

## Report No. R12612 (RC20322)

### Introduction

The foam was allegedly made from "rubber tree sap" without toxic ingredients and reputed to be biodegradable.

A portion of the foam was extracted in hot acetone overnight. The extract was examined by FTIR, GCMS,  $^1\text{H}$  NMR and TLC. The rubber residue was examined by FTIR-ATR.

### Extract

34.9wt% extractable material was removed that looked like a viscous oily material. FTIR showed major peaks matched with a reference spectrum of polypropylene glycol and some urethane groups.

Further evidence of polypropylene glycol was found by GCMS and  $^1\text{H}$  NMR.

$^1\text{H}$  NMR also showed two peaks related to the incorporation of methylene diisocyanate (MDI).

GC-MS of the solvent extract showed peaks for triethylenediamine (DABCO – a polyurethane catalyst), MDA (4,4'-methylenedianiline) – a possible precursor to MDI, MDI, a range of polypropylene glycols and some low levels of phthalates (diethyl, dibutyl and diethylhexyl). There were no peaks that could be used to identify whether any of the polyurethane starting materials could be of a natural origin.



Tests by TLC with three sprays (Gibbs, Copper Acetate and Anisaldehyde) that should detect naturally occurring Hevea rubber products) did not show any identifiable Hevea components.

### Rubber after extraction

The FTIR-ATR spectrum showed a polyether urethane that included peaks for polypropylene glycol.

### Comments – Informal at this stage.



The major basic starting material components of this foam are polypropylene glycol and MDI.

While propylene glycol may be manufactured from glycerol and refined from natural sources, using special catalysts to add hydrogen, it is also normally made from petroleum products. If it can be demonstrated by the manufacturer that the propylene glycol had been manufactured and refined from natural sources they can claim that the foam is made, in part, from natural materials, and possibly from Hevea 'sap'. (This does not mean, or necessarily imply, natural latex rubber, though that might well be inferred by someone reading the publicity literature.)

\* MDI is toxic and we have no evidence it could be derived from a natural source. MDA likewise.

A search for literature data on urethanes from natural products indicates that some may be made from the conversion of plant based oils but we have no evidence this is the case in this sample.