

Microscopic View of Chimeric EGFP::S-layer Proteins Purified from Recombinant *Escherichia coli*

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Abstract

Many strains of archaeobacteria and gram-positive and gram-negative bacteria possess regular arrays of subunit (S-layers) on their cell surface. S-layer proteins have the ability of self-assembly. The high density and regular arrangement of functional groups on the S-layer lattice have opened a broad potential for application in biotechnology, molecular nanotechnology, and biomimetics.

We constructed a chimeric gene encoding S-layer protein of *Lactobacillus brevis* and enhanced green fluorescent protein (EGFP). EGFP has been used to be an *in vivo* marker for gene expression and/or protein localization. The purified fusion protein (78kDa) showed the ability of self-assembly in the phosphate buffer (50mM, pH7.0). The self-assembled chimeric protein was stable in the broad range of pH6-8 and 4-40°C and even in the absence of Ca²⁺ ion. Immobilization of the fusion protein on the matrix of Ca-alginate bead, DEAE-Sephadex, CM-Sephadex, Phenyl-sepharose, and Eupergit C was studied. Microscopic photos of the self-assembled proteins as well as the immobilized proteins were taken by use of Fluorescence Microscope, Scanning Electron Microscope, Atomic Force Microscope, Stereo-Microscope and Transmission Electron Microscope.

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References

1. M. J. Vijnanen, S. A. Jaaskelainen, P. Messner, U. B. Sleytr. Isolation of three new surface layer protein gene(*slp*) from *Lactobacillus brevis* ATCC 14869 and Characterization of the Change in Their Expression under Aerated and Anaerobic conditions.(2002). *J. Bacteriol.* 184: 6786-6795.
2. M. S. Sara, D. Pum, S. Kupcu, P. Messner, U. B. sleytr. Isolation of two physiologically induced variant strains of *Bacillus stearothermophilus* NRS 2004/3a and characterization of their s-layer lattices. (1994). *J. Bacteriol.* 176: 848-860.