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Lyotropic liquid crystal behavior of two novel glycosides

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The discovery of the liquid crystal happened over a century and since this time the phenomena has been applied to many products in our society. Liquid crystals are the fourth state of matter and they are mainly divided into two main classes, thermotropic and lyotropic liquid crystals, based on the mechanism driving the molecular organization. The formation of lyotropic phases not only depends on temperature but also depends on the type of the solvent and the concentration. Amphiphilic molecules mainly form lyotropic liquid crystals by self aggregating in the presence of a solvent and form supramolecular aggregates that collectively exhibit lyotropic mesophases. Most of the compounds which show lyotropic liquid crystal behavior can be used as surfactants at specific conditions. In With increasing the surfactant concentration, at a specific, narrow concentration range, which is named as the *critical micelle concentration* (CMC), surfactant molecules tend to self associate in to thermodynamically stable molecular aggregates/ complexes (micelles) in aqueous solutions under specific environmental conditions.

The present research describes the lyotropic liquid crystal behavior of two novel carbohydrate derived liquid crystals, Cinnamyl 2, 3, 4, 6-tetra- α -acetyl- β -D-glucopyranoside (CTAGP) and 2-chloro-5,6-dimethylphenyl 2, 3, 4, 6-tetra- α -acetyl- β -D-glucopyranoside (CXTAGP) in order to use as nonionic surfactants in future. The lyotropic behaviour was studied using optical polarizing microscopic textures and further by the determination of CMC using two comparable methods; UV absorption method and the turbidity measurements. Compounds, CTAGP and CXTAGP show lamellar type lyotropic liquid crystal behavior which leads to the formation of micelles. The CMC of both compounds lies in-between the typical CMC for nonionic surfactants; $10^{-5} - 10^{-4}$ M.

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