be adjusted and validated by scanning the same type of samples collected at different times or locations.

The preliminary results have shown that the proximate composition analyzed by NIRs method and Biochemistry method are very similar (Figure 3). More samples of each ingredients, however, will be needed to test so that a reliable calibration library of local ingredient can be established.



Figure 2. Selective local ingredients

Ingredient	Biochemistry Method (%)				NIRs Method(%)			
	dry matter	ash	protien	lipid	dry matter	ash	protien	lipid
Azolla	94.1	11.6	19.9	1.8	94.2	11.6	19.9	1.8
Black Soldier Fly (Freeze Dried)	94.0	7.8	43.6	30.2	94.1	7.9	43.6	30.1
Black Soldier Fly (Oven Dried)	91.6	6.8	43.6	32.8	91.6	6.8	43.6	32.9
Cassava	94.9	1.3	1.6	0.4	95.7	1.5	1.6	0.3
Copra	94.6	5.6	23.0	11.3	94.7	5.6	23.1	11.3
Defatted Haematococcus	94.5	12.8	40.3	0.9	94.6	12.9	40.2	0.9
Duckweed	94.3	23.5	12.8	5.8	94.4	23.5	12.7	5.8
Local Fishmeal	97.3	21.4	58.9	8.6	97.3	21.2	58.9	8.7
Menhaden Fishmeal	93.0	18.1	62.9	10.8	93.0	18.0	62.9	10.8
Pongamia Presscake	92.3	NT	28.4	11.7	92.3	NT	28.5	11.9
Raw Camelina	91.3	NT	28.3	30.2	91.4	NT	28.3	30.1
RMI Fermented Breadfruit	97.9	NT	30.4	8.3	97.8	0.7	30.4	8.2
Salvina	95.2	9.4	28.2	4.5	95.3	9.4	28.1	4.5
Spirulina	91.9	9.4	53.7	3.5	92.0	9.5	53.7	3.5
Wheat Mill Bran	93.0	4.8	18.4	4.6	92.9	4.8	18.3	4.7

Table 1: Proximate compositions of local ingredients analyzed by both biochemistry and NIRs methods.

Acknowledgement

This project is funded by CTSA (sub-Award #2012-240) and led by Principle Investigator Dr. Dong-Fang Deng. Da-Yan Liu is a former student who graduated from Hawaii Pacific University in 2014, and Tod Nakahira is currently an undergraduate student at Willamette University in Salem, Oregon. We appreciate their volunteer time in this project. Dr. Zhi Yong Ju, a research scientist in the Aquatic Feeds and Nutrition Department of Hawaii Pacific University, has contributed to supervising students for the analytical work. We would also like to thank Adrian Liu, Ryan Murashige, Warren Dominy, Robert Olivier and Cyanotech for their help in collecting ingredients for this project.

AquaClip ~ (NORWAY) Algae may replace fish oil in salmon feed

by *Aquafeed.com* staff. August 13, 2014

Fish oil is an ideal source of omega-3 in salmon feed, but the capacity to produce farmed salmon

using fish oil as the main source of omega-3 in feed is limited, if the farmed salmon itself is to remain a rich source of omega-3. This means that the salmon feed industry needs access to large volumes of new ingredients that contain omega-3. Experiments at Nofima have shown that a type of algae known as "heterotrophic algae" can fully replace fish oil in feed used for small salmon.

"We need further sources of omega-3, and heterotrophic algae are one of very few real possibilities at the moment. The algae meal that we have tested contains nutrients that salmon need. We have managed to release and preserve the important nutrients through the process of manufacturing the feed, and this is a necessary condition for the use of this ingredient," says scientist Katerina Kousoulaki.

Kousoulaki works at the food research institute Nofima and, together with colleagues and the Feed Technology Centre in Bergen, has tested algae meal from heterotrophic algae in the feed of farmed salmon.

[Click here to read the full article.](#)

The Center for Tropical and Subtropical Aquaculture (CTSA) is one of five regional aquaculture centers in the United States established and funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture (NIFA) under grants 2008-38500-19435, 2010-38500-20948, and 2012-38500-19566. The regional aquaculture centers integrate individual and institutional expertise and resources in support of commercial aquaculture development. CTSA was established in 1986 and is jointly administered by the Oceanic Institute and the University of Hawaii.

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