International Journal of Advance Research in Science and Engineering
Vol. No.6, Issue No. 01 , January 2017
www.ijarse.com
IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

A Versatile Tactic for Etherification of Glycerol

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ABSTRACT

This article is mainly concerned with the etherification of glycerol with tert-butanol (two phase system) has been studied in toluene at the presence of Lab-made sulphonated-silica, Sulphonated Cr-MOF, Sulphonated cellulose and Amberlyst-15 as catalyst. The effect of reaction conditions was studied and conditions for optimal selectivity towards ethers were discovered. The maximum conversion of glycerol near 85% was reached at the temperature 60 ^{o}C and at the molar ratio tert-butanol/glycerol (4:1) after 5 hr. The Catalytic activity of sulphonated-silica was compared with Sulphonated Cr-MOF, Sulphonated cellulose and Amberlyst 15. Sulphonated-silica is the best catalyst over the reported other homogeneous and heterogeneous catlalyst.

Keywords- SBIs: Secondary bonding Interactions

I. INTRODUCTION

Organotellurium compounds have attracted considerable interest is the recent years in the fields of (1) organic synthesis[1,2] (2) material science owing to their semiconducting[3], superconducting,[4,5] non-silver photo-imaging[6] and liquid crystal properties and (3) coordination chemistry as telluroether ligands.[7,8] More emphasis has been paid on the use of organotellurium compounds in organic syntheses and also in the study of inter- and intra-molecular secondary bonding interactions between the hypervalent tellurium atom along with other atoms *viz.* Cl, Br, I, O, N, S present in the molecule (intramolecular interactions). Intramolecular interaction also expected to be present in organotelluriums containing functionally substituted organic groups. A direct route to α-carbonyl or α-amido functionalized organotellurium compounds, involving insertion of elemental tellurium in to the C_{sp3}–Br bond of an acylmethyl or amido methyl bromide [$RC(O)CH_2Br$], has been developed and exploited in our laboratory. By the use of bulky groups, it has been possible to obtain dialkyltelluroethers, $[RC(O)CH_2]_2Te$ (R = Mes) and $[RC(O)CH_2]TeAr$ (R = *i*-Pr, Mes; Ar = Mes, Np) in crystalline state. Pronounced steric rigidity along the Te–$C_{mesityl}$ bond was observed even upto 100 ^{o}C in the case of [*t*-$BuC(O)CH_2$](Mes)$TeCl_2$.

Also, diorgano ditellurides, RTeTeR (R = alkyl, aryl), are versatile starting materials in organotellurium chemistry, such as for the preparation of organic charge-transfer complexes and ion-radical salts possessing high conductivity. Common routes for the preparation of ditellurides involve the reaction of organolithium or organomagnesium reagents with tellurium powder followed by air oxidation or alternatively, the reduction of organotellurium(IV) halides. Occasionally, these procedures also give rise to the formation of rather unstable diorgano tritellurides, RTeTeTeR (R = alkyl and aryl) in varying amounts. In view of the pronounced steric and

IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

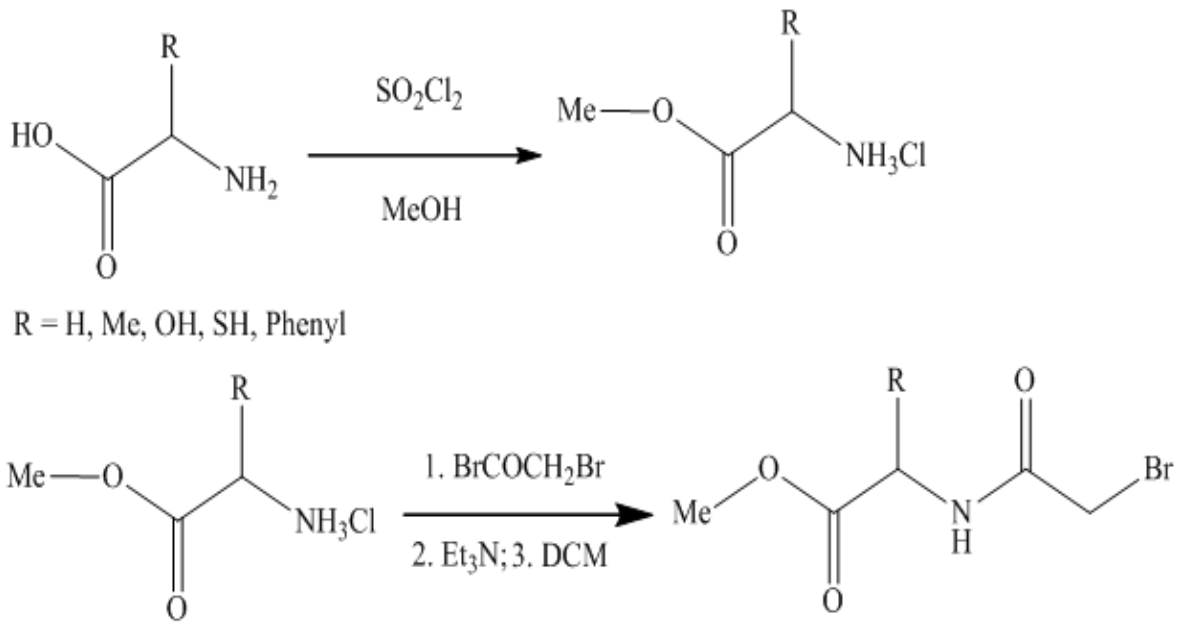
electronic effects of 1-naphthyl group, its influence relative to phenyl, on supramolecular self-assembly in the case of unsymmetrical diaryltellurium(IV) dihalides appears to be an interesting subject for studies.

On the other hand Selenium in biochemistry has emerged in 1973, when two bacterial enzymes formate dehydrogenase and glycine reductase, were reported to contain selenium.[9-13] Se-containing amino acids have attracted interest of biological chemists as these are at the active sites of several selenoenzymes and play role in biological synthesis, metabolism and structure determination of proteins. Selenocysteine and its derivatives have been known to possess significant chemopreventive and antitumer activities. Glutathione peroxidase (GPx) is a naturally occurring selenoenzyme that protects cell against oxidative damage by reactive oxygen species.[14]

Recently Jacob et al. reviewed the biological potential of tellurium[15]. In this review the authers described the antibiotis and anticancer characteristics of tellurium compounds. The biochemical mechanism of tellurium cytotoxicity is the emerging area of research. The close chemical relationship between tellurium and sulfur would provide an opportunity for the development of enzyme inhibitors and redox modulators, some of which could be interest in the field of antibiotics and anticancer drug design.

II. RESULT AND DISCUSSION

Synthesis and characterization of Selenium and Tellurium containing amino acids are given in Scheme 1 & 2.



Scheme 1. Synthesis of Protected amino acids

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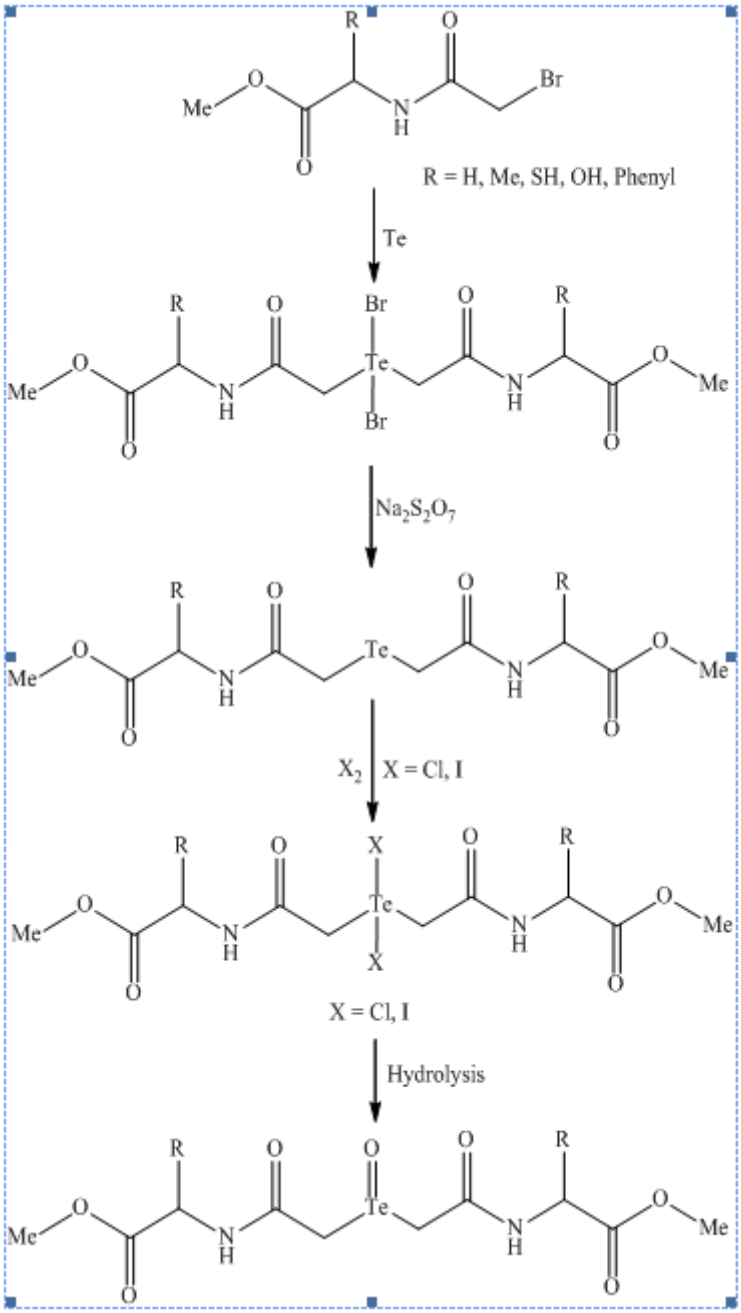

Scheme 2. Synthesis and Characterization of tellurium containing amino acids precursors for Novel Peptides

III. CONCLUSION

Synthesis and characterization of novel organochalcogen derivatives has been established.

I. **Acknowledgement** PS is thankful to DSMNRU to provide the space and facility.

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IJARSE
ISSN (O) 2319 - 8354
ISSN (P) 2319 - 8346

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