

Short Communication

SOME OBSERVATIONS ON THE THERMAL BEHAVIOUR OF CURCUMIN UNDER AIR AND ARGON ATMOSPHERES

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The TG, DTG and DTA curves of curcumin(I) have been recorded in static air and inert dynamic argon atmosphere over the range between ambient temperature and 600°–700°C using a Netzsch thermal analyser STA 429. Careful examination of these curves reveals appreciable differences in the behaviour of I under either atmospheres, which are easily recognized by comparing the profiles of their thermal curves, particularly in the melting point, thermal stability of intermediates, percent weight loss and exothermicity of the chemical processes. Gas-chromatographic analysis of volatile pyrolysates trapped during thermal analysis indicates the formation of (CH₃)₂CO, CH₃COH and C₆H₅OCH₂COOH (phenyl oxyacetic acid). However, in static air CO₂ and H₂O were identified as well. X-ray diffractometry reveals the formation of amorphous carbon as a final product in argon and a mixture of amorphous carbon and graphite in air. It seems that the relatively high mass of argon plays an important role in the reactions and stability of intermediates. In either atmospheres curcumin is thermally stable up to 249°C with *m.p.* of 176.4°–177.5°C. The unique shape of the DTA curve of I could be used for its identification.

Keywords: curcumin, gas-chromatographic analysis, TG-DTG-DTA

Introduction

Curcumin, 1,7-bis(4-hydroxy-3-methoxy-phenyl)-1,6-heptadiene-3,5-dione, turmeric yellow, scheme 1, is an orange crystalline compound (1) which is insoluble in water (2) but soluble in some organic solvents and finds many applications in food and dye industries and agriculture. The annual world consumption