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# SYNTHESIS OF FATTY ACIDS-SUBSTITUTED *N*-CHRYSENYL-β-LACTAMS

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**Abstract:**
The reaction of the activated fatty acid chlorides with the racemic 3-hydroxy-4-phenyl-*N*-chrysenyl- β-lactams provided β-lactams substituted with fatty acids chain at C-3 position of the ring in good yields. The corresponding acid chloride was prepared by treating the fatty acids with oxalyl chloride in the presence of TEA. This is the first report to synthesize novel *N*-chrysenyl β-lactams with C-3 substitution of fatty acids in a single operation.

**Key Words:**
Fatty Acids, Chrysenyl β-Lactams, Esterification

**Introduction:**

The β-lactam skeleton has gained significant interest among synthetic as well as medicinal chemists over the years, mainly because it represents the core structure of synthetic and natural β-lactam antibiotics. The importance of the β-lactam unit as a synthon has been recognized in the synthesis of a variety of biologically active β-lactam and non β-lactam derivatives [1]. The constant need for new drugs displaying broader antibacterial activity and the necessity for new β-lactam antibiotics to combat microorganisms that have built up resistance against traditional drugs have maintained the interest of organic chemists for decades [2].

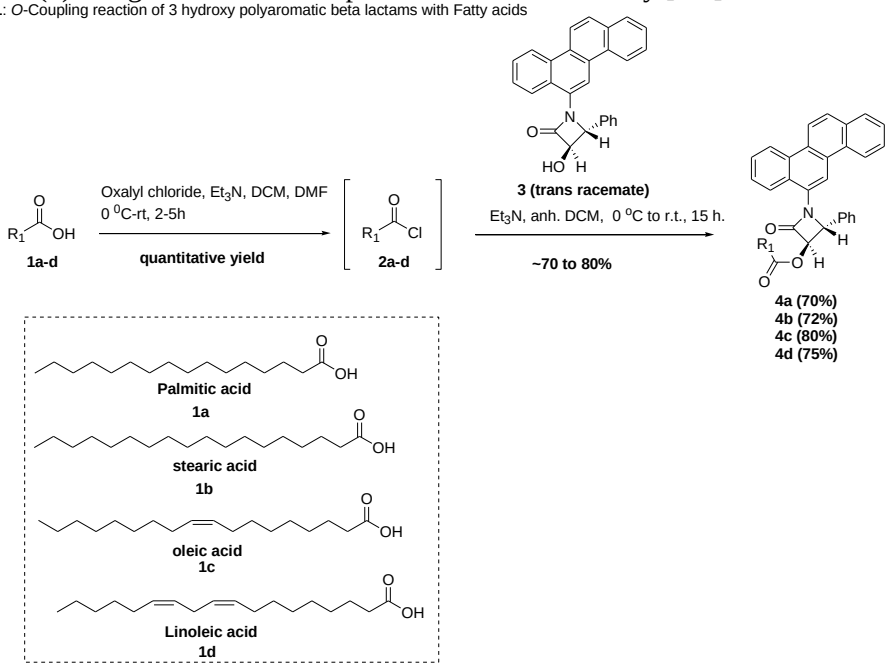
Transformations at the C-3 carbon of β-lactams leading to the formation of diverse molecules are an important area of research [3]. In general, fatty acids are long hydrocarbon chain carboxylic acids that are the building blocks of fatty esters. They are highly non-polar and insoluble in water and used for energy and as metabolic precursors for biological membranes in most types of cells. The hydrocarbon chain length may vary from 10-30 carbons, differing in units of two carbon units. Four different fatty acids are commercially available such as Palmitic acid, stearic acid, oleic acid, and Linoleic acid shown in Scheme-1[4]. We describe here the reaction of the activated Fatty acid chlorides (**2a-d)** with the racemic 3-hydroxy-4-phenyl-*N*-chrysene β-lactams (**3**) resulted in *N*-Polyaromatic β-lactams substituted Fatty acid chain at C-3 (**4a-d**) in good yields. We report here a simple *O*-coupling reaction of various fatty acids with racemic 3-hydroxy-4-phenyl- *N*-chrysene β-lactams in a good yield [5-6].

**Results and Discussions:**

The reaction of the activated Fatty acid chlorides (**2a-d)** with the racemic 3-hydroxy-4-phenyl- -chrysene β-lactams (**3**) resulted in β-lactams substituted Fatty acid chain at C-3 (**4a-d**) in good yields. The corresponding acid chloride (**2a-d**) was prepared by treating the fatty acid (**1a-d**) with oxalyl

chloride in the presence of TEA and used for further reaction with 3-hydroxy-4-phenyl-*N*-chrysene β-lactams (**3**) (**Scheme-1**). The stereochemistry of all these new β-lactams is *trans* and confirmed by coupling constant of β-lactam ring protons. We have used here *trans* racemic 3-hydroxy-4-phenyl- *N*-chrysene β-lactams (**3**) using well established protocol in our Laboratory [5-6].

**SCHEME 1**: *O*-Coupling reaction of 3 hydroxy polyaromatic beta lactams with Fatty acids




**Experimental Section:**

**General procedure for the *N*-Chrysenyl β-lactams substituted fatty acid chain at C-3 Position:**

A solution of the Fatty acids (1 mmol) was treated with oxalyl chloride (1.2 mmol) in the presence of TEA (0.1 mmol) in DCM (5 mL) and DMF (0.1 ml)) at room temperature. After completion of reaction by TLC, concentered the DCM and used this crude compound as such without purification. The other RB flask, a solution of *trans* racemic 3-hydroxy-4-phenyl- *N*-chrysene β-lactams (1 mmol) in TEA ( 3 mmol) in DCM (5 volume) at 0 °C, added Fatty acid chloride in DCM (5 volume) using additional funnel and reaction mixture was stirred for 15h. After completion of reaction by TLC, the reaction mixture was concentrated under reduced pressure to get the crude compound. The crude compound was purified by Flash column chromatography (10-20% EtOAc in *n*-hexane) to get *N*-Polyaromatic β-lactams substituted Fatty acid chain at C-3 (**4a-d**) as white solids in ~50-75% yield. All newly synthesized β-lactams were characterized by $^1$H NMR analysis.

**Conclusions:**

This is an efficient synthesis of novel *N*-Polyaromatic β-lactams substituted Fatty acid chain at C-3 position in a single operation. The reaction is very simple in operation, and this is the first report to have Fatty acids as C-3 position.

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