

Polyurethane Systems with Sophorolipid-Based Oligomers as Polyol Components

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Editorial

The Ugi-azide is a four-component reaction for the synthesis of 1,5-Disubstituted Tetrazole(1,5-DST), which involves an aldehyde, various amines, isocyanides, and as an azide source the Trimethylsilylazide (TMSN₃), in water as a solvent, with Tetradecyltrimethylammonium Bromide (TTAB) as a catalyst, which provides This method is a first step toward a 1,5 disubstituted tetrazole green chemistry synthesis. By utilising a vast substrate scope, a series of 1, 5-disubstituted tetrazole was synthesised, yielding yields ranging from 43% to 56%, which were then compared to yields produced with methanol as the solvent. Tetrazole derivatives have gotten a lot of interest as prime heterocycles because of their widespread use in industries including medicine, pharmacology, and photography, as well as their potential use as explosives and rocket propellant components due to their high energy characteristics. Because of their bioisosterism to carboxylic acid and amide moieties, and lipophilicity, which is potentially more beneficial when cell membrane is desiccated, 1, 5-disubstituted tetrazole moieties (1,5-DST) have been widely and successfully used in medicinal chemistry and drug design as anti-inflammatory (I), antiviral (i.e., HIV) (II), antibiotics (III), antiulcer (IV), anxiety (V), anti-tubercular (VI). The 1,3-dipolarcycloaddition reaction between nitriles and azides is the most popular way to get tetrazole derivatives. However, the nitrile substrate's necessity for strong electron withdrawing groups limits the scope of the reaction, necessitating, in general, high reaction temperatures and catalysts. Since its introduction as a strong technique in combinatorial chemistry and drug development, it has provided substantial benefits over traditional linear stepwise syntheses. Ugi described a Passerini MCR variant that resulted in -hydroxymethyl tetrazoles years later. The Ugi azide MCR differs from the traditional Ugi-4CR by substituting an azide source for the carboxylic acid, which traps the intermediate nitrilium and leads to the synthesis of 1,5-DSTs.

Green chemistry has arisen in recent decades as an alternative and long-term option for designing processes and syntheses that decrease or eliminate the usage or creation of hazardous compounds, which can leave harmful residues at the conclusion of the reaction that, are difficult to remove. As a result, utilising water as a solvent instead of MeOH in the synthesis of 1,5-DST would be a superior option because it is safe, non-toxic, affordable, and has no environmental risk. However, due to the poor solubility of organic molecules in water, it is rarely used as a solvent, if at all. As a result, using surface-active chemicals (surfactants) as a catalyst in aqueous media has been shown to increase water reactivity by forming micelles or vesicular cavities. Micellar catalysis refers to the use of catalytic concentrations of amphiphiles that self-aggregate spontaneously to form micelles in water to speed up the rate of a reaction. In both situations, no reaction happened, which can

be explained by the substrates being either less soluble or insoluble in water, which has a direct impact on the reaction. Following that, we repeated the reaction using TTAB as a catalyst, which allows micelles to form in which the majority of organic substrates are concentrated. These micelles operate as a hydrophobic reaction site, increasing the effective concentration of organic reactants and, as a result, increasing the reaction rate via the concentration effect. As a result, organic substrates in micellar solution are pushed away from water molecules and towards the hydrophobic core of micelles, resulting in efficient collision between organic substrates, which speeds up the reaction rate and allows for a 43% yield.