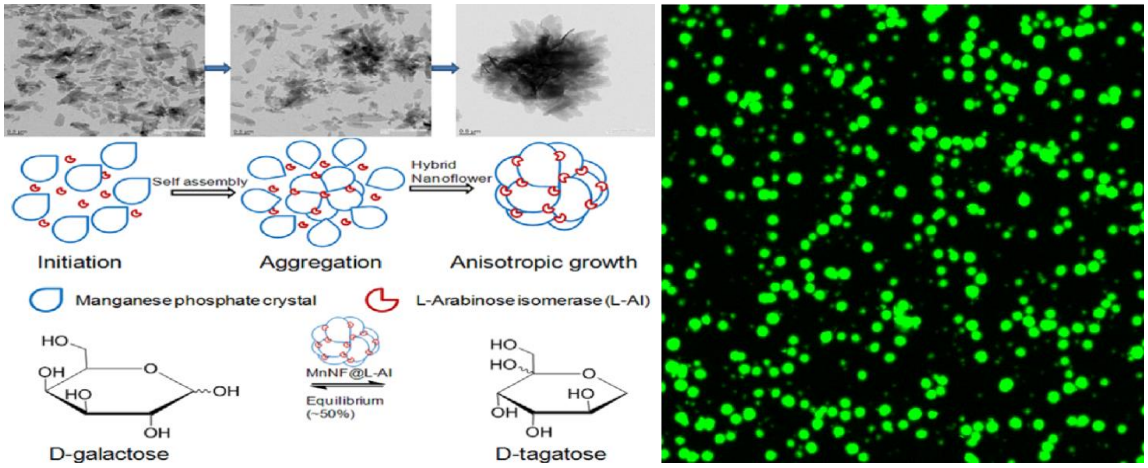
Scientists at CIAB designed a manganese phosphate nano-flower consisting of L-AI from *Lactobacillus sakei* 23K

Team of researchers headed by Dr. Sudesh at DBT's Center of Innovative and Applied Bioprocessing, Mohali has designed a manganese phosphate nano-flower consisting of L-AI from *Lactobacillus sakei* 23K, under the optimized conditions of pH and temperature. The immobilized preparation showed equilibrium level conversion similar to free L-AI. The novelty of this approach lies in the fact that the researchers did not add additional manganese ions for activation of L-AI immobilized in the hybrid nanoflower system.



Design of hybrid nanoflower consists of manganese and L-AI using self-assembly method (left) and CLSM image of hybrid nanoflower consist of L-AI (right)

Interestingly, the L-AI immobilized in hybrid nanoflower was reused for more than five cycles. The morphology of hybrid nanoflower was studied using scanning electron microscopy and transmission electron microscopy, in whichit has been observedto possess flower like structure where the hybrid nanoflowers consist of numerous petals arranged to form a flower. The localization of L-AI was further confirmed by immobilization of FITC (a green fluorescent dye) labelled L-AI in a hybrid nanoflower. The confocal laser scanning microscopy showed interesting green particles of hybrid nanoflower. Furthermore, the structural characteristics of hybrid nanoflower was studied using various analytical techniques such as fourier transform infra red spectroscopy, energy dispersive x-ray spectroscopy, x-ray differaction study etc.

The D-Tagatose, is a rare sugar and in high demand for its potential physiological effects such as prebiotic, antiobesity, promotion of weight loss, low glycemic index, antidiabetic, non-

carcinogenic, and Antihalitosis properties. It is also authorized by US-FDA as "*Generally Recognized as Safe*'' status. It is used in various food and pharmaceutical products as a part of nonchronic drugs, mouth wash, tooth paste and an array of foods varieties, beverages, health foods, and dietary supplements. It is used in low-carbohydrate diets, chocolate, candy, chewing gum, yogurt, soft drink, bakery items, milk-based drinks, and confectionery. Normally, D-Tagatose is produced by isomerization of D-Galactose to D-Tagatose using chemical or enzymatic process and later was more preferred due to non by-product formation, environment friendly approach. The isomerization of D-Galactose to D-Tagatose is catalyzed by L-Arabinose Isomerase (EC 5.3.1.4). The L-Arabinose Isomerase (L-AI) required manganese for its activity.

Link: http://www.ciab.res.in/

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