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"Technology does not drive change -- it enables change."

— ***Unknown***

President's Column

Footprint analysis was invented by Rees and Wackernagel (1994) as a conceptual tool enabling comparisons of the impact of various human activities on the earth's ecosystem. Footprint analysis consists essentially of expressing all human activities in terms of the surface area required for generating products that are consumed by us, or for absorbing the waste generated in the course of supplying these products.

Most of us by now are familiar with the term 'carbon footprint', but how many are familiar with their 'water footprint'?

In 2002, Professor Arjen Y. Hoekstra, Professor in Multidisciplinary Water Management at the University of Twente in the Netherlands, created the water footprint concept while he was undertaking research on what is known as virtual water trade flows for the Unesco - IHE Institute for Water Education.

The water footprint relates to how much water is being used to make a product, but it also refers to where that water is being used and when that water is being used. Indeed, it is about the water use in different parts of the world to make products for businesses and individuals, so this enables an impact assessment and a formulation of policy to improve the water sustainability of these products.

The concept is similar to the carbon footprint in which the main goal is to be water neutral so it can be marketed to consumers. Pretty much the water footprint of any business has two components -- the water used during operations and the water used in the supply chain. In order for a product to be sustainable you have to make both operations of the business sustainable as well as the supply chain.

While 85 percent of the world's water usage is in agriculture, 10 percent is industry and 5 percent is in households these sectors are not independent.

It means that if the industrial sector has to reduce their water footprint it also means they have to look at their supply chain and part of their supply chain is in the agricultural sector. Here are some examples of how much water it takes to make:

1 kilo of beef: 15,500 liters of water
1 glass of beer: 75 liters of water
1 hamburger: 2,400 liters of water
1 cup of coffee: 140 liters of water
1 cup of tea: 30 liters of water
1 cotton shirt: 2,700 liters of water

As we once predicted with the carbon footprint and as world water availability begins to decline as the result of population growth, overconsumption, and climate change, more water advocates will encourage governments and consumers to internalize the true cost of water through an account of their water footprint. It is just a matter of time before we will be calculating the water footprint for the rendering industry.

Sergio F. Nates, Ph.D.

Country focus - Colombia (Sergio Nates)

Colombia is a member of the World Trade Organization (WTO) and the Free Trade Area of the Americas (FTAA). In addition, it is one of the Andean Community nations (CAN - Comunidad Andina de Naciones). Colombia is also a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and to both, the Convention on Biological Diversity (CBD) and the Biosafety Protocol.

According to the U.S. Meat Export Federation, the current annual market for pork in Colombia is around 170,000 metric tons, imports account for 8,000 to 10,000 mt and most imports are from the United States (36 percent), Chile (35 percent) and Canada (25 percent). Colombia ranks third in the Central and South American region as a destination for U.S. pork exports. Likewise, prior to the first case of U.S. BSE case, the United States sent livers, lungs and stomachs to Colombia. Beef production is a traditional industry in Colombia and annual per capita beef consumption (37.4 lbs) is relatively high in comparison with other Latin American countries. The cattle herd numbers approximately 24 million head and annual beef production is around 700,000 mt. The herd is primarily zebu and average slaughter age is 4 to 4.5 years. The current annual market for beef in Colombia is around 680,000 mt.

Over the past 20 years, domestic production of chickens has increased nearly fourfold, while chicken and egg consumption per capita has tripled. Today, poultry is the second largest source of protein, accounting for 40 percent of total meat consumption and 10.5 percent of agricultural gross domestic product.

In terms of food safety regulation, in 1997, the government approved a food safety regulation to be enforced by the newly established National Institute for Food and Drug Surveillance (INVIMA). This rule substantially increases standards for fresh products and shifts the emphasis from inspection of final product to process control. The rule requires companies to document compliance with Good Manufacturing Practices (GMPs). It also embraces the minimum standards defined by the Codex Alimentarius commission.

In 2002, the government approved a regulation that recommended adoption of Hazard Analysis Critical Control Point (HACCP), established parameters for certification of HACCP plans, and defined rules for quality assurance labels. In addition, since March 6, 2001, Colombia has enforced Resolution N° 0347/2001 by which the use of meat meal, blood meal, bone meal, meat and bone meal of mammalians is prohibited for ruminant feeding (MMBM-ban).

R&D Update

08B-2

Implementation of rendered fats in aquaculture feeds: maximizing ability to tailor nutritional value of cultured finfish while minimizing reliance on marine resources (By Dr. Jesse Trushenski)

Objectives:

- Assess the relative suitabilities of beef tallow, pork lard, poultry fat, and yellow grease as partial substitutes for FO in rainbow trout grow-out feeds in terms of production performance and responsiveness of fillet tissue to FA profile restoration during finishing

- Employing the ideal rendered lipid identified in Objective #1, determine the relationship between FO substitution level and duration of finishing period in order to maximize utilization of the ideal rendered lipid throughout the production cycle of rainbow trout.

Experimental design:

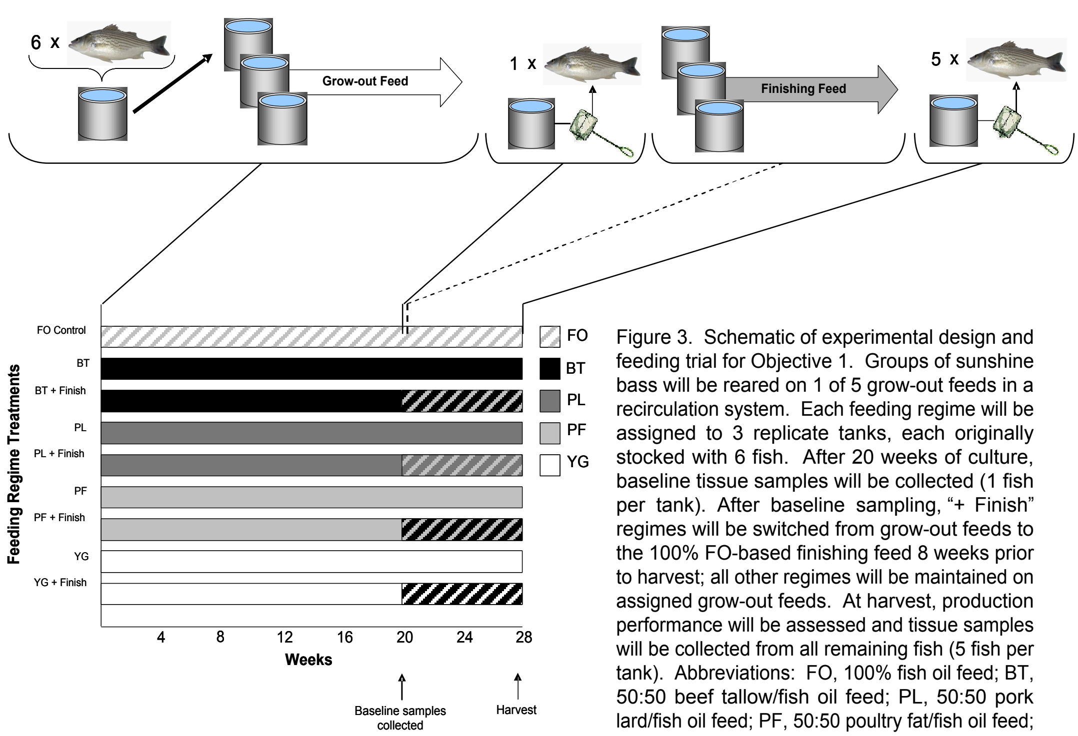

Figure 3. Schematic of experimental design and feeding trial for Objective 1. Groups of sunshine bass will be reared on 1 of 5 grow-out feeds in a recirculation system. Each feeding regime will be assigned to 3 replicate tanks, each originally stocked with 6 fish. After 20 weeks of culture, baseline tissue samples will be collected (1 fish per tank). After baseline sampling, "+ Finish" regimes will be switched from grow-out feeds to the 100% FO-based finishing feed 8 weeks prior to harvest; all other regimes will be maintained on assigned grow-out feeds. At harvest, production performance will be assessed and tissue samples will be collected from all remaining fish (5 fish per tank). Abbreviations: FO, 100% fish oil feed; BT, 50:50 beef tallow/fish oil feed; PL, 50:50 pork lard/fish oil feed; PF, 50:50 poultry fat/fish oil feed; YG, 50:50 yellow grease/fish oil feed.

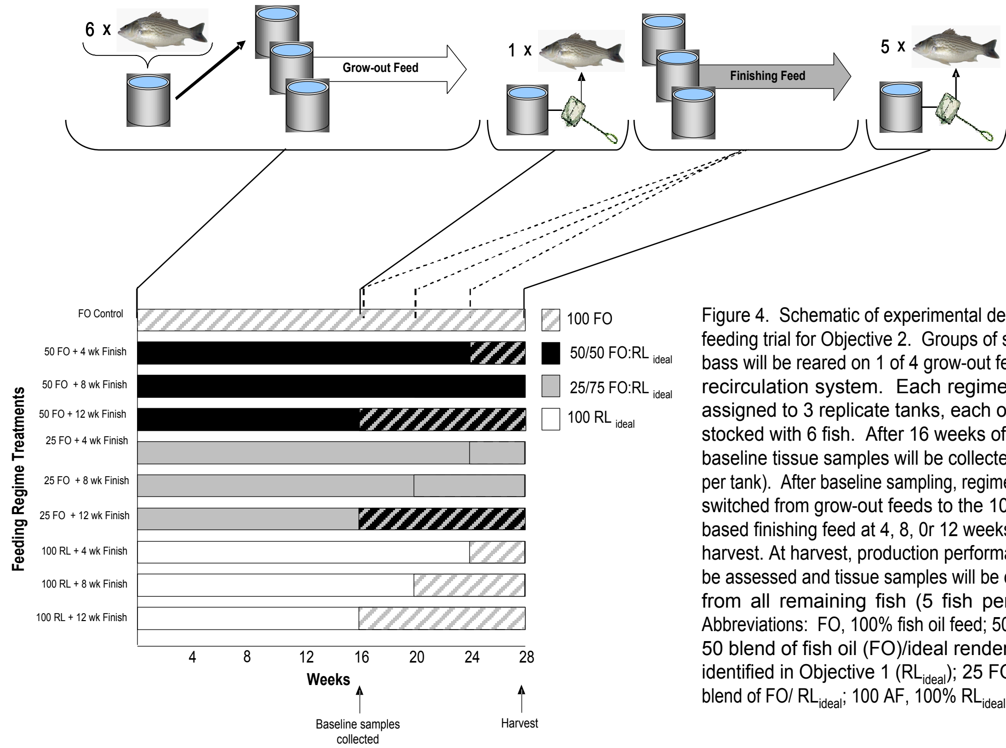

Figure 4. Schematic of experimental design and feeding trial for Objective 2. Groups of sunshine bass will be reared on 1 of 4 grow-out feeds in a recirculation system. Each regime will be assigned to 3 replicate tanks, each originally stocked with 6 fish. After 16 weeks of culture, baseline tissue samples will be collected (1 fish per tank). After baseline sampling, regimes will be switched from grow-out feeds to the 100% FO-based finishing feed at 4, 8, 0r 12 weeks prior to harvest. At harvest, production performance will be assessed and tissue samples will be collected from all remaining fish (5 fish per tank). Abbreviations: FO, 100% fish oil feed; 50 FO, 50/50 blend of fish oil (FO)/ideal rendered lipid identified in Objective 1 (RL_{ideal}); 25 FO, 25/75 blend of FO/ RL_{ideal}; 100 AF, 100% RL_{ideal} feed.

Results to date:

Fish for the 1st trial were acquired from Crystal Lakes Fisheries (Ava, MO) in February 2009, and are currently being maintained in the Fisheries and Illinois Aquaculture Center Wetlab. All experimental feedstuffs are currently in-house, having been graciously donated by Darling International (yellow grease and beef tallow), Hormel (pork lard), and Tyson (poultry fat). This week, samples of these rendered products were prepared for FA profile analysis, which will occur next week.

Experimental feeds for the 1st trial will be manufactured in-house over the next few weeks, and the trial itself will begin as soon as the feeds are ready and a recirculation system is available to conduct the study (a trial is currently ongoing in the prospective system, but will be complete in 8 weeks).

Noteworthy Article

Cayuela ML, Mondini C, Insam H, Sinicco T, Franke-Whittle I. (2009) Plant and animal wastes composting: Effects of the N source on process performance. Bioresource Technology (Epublish ahead of print – March, 2009)

The aim of this work was to evaluate the impact of different N-rich animal wastes on the composting of ligno-cellulosic wastes by a range of classical and novel methods, with particular emphasis on microbial community composition. Two composting mixtures were prepared by adding to a mixture of cotton carding wastes and wheat straw: (i) meat and bone meal and (ii) blood meal and horn and hoof meal. Composts were analyzed using physico-chemical and biochemical properties, as well as nucleic acid microarrays. Results showed that physico-chemical and biochemical parameters differentiated composts depending on their degree of stability, while microarray hybridization discriminated compost samples according to the starting materials used in the compost production. Microarray analysis indicated not only the presence in the composts of bacteria involved in N(2) fixation and plant disease suppression, but also the presence of Acinetobacter calcoaceticus that is suspected to trigger an autoimmune response related to bovine spongiform encephalopathy. The present work highlights the importance of using parameters addressing different properties of the composting matrix for a proper evaluation of the process performance.

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