

FW: Questions Re: Rendering of Salmon Byproduct (TRRi)

This material is part of a collection that documents the harassment, discrimination, and retaliation perpetrated against Alaska's women research scientists by their supervisor, with full knowledge (and arguably, "tacit approval") of their federal employer, the USDA Agricultural Research Service (ARS)

From: "Bower, Cindy" <Cindy.Bower@ars.usda.gov>
Subject: FW: Questions Re: Rendering of Salmon Byproduct (TRRi)
Date: Thu, May 6, 2010 7:58 am
To: bower@sfos.uaf.edu

From: Heather Hardcastle [redacted]
Sent: Monday, May 03, 2010 12:18 PM
To: peter bechtel; Bower, Cindy
Cc: Fong; Kirk Hardcastle; Len Peterson; Heather Hardcastle; Kirsten Walker
Subject: Re: Questions Re: Rendering of Salmon Byproduct (TRRi)

Hi Peter, Cindy and Quentin,

Thanks for your immediate replies, Peter and Cindy. In response to your email, Cindy, the meeting last week between USDA ARS and Juneau area fishing industry folks was organized by the Juneau Economic Development Council with the goal of connecting us fishermen and processors keenly interested in fish byproduct utilization with researchers like yourselves at ARS (we were notified of the meeting just days prior to the event, as were most folks in attendance, I think). Alberto focused on how we fishermen should be in contact with you and Peter and your colleagues because of your specific areas of expertise. We definitely hope to collaborate with you in the future.

Peter, thank you for connecting us with Quentin for our questions regarding salmon rendering costs, in particular. Quentin, the following are our specific rendering questions:

--We understand that it may only make sense to render when one has access to a very large amount of salmon byproduct. *However, can the rendering process be scaled down dramatically when a plant will only render 12-25 million pounds of salmon "waste" annually (with over 80% of this byproduct generated June-August)?*

--We're trying to estimate the capital and operating costs of a [small] rendering facility that would process the above approximate byproduct poundage and wonder if you know how we might calculate/estimate such costs?* Related to this question, we're also wondering how long it might take to render salmon heads/skin/frames/viscera (and especially the heating portion of the process)?

--With our rather rudimentary oil extraction methods, we achieved a ~3% oil yield from the above salmon parts. We've read that this yield may be as high as almost 7% with the use of classic rendering equipment, including a centrifuge. * What approximate oil yield from salmon heads/skin/frames/viscera do you think we can expect with traditional high-heat rendering practices?

--Do you know approximate costs of equipment and stabilizing chemicals, etc. that are needed in order to prepare salmon oil for sale as a commodity feed ingredient?

Our goal is definitely full utilization of fisheries byproduct (mostly salmon fisheries waste here in Southeast). Our central aim in this feasibility study is to determine whether it makes economic and energetic sense to extract oil from salmon waste and convert this oil to biodiesel IN ADDITION TO utilizing the byproduct sans oil in other way(s) (as meal or fertilizer, for example, as you mentioned, Peter). A large part of this study has been for us to figure out, logistically, how to most cost-effectively collect fisheries byproduct from Juneau area processors and hatcheries (including Ocean Beauty's Excursion Inlet plan) prior to further processing. This has been a large endeavor!

We definitely know that salmon oil as a feed ingredient is likely much more lucrative than biodiesel, but we've also heard that the market is saturated with wild salmon oil sales (?). Additionally, we see that affordable, clean energy is one of the most pressing issues of our time and we want to be able to paint a realistic picture of the costs involved with biodiesel production from salmon byproduct to see if it holds promise at some scale (for example, it may not make sense in Juneau but perhaps it would be worthwhile in a smaller, more isolated community or in a much larger one that generates much more salmon byproduct).

After witnessing how processors utilize fisheries and fish farm byproduct in Finland, we're intrigued with the potential of methane production from salmon waste, as well. Some Finnish processors extract oil from whitefish and trout viscera through ensiling (no high-heat rendering needed to break apart the tissues in the heads, etc.) for biodiesel production and then allow the rest of the waste to be decomposed to methane and fertilizer in an anaerobic digester.

As we compare potential uses of salmon waste, our findings with regard to Juneau area byproduct collection logistics and the feasibility of biodiesel production are critical, as are rendering cost estimates and costs involved with preparing salmon oil as a commodity feed ingredient. We thank you for the assistance you've provided and for any additional

assistance!

Best,
Heather

On May 3, 2010, at 10:39 AM, peter bechtel wrote:

3MAY10
Heather H.

I was just looking at a few of the numbers and need more time.
If you have 20,000,000 lbs - that is about 9,000 MT of

byproduct.

A big question is the amount of oil in the salmon byproduct.

Salmon stores much of their fat in the head and muscle - you sell the muscle so you have viscera, heads, and maybe a little skin and frames (depends on the end product such as H&G and canned pinks usually have little frame and skin byproduct).

Also the species (reds vs pinks) will have different amounts of fat and also the fat content will vary with the harvest time.

Possibly working with only heads is advantageous.

Need to determine the exact fat content of your raw material.

Just for calculation if the fat content of your byproduct is 5% (there is a large variation in fat content and you may have a higher or lower number).

9000 MT X 5% is 450 MT if you have an exceptional yield.

The value of 450MT of salmon oil as a world commodity feed ingredient is about \$1000/MT (but could go higher) or \$450,000 total

You can also calculate the price of diesel per ton it could be less than \$1000 MT

So one question- can one collect and process the waste for that amount of money?

Also it would appear you are interested in making diesel (an additional step) rather than simply using the oil as boiler fuel.

There are some options for processing and some of these can be scaled down.

However, there is going to be a substantial cost associated with extracting oil from fish byproduct..

Most folks that work with fractionation of byproduct will have at least 2 product streams oil and a protein (meal, hydrolysate, fertilizer etc).

If you are just after the oil there will be a disposal issue for the protein and bone.

With these few words I am putting you in contact with Dr. Quentin Fong - Dr. Fong is the economist and marketing person for the Marine Advisory Program (MAP) in Alaska - he can provide insight into the calculations needed.

One obvious exercise is to look at making a product that is worth more money than diesel fuel.

Good Luck
Peter B.
