Seaweed Tissue Analysis: Allergen and Carbohydrate Process Description

The Seaweed Tissue Analysis initiative, funded by AMC and AFDF, analyzed numerous samples of farmed and wild seaweed from throughout Alaska. The analyses occurred at four different labs: SGS Canada, Creative Protometrics, Foodmetrics Laboratories, and Centre d'Etude et de Valorisation des Algues (CEVA). Each lab specializes in slightly different processes that test for the desired information about the seaweed samples, including minerals, heavy metals, carbohydrate and polysaccharide profiling, and allergen detection.

Both Creative Protometrics and CEVA specialize in carbohydrate and polysaccharide profiling. However, their methods differ and can showcase specific results, therefore both labs were used to analyze samples and gain a fuller picture of the carbohydrate breakdown in the seaweed samples. This was done because seaweed farmers and buyers are especially interested in carbohydrate profiling for species selection and end-use product development. The diversity and amounts of carbohydrates in a seaweed species can point to specific products or compounds that may be most valuable from each type of species. This allows farmers to choose species that fit certain market demands or specific end products, such as alginates, or to understand which compounds are most abundant in the seaweed they want to grow and choose appropriate end products.

Carbohydrate Profiling Methods:

Creative Proteomics - *Sulfuric Acid Extraction*. Samples are hydrolyzed (chemically broken down into smaller pieces or individual building blocks by reacting with water) and dehydrated with Sulfuric Acid. This method provides the 'total sugar profile' and is valuable for providing total sugar content.

CEVA - *Methanolic Extraction*. Uses methanol to dissolve and separate sugars from solid biological material, leaving complex compounds (i.e., proteins and fiber) behind. This method also measures alginate, a compound of high interest, and does not break down cellulose. This carbohydrate profile is the 'soluble' sugars that can be easily extracted using conventional methods.

Importantly, the combination of the CEVA method with the Creative Proteomics method allows for the measurement of laminarin. Quantification of this valuable carbohydrate compound has been missing in past analyses. These totals, as well as the average results for carbohydrates from both Creative Protometrics and CEVA are found in the AFDF Online Seaweed Database.

Allergen Analysis:

Foodmetrics Laboratories was used for the allergen analysis in the seaweed samples. Samples were tested for finfish and crustacean protein levels to discern if these allergens were of concern in seaweed products. The results from this test found that all samples were well below

the threshold for allergen concern. However, ongoing monitoring of allergen levels in specific products is encouraged.