

# Evaluating Taste Preferences in Dairy Calves Offered the Brown Seaweed *Ascophyllum nodosum*

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## Introduction

### Background:

Approximately 50% of organic dairy farmers in the Northeast feed the brown seaweed the *Ascophyllum nodosum* popularly known as kelp. Based on findings from projects done at the University of New Hampshire (UNH), feeding kelp meal to dairy cows reduced the production of the greenhouse gas methane. However, there is limited knowledge on the impact of kelp meal on animal health or the taste preference of kelp meal in dairy cattle. Kelp meal is an expensive product and understanding taste preference can help farmers make decisions about whether to feed kelp meal. A preference trial conducted at UNH showed that Holstein calves preferred a diet containing grain not supplemented with kelp meal than that supplemented with the seaweed (Erickson et al., 2012). To the best of our knowledge, there is no research that has tested taste preference in calves receiving kelp meal from different seaweed suppliers.

### Study Objectives:

The objective of this study was to test which source of kelp meal was the most preferred by organic dairy calves. To address this goal, we tested 3 commercial sources of kelp meal from Acadian Seaplants, Thorvin, and Sealife, and a control diet in which calves received a mash grain without seaweed supplementation. This experiment was run at the UNH Organic Burley-Demeritt Organic Dairy Research Facility.

## Methods

- Calves were fed: 1) grain mash (control); 2) grain mash + 57/d g of Acadian kelp meal; 3) grain mash + 57 g/d of Thorvin kelp meal; 4) control mash + 57 g/d of SeaLife kelp meal.
- The feed was measured out daily into equal amounts and recorded.
- For the first 4 d for each calf, all 4 feeds (control mash and 3 kelp meal sources) were offered to the calves in a manger with dividers with the order of each feed placed in the tubs randomized during each feeding.
- After the d 4, the most consumed feed was removed, and the process began again to select the second most preferred feed and until all feeds were ranked
- There were a total of 6 calves that ranked feeds in this project, totaling at least 70 d of feeding.

## Results

### Nutrient Composition of Mash and Seaweeds in %DM

	Mash	Acadian	Thorvin	Sealife
<b>Crude Protein</b>	16.1	9.4	8.6	11.1
<b>ADF</b>	5.3	20	19.9	18.5
<b>aNDF</b>	10.5	31.3	22.6	23.2
<b>Lignin</b>	1.06	16.25	11.25	15.46
<b>Starch</b>	51.9	0.2	0.2	0.2
<b>Ash</b>	6.53	25.91	31.18	28.29

Figure 1: This table represents some of the major nutrient composition of the three different types of seaweed as well as the control feed. Although this was not what the project itself was on, the hope is that this data could give some insight into why certain seaweeds were favorable to others. There are small differences in the percentages of the bioactive components which although small could possibly make a difference in a calf's preference.

### Final Ranking

	Favored	2nd Favored	3rd Favored	4th Favored
<b>Calf 1</b>	Acadian	Thorvin	Mash	SeaLife
<b>Calf 2</b>	Mash	Acadian	Thorvin	Sealife
<b>Calf 3</b>	Acadian	Thorvin	Sealife	Mash
<b>Calf 4</b>	Acadian	Sealife	Thorvin	Mash
<b>Calf 5</b>	Acadian	Mash	Thorvin	Sealife
<b>Calf 6</b>	Mash	Thorvin	Acadian	Sealife

Figure 2: This table represents the final rankings for each calf in this project. As described in the methods section, when presented with all four options, Acadian, Thorvin, SeaLife and Mash (the control), the favored feed was the one that that calf consumed the most of consistently over a four-day period. Then, that preferred food was removed from the options for the calf for the next three days in which the second favored was the most consumed.



Figure 3: Features an image of one of the ix calves who participated in this project.



Figure 4: This shows a better view of the manger that was used to feed the calves. There were seven slots although only up to four of them had feed in them. The feed was randomized every day so the calves could not form a habit and have it be



Figure 5: This is a more expansive view of the enclosure. This includes the hutch which provided protection from the heat/rain and to the left of the image there was an automatic water

## Discussion

- Calves preferred the most diet containing Acadian kelp meal and preferred the last the diet with SeaLife kelp meal.
- Our results showed that calves were able to distinguish among the 3 sources of kelp meal the one they like most and the brand they least like. Although the mechanism behind this difference in taste preference is not well understood based on the present results, it is conceivable that difference in seaweed processing from these 3 different seaweed companies, as well as differences in bioactive compounds such as phlorotannins may be involved.
- Previous results from Erickson et al. (2012) showed that Holstein calves did not prefer kelp meal over grain. In contrast, organic Jersey calves used in the present experiment did prefer Acadian kelp meal over the control grain mash suggesting differences in feeding behavior between Holstein and Jersey.
- Further research is needed to better understand the role of bioactive compounds present in kelp meal that may regulate taste preference and feeding behavior of calves supplemented with seaweeds.
- Further research is also needed to investigate the potential impact of methods of processing, seasonality, and harvesting methods on the concentration of bioactive compounds in kelp meal.

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