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## SEAMARK DELIVERABLE 6.1: RESEARCH AND DEVELOPMENT PLAN & SPECIFICATION FOR BIOACTIVE OLIGOSACCHARIDES

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**Summary:**

Matis (MAT), University of Lund (LUN) and the Technical University of Denmark (DTU) have developed an enzyme toolbox for refining polysaccharides from Brown and Green algae. This includes specific laminarinases and beta-glucan branching enzymes for tailoring laminarin oligosaccharides for enhanced bioactivities; novel alginate-, fucoidan- and ulvan-modifying enzymes that can be used to produce oligomer of different sizes and structures, and potentially tailor-make bioactivity. Various bioactivities have been reported for crude mixture these polysaccharide oligosaccharides derived from seaweed polysaccharides. However, the relationship between structure and biological function is unclear, such as antioxidant activity, plant growth promoting activity and antitumor activity. Laminarin-rich fractions composed of beta-1,3-glucans with 1,3(6)-linked branches are reported to bring various health benefits (immune-boosting and pro-, and anti-inflammatory activity) to humans and are of significant interest as pharmaceuticals or medical devices. Oligosaccharides derived from sea lettuce (*Ulva* sp.) and sugar kelp (*Saccharina latissima*) have great potential as a highly potent bioactive source with numerous health promoting effects. Today, the production of oligosaccharides of defined structure requires a lengthy synthetic procedure that could be replaced by more cost-effective production from a natural source like seaweed using fractionation and separation followed by purification. In SeaMark, laminarin-, fucoidan- and alginate-rich fractions from sugar kelp will be used to produce bioactive oligosaccharide of defined structures by enzymatic processes developed by MAT, DTU, LUN) and University of Utrecht (UTR. The different bioactive oligosaccharides produced in SeaMark will be marketed to end-users by the partners, Oceanium (OCE), Algaia (ALG) and ALGApplus (ALGP) in the sector of nutraceuticals and medical devices. Whereas enzymes and enzymatic processes will be commercialized by MAT, DTU, LUND and UTR.



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