

**WP n°:**

**Title:**

**Combination of Lipase Catalysis and Thiol-Michael Addition for The Synthesis of Carbohydrate Esters  
Used as Stabilizers in Supercritical Carbon Dioxide Emulsions.**

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**Summary** (max 200 words):

The use of aqueous dispersed media, such as emulsions and miniemulsions, has many advantages over solution processes for chemical transformations and polymerization reactions, i.e. limited environmental impact, ease of products recovery and increased reaction rate. Although, dispersed media are usually implemented from water/solvent mixtures, supercritical carbon dioxide (scCO<sub>2</sub>) (Pc = 74 bars; Tc = 31°C) constitutes an interesting alternative to the traditional organic solvents because it is inexpensive, non-toxic, non-flammable and environmentally friendlier.

In this context, we develop a novel class of surface active compounds able to stabilize water/scCO<sub>2</sub> emulsions, i.e. fluorinated modified carbohydrates. The hydrophilic head of the surfactant consists in a sugar moiety whereas the fluorinated tail has a strong affinity for the scCO<sub>2</sub> phase. These carbohydrate esters are prepared by a two-step strategy which takes advantage of the selectivity of enzymatic catalysis and the versatility of the thiol-Michael addition reaction. The new thiolated mannose intermediate is a useful building block for the incorporation of unprotected sugar moieties into complex molecules. The surface active properties of the fluorinated derivatives have been evaluated as well as their use as stabilizers for the preparation of microparticles and highly porous polymer materials in scCO<sub>2</sub>.