

UPTAKE AND PROCESSING OF DISSOLVED CARBON AND NITROGEN SUBSTRATES IN MICROALGAE-DOMINATED SEDIMENT: A COMPARISON ACROSS THREE ESTUARIES

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Microbial communities comprising bacteria and microalgae within bare intertidal sediment are sinks for dissolved inorganic and organic forms of carbon (C) and nitrogen (N) in coastal waters. Where nutrient concentrations are low, there can be intense competition between bacteria and microalgae for available substrates; this competition may diminish with increased nutrient availability. Short-term uptake and processing of C and N by the microbial community can be quantified using stable isotope labeled substrates combined with amino acid analysis of D/L-alanine. This method allows for partitioning of C and N uptake between bacteria and microalgae. However, the dynamics of short-term C and N processing within *in situ* intertidal microbial communities remain uncertain; most studies have been *ex situ*. Here we compare *in situ* uptake (1-3 hour) and short-term processing (24 hour) of various C and N substrates across three estuaries in subtropical Australia. Four isotope labeled substrate combinations were applied to separate sediment plots: 1) algal-derived <sup>13</sup>C & <sup>15</sup>N-DOM, 2) algal-derived <sup>13</sup>C & <sup>15</sup>N-amino acids, 3) <sup>13</sup>C-glucose & <sup>15</sup>N-ammonium, and 4) <sup>13</sup>C-bicarbonate & <sup>15</sup>N-ammonium. We found greater N utilization from amino acids than from algal DOM, but limited C utilization from either substrate. This suggests that uptake of N from DOM can be significant and should not be ignored as organic substrates can contribute significantly to N inputs to intertidal sediments.