TRANSFORMATION OF SUCROSE

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A B S T R A C T

Investigations carried out in the present work were undertaken with the two objectives:

1. To study the reactivities of different hydroxyl groups in sucrose molecule.

2. Preparation of mono-, di-, tri-and tetra derivatives of sucrose from its mesyl acetates which could be potential starting materials for the preparation of medicinally important compounds having antibacterial, antitumor and antibiotic properties and polymers of commercial importance.

It is gratifying to note that to a considerable extent both these objectives have been realized.

Monomolar, dimolar, trimolar and tetramolar mesylation of sucrose followed by acetylation with acetic anhydride in the same reaction mixture have been performed to prepare the mono-, di-, tri- and tetra-O-mesyl acetates of sucrose to establish the reactivities of different hydroxyl groups. The structures of all the compounds prepared and separated by column chromatography have been elucidated by studying their IR and NMR spectra. The structures of mono-, di- and tri-O-mesylsucrose acetates have also been confirmed by converting them into their known iodo or azido derivatives.

Mesyl acetates thus obtained have been converted into iodo and azido derivatives of sucrose by treating them with sodium iodide and sodium azide in butanone and DMF. Azido derivatives thus obtained have been catalytically hydrogenated to get the corresponding amino sucroses. As

amino derivatives of sugars have been known to have the antibiotic properties, tetraaminosucrose (a new compound) has been prepared in the present investigations which needs to be investigated for its physiological activity.

In the present work attempts have been made to prepare octa-O-tosyl-sucrose as single entity at different temperatures (varying from -15 to 80°C) by the method of Hockett and Zief.[37] In the experiments carried out above 0°C it has been noticed (by TLC) that in no case Octa-O-tosyl-sucrose is obtained as a single product i.e. it is always a mixture of more than eight products. In the reactions carried out above room temperatures it was noticed (by detecting the presence of chlorine in the products obtained) that some chlorination occurs at primary positions instead of tosylation but the reaction mixtures were not separated and characterized. However, in the present investigations it was observed that octamolar tosylation of sucrose does not give a single product, instead it gives a mixture of different compounds. The mixtures thus obtained at 0°, -5° and -15°C have been separated by column chromatography and characterized by the study of their IR and NMR spectra.

LIST OF SYMBOLS

mp	melting point
RT	Room Temperature
TLC	Thin Layer Chromatography
DMF	N,N-Dimethylformamide
HMPTA	Hexamethylphosphorictriamide
Ms	Mesyl (Methanesulfonyl)
Ts	Tosyl (p-toluenesulfonyl)
Ac	Acetyl
Tr	Trityl (Triphenylmethyl)
Mes	Mesitylenesulfonyl
Tp	Tripsyl (triisopropylbenzenesulfonyl)
s	Singlet
d	doublet
t	triplet
dd	doublet of the doublet
m	multiplet

C O N T E N T S

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