E2 258

Synthesis of the aggregation pheromone of Coconut Rhinoceros Beetle from cane sugar

The rhinoceros bettle, *Oryctes rhinoceros* L. is an important pest of coconut in all coconut growing countries including Sri Lanka. Ethyl 4-methyloctanoate has been identified as an aggregation pheromone of coconut rhinoceros beetle.

The methods available for the synthesis of ethyl 4-oxopentanoic are laborious and expensive. We were interested in developing a synthesis of the pheromone, which could be conveniently carried out using cheap raw materials.

The aggregation pheromone was synthesized using cane sugar as starting material. Cane sugar was treated with concentrated hydrochloric acid to give 4-oxopentanoc acid (laevulinic acid) in 20% yield. Cyclisation of glucose formed from the hydrolysis of cane sugar yields furan derivatives whose break up gives formic acid and laevulinic acid. Fischer-Speier esterification of laevulnic acid gave ethyl laevulinate in 90% yield.

Witting olefination of ethyl laevulinate with triphenylphosphoniumbutylylide gave the ethyl 4-methyl-4-octenoate in 12% yield. In generating the ylide, some of the KH used as base reacted with ethyl levulinate to give cyclopentance-1,3-dione as a side product, lowering the yield. Hydrogenation of the alkene with hydrogen and palladium-carbon catalyst gave the pheromone in racemic from can be used in plant protection without resolution.