

The abstracts of the recent research information appearing in Vol.11 No.4-6 of "AIST TODAY" are introduced here, classified by research area.
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Environment and Energy

The membrane separation technology for refining biobutanol High concentration butanol recovered from 1 wt% butanol solution

We have developed an energy-saving technology for purifying biobutanol. It uses a kind of zeolite membrane and can recover concentrated 1-butanol (hereinafter referred to as butanol) of at least 80 wt% from dilute (about 1 wt%) aqueous butanol solution. Butanol has a larger calorific value than ethanol. It is expected to be a post-bioethanol fuel, namely a renewable liquid biofuel that is useful in mitigating global warming. A silicalite membrane that has high permselectivity for butanol was synthesized through the optimization of hydrothermal synthesis conditions. The membrane enables the recovery of highly concentrated butanol from low-concentration aqueous solutions of butanol by pervaporation separation. Its use is expected to reduce drastically the energy required to recover butanol by separation membrane methods. Use of this membrane would contribute to the further development of butanol production technologies and effective use of biomass.

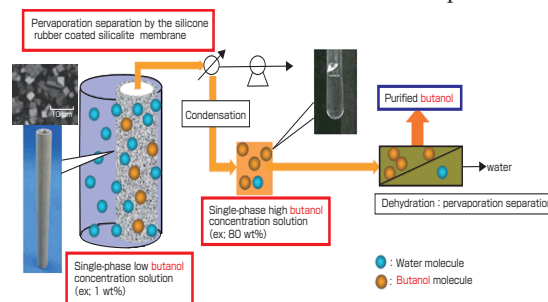
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AIST TODAY Vol.11 No.5 p.10 (2011)

Preparation system of purified butanol from low-concentration aqueous solutions of butanol using the novel separation membrane



Life Science and Biotechnology

Discovery of a novel endosymbiotic bacterium inducing body color change of insect Symbiotic bacterium modifies aphid body color

We discovered a novel symbiotic bacterium of the genus *Rickettsiella* in European natural populations of the pea aphid *Acyrtosiphon pisum*, and demonstrated that the symbiont induces a drastic color change of the host aphids: originally red insects turned into green when infected. Body color is an ecologically important trait, often involved in species recognition, sexual selection, mimicry, aposematism, and crypsis. However, there has been no report on such a phenomenon that the important biological trait, body color, is drastically changed by a symbiotic microorganism. This finding provides a new viewpoint to the ecology and adaptation of insects and other organisms in general.



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AIST TODAY Vol.11 No.5 p.11 (2011)

The green pea aphid (left) is, although genetically identical to the red aphid (right), infected with a novel symbiont of the genus *Rickettsiella*, which modifies the aphid body color from red to green.