ISGC 2022

N°1253 / PC
TOPIC(s) : Clean reactions

ENZYMATIC ESTERIFICATION OF DIBENZYLIDENDE-D-ALDITOL

AUTHORS
Eric PHALEMPIN / L'ORÉAL, 1 AV. EUGÈNE SCHUELLER, AULNAY SOUS BOIS

PURPOSE OF THE ABSTRACT

ENZYMATIC ESTERIFICATION OF DIBENZYLIDENDE-D-ALDITOL

Eric Phalempin, Maude Brossat
L'Oréal Research and Innovation, Aulnay-sous-Bois

Thickeners are essential ingredients in cosmetic formulas. Today, many technical solutions are available for gelling aqueous phases but it is more difficult to find commercial products for gelling oil phases because most of them impact the sensoriality, such, for example, dextrin palmitate or candelilla wax. Although efficient, these compounds have certain drawbacks such as the price, the conditions of implementation and are not universal as gelling agent, to all cosmetic oils. The family of Low Molecular Weight OrganoGelators (OGFPM) have the ability to thicken and gel complex mixtures.

These low molecular weight compounds (< 3000 daltons) can form supramolecular bonds through the creation of three-dimensional networks. This network self-assembles via non-covalent bonds such as hydrogen, dipole-dipole, py-py stacking, electrostatic and van der Waals bonds... Among the many gelling agents in this category, 1,3:2,4-Dibenzylidene-D-sorbitol (DBS) is one of the best known gelling agents (fig. 1) .

By structure, DBS is a chiral organogelator; it forms a self-assembled network by trapping the solvent. This network is structured according to py-py stacking and hydrogen bonding interactions. However, because of its polarity, the implementation of this compound requires specific conditions (T > 120°C) which do not allow the use of heat-sensitive cosmetic ingredients. By modifying the structure of DBS , we have managed to obtain an oil gelling agent under mild conditions, without compromising on naturalness and performance (fig. 2).

FIGURES

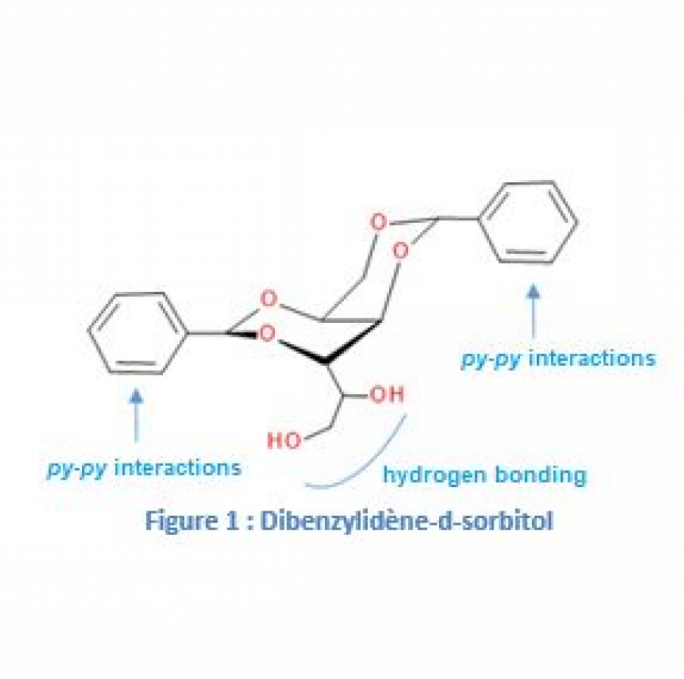

Figure 1 : Dibenzylidène-d-sorbitol

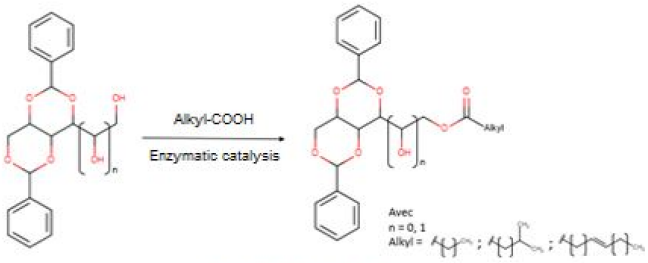

Figure 2 : Chemical pathway

FIGURE 1
Dibenzylidene-d-sorbitol
Dibenzylidene-d-sorbitol

FIGURE 2
Chemical pathway
Chemical pathway

KEYWORDS
Biocatalysis | Natural oilgelifer | Green chemistry

BIBLIOGRAPHY

Bruna Gioia, Nesrine Bem Ghalia, Plamen Kirilov, Research and reviews: Journal of Pharmacy and Pharmaceutical Sciences, 2018, volume 7, issue 1

Babatunde O. Okesola, Vania M. P. Vieira, Daniel J. Cornwell, Nicole K. Whitelaw,David K. Smith, Soft Matter, 2015, 11, 4768

Brevets OA10058 et OA20073