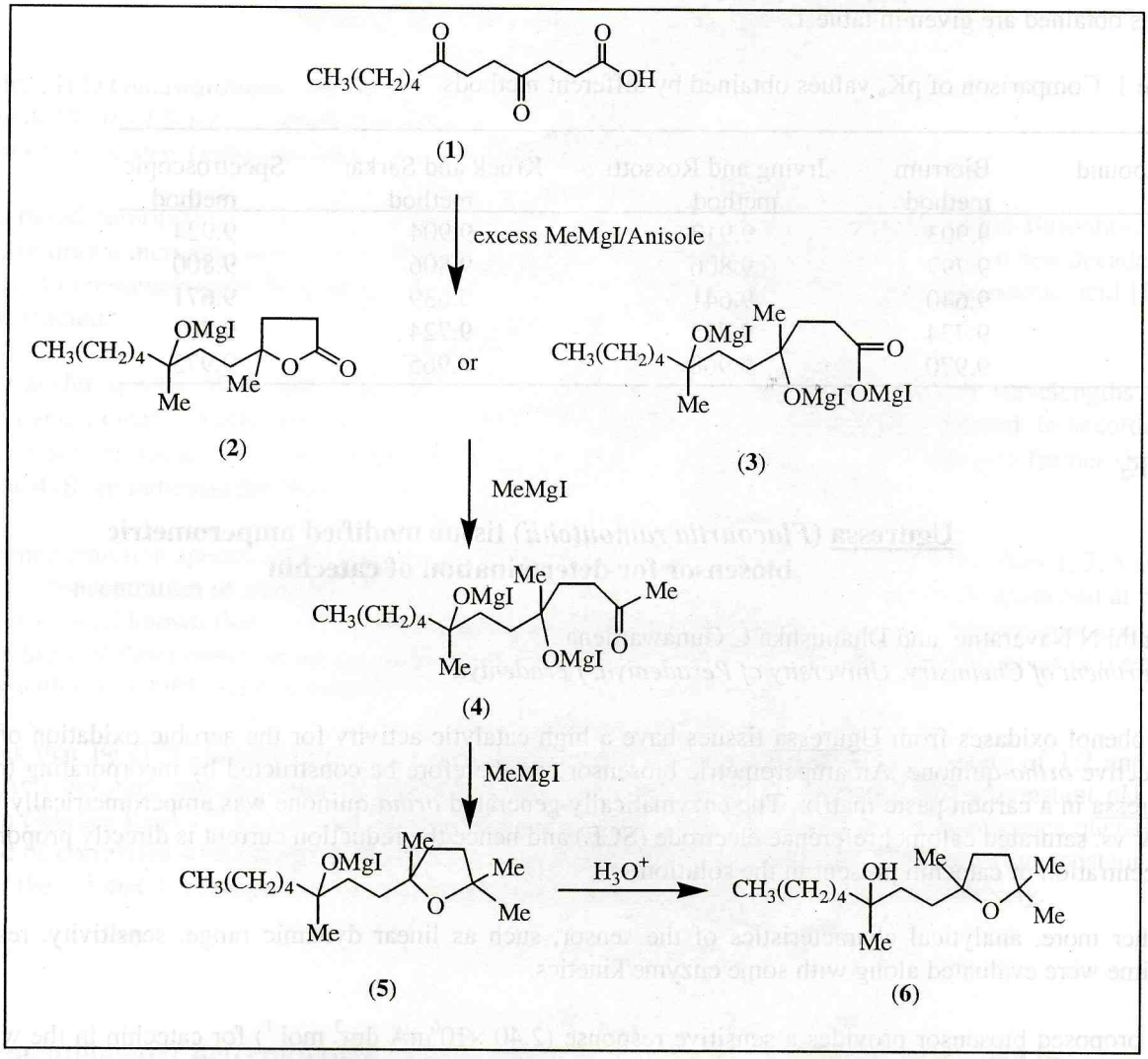
Reaction of methyl magnesium iodide with a gamma keto carboxylic acid to yield a tetra substituted tetrahydrofuran

A M Abeysekera* and J R D M Sajeevani
Department of Chemistry, University of Sri Jayewardenepura, Nugegoda

4,7-dioxocarboxylic acids are useful intermediates in the synthesis of compounds such as cyclopentenones and γ-lactones. We have reported earlier, the synthesis of 7-hydroxy-γ-lactones by the $NaBH_4$ reduction of 4,7-dioxocarboxylic acids. We expected methyl magnesium iodide to react with 4,7-dioxocarboxylic acids by an analogous reaction to form 7-hydroxy-γ-lactones with an angular methyl group. However, the reaction of 4,7-dioxododecanoic acid (**1**) with excess methyl magnesium iodide gave not the expected lactone, but the tetra substituted tetrahydrofuran, 1[4-(1,1,4-trimethyltetrahydrofuryl)]-3-methyl-octan-3-ol (**6**).

The 1,1-4,4-tetra substituted structure (**6**) was assigned to the new compound based on its IR, 1D NMR (^1H, ^{13}C & DEPT) and 2D NMR (COSY, HMBC & HMQC) spectra.

The reaction probably proceeds via the methyl ketone (**4**) which could be formed from the lactone (**2**) or the open chain compound (**3**) (Scheme 1).



Scheme 1 : Proposed mechanism for the formation of (6)

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