

BIOACCUMULATION OF SOME RADIONUCLIDES BY MARINE MICROPLANKTON

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Uptake of radionuclides of metals (chlorides) and phosphorus (sodium phosphates) by marine heterotrophic bacteria, as well as ^{32}P (phosphates) by *Skeletonema costatum* and a natural Mediterranean microplankton community has been studied. Concentration factors were low (< 7) for the radionuclides ^{137}Cs , ^{90}Sr , ^{89}Rb , ^{45}Ca , moderate (≈ 90) for ^{65}Zn and very high (10^3 - 10^5) for ^{32}P .

The present work is a continuation of a series of investigations reported previously (1-3). Wet weight concentration factors (C.f.) of ^{137}Cs and ^{90}Sr in *Bacterium halophilum*, *B. album*, *Pseudomonas liquefaciens*, *Chromobacterium aurantiacum*, *Micrococcus tetragenus*, *Bacillus luteus* and *Vibrio cineatus*, obtained under experimental conditions were similar for all species, namely, about 1 for ^{137}Cs and 6-7 for ^{90}Sr . The C.f. for ^{86}Rb in both *B. halophilum* and *B. album* was approximately 1. The ^{45}Ca C.f. in *B. halophilum* was 3, that is two times less than that for ^{90}Sr . The ^{65}Zn C.f. in the same species was 90, however, the ^{32}P C.f. (at 5-7 ppb P in the phosphate form) reached values as high as 2.5×10^3 . The ^{32}P C.f. in *Skeletonema costatum* reached steady state after 9 hours in the medium with different phosphate concentrations. The degree of uptake was dependant upon the external phosphorus concentration: C.f.'s were 9.5×10^4 (at 10 ppb P) and 3.5×10^3 (at 620 ppb P). The ^{32}P C.f.'s in natural microplankton (phyto- and bacterioplankton) reached 1.1×10^7 at conditions similar to those *in situ* from the north-western part of the Mediterranean Sea during January and February 1980. Natural concentrations of mineral phosphorus in the phosphate form in Mediterranean water ranged between 0.4 to 2 ppb P. The turnover time of this metalloid was very rapid in comparison with that of Cs. In contrast to metals, up to 50% of the phosphorus is extracted from water by microplankton. This ability for very high uptake of phosphorus by certain autotrophs offers an explanation for the often observed phenomenon of phosphate limitation of primary productivity.

References

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Discussion

No comment.