Microbial Degradation and the Fate of Salps Carcasses in the Western North Pacific

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Salps are gelatinous macrozooplankton which periodically swarm and develop dense blooms in oceanic areas (e.g. Nishikawa et al. 1995, Madin et al. 2006). This can be due to their high rate of filter feeding, rapid growth and versatility between sexual and asexual reproduction. The salp's carcasses are considered to be large standing stocks of organic carbon and these carbons should be channeled by bacteria in the water column and in the seafloor, contributing greatly to the microbial detrital food webs. However, no works have been done on microbial degradation of dead salps. Here, we report on the results of degradation experiments of salps dead bodies. The rate of carbon transformation from particulate to dissolved forms and the change of microbial communities along with salps degradation were studied. The salp, *Salpa fusiformis*, was collected from the areas affected by the Kuroshio Current in the western North Pacific in April and May 2009. The dead salps were placed into plastic bottles one by one with ambient seawater and kept for up to 54 days. Particulate and dissolved organic carbon contents remained in each bottle were measured at various time points and the loss of carbon was estimated. At surface temperature (16 C˚), 80 % of initial carcass carbon was mineralized in 3 days but 20 % still remained after 8 days. Also, in the 54 days of incubation at *in situ* temperature of >1000 m deep (4 C˚), the particulate form of carcass carbon was exponentially lost. After 54 days, almost all the carcass particles were lost and transformed into dissolved form, however 20 % of the carbon remained as dissolved organic matters. Bacterial abundance and community structures were largely changed during the incubation. The occurrences of *Bacteroidetes* group bacteria and also cellulolytic bacteria were observed at the late period of the incubation. Since the sinking rates of the salps carcasses measured on board were from 140 to 268 m day^{-1}, it was speculated that much of carcass carbon could be exported out from surface layers. This study revealed the rate and the pattern of microbial degradation of salps carcasses in the ocean. These results implied that dead salps could largely contribute nutrient supply and microbial loop in the water column and also microbial detrital food webs in the deep seafloor.

References

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