# **SYNLETT** Spotlight 396

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

## 2,2,6-Trimethyl-4H-1,3-dioxin-4-one

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Dedicated to my research supervisor Prof. Ahmad Shaabani

 $2).^{2}$ 

Scheme 2

- acetone

### Introduction

In 1952 Carroll and Bader reported that diketene and acetone can be reacted to afford 2,2,6-trimethyl-4H-1,3-dioxin-4-one (1) (Scheme 1).<sup>1</sup>



### Scheme 1

Dioxinone 1 is stable at room temperature, but decomposes when pyrolyzed into acetylketene 2 and acetone. Therefore, this compound is an important building block in organic synthesis as direct precursor of  $\beta$ -dicarbonyls compounds. Thus, pyrolysis of 1 provides an acetoacety-

### Abstracts

(A) 2-Diazo-N-methyl-N-phenylacetamide was prepared from Nmethyl-3-oxo-N-phenylbutamide, itself synthesized from 2,2,6-trimethyl-4H-1,3-dioxin-4-one and N-methylaniline in xylene at reflux temperature, via diazo transformation with tosyl azide and subsequent hydrolysis with sodium methoxide.4

(B) The functionalization of position 5 of the 1,3-dioxin-4-ones with an electrophile leads to products with a potential use as pharmaceuticals and agrochemical intermediates. The iodination of 2,2,6-trimethyl-4H-1,3-dioxin-4-one with N-iodosuccinimide (NIS) in acetic acid furnishes 5-iodo-1,3-dioxin-4-one.5

(C) Acetoacetylation of 1-phenylprop-2-en-1-ol to provide the corresponding acetoacetate ester in excellent yield. Mn(III)-mediated oxidative cyclization of \beta-keto ester successfully provided the desired cyclopropane in good yield and excellent diastereoselectivity.6

xylene, 150 °C Mn(OAc)<sub>2</sub>, Cu(OAc) AcOK, AcOH, 70 °C





lation procedure in the presence of nucleophiles (Scheme

Due to the importance of  $\beta$ -dicarbonyls compounds<sup>3</sup> as

excellent materials in the synthesis of heterocyclic compounds, the alternative method for the synthesis of them is

the use of acetoacetylating reagents. Because of some

drawbacks of using diketene as acetoacetylating reagent,

2,2,6-trimethyl-4H-1,3-dioxin-4-one, a 1:1 acetone dike-

tene adduct is a convenient alternative to diketene.



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 $_{2}R^{1}$ 

ΗŃ

R1

Zn, AcOH

(D) 2-Amino-4-aryl-4*H*-pyran derivatives could be prepared rapidly and smoothly in good to excellent yields by the microwave-assisted liquid-phase strategy of multicomponent synthesis on polyethylene glycol.<sup>7</sup>



R<sup>1</sup>NH<sub>2</sub>

1/0 °C

HO

AcOH

NaNO

(E) Using the Knorr pyrrole synthesis, pyrrole amides were readily prepared from the oxime of the acetoacetamide derivatives that were prepared from 2,2,6-trimethyl-4*H*-1,3-dioxin-4-one.<sup>8</sup>

(F)  $\beta$ -Keto esters and  $\beta$ -keto amides were obtained by the reaction between 2,2,6-trimethyl-4*H*-1,3-dioxin-4-one and secondary or tertiary alcohols (including chiral ones) or primary or secondary amines.<sup>9</sup>

(G) Diketo-1,3-dioxinone was synthesized by thermolysis of commercially available 2,2,6-trimethyl-4*H*-1,3-dioxin-4-one, which underwent a retro-Diels–Alder reaction to form acyl ketene, which was trapped with benzotriazole to form the amide. Subsequent crossed Claisen condensation via reaction of the lithium enolate from 2,2,6trimethyl-1,3-dioxin-4-one with amide gave diketo-1,3-dioxinone as a 5:95 mixture of keto–enol tautomers over two steps.<sup>10</sup>

(H) 2,2,6-Trimethyl-4*H*-1,3-dioxin-4-one was used in the synthesis of optical pure compounds. These compounds were used as a medicament for the treatment and prevention of type B hepatitis.<sup>11</sup>











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