

[Quantitative analysis of fatty acids in vulcanized styrene-butadiene rubber by thermal desorption and thermally assisted hydrolysis and methylation-GC/MS](#)

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Rubber Chem. Technol. 87 (2014) 516-525

Abstract:

Determination of stearic acid in rubber is very important from the viewpoint of quality control of products. In place of the conventional liquid-phase extraction procedures for the analysis of additives in rubber, stearic and palmitic acids in vulcanized styrene-butadiene rubber (SBR) samples were directly analyzed in the solid state by thermal desorption (TD)-gas chromatography (GC)/mass spectrometry (MS) and thermally assisted hydrolysis and methylation (THM)-GC/MS. It was found that the precision of analytical data was only fair in the TD-GC/MS analysis, with 7.8% relative standard deviation (RSD), because of the interaction between the polar fatty acids and basic sites in the GC chromatographic system. On the other hand, THM-GC/MS, in which the fatty acids are derivatized to the methyl esters using tetramethylammonium hydroxide, can overcome this problem. Under the optimized measurement conditions of this study for THM-GC/MS, the average determined value (0.62 wt%) of total fatty acids in the SBR samples was found to agree well with the compounded amount (0.64 wt%) used in the preparation stage of the SBR samples, and the RSD was 3.2%.

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Multi-Shot Pyrolyzer, Micro puncher, UA⁺-5, UADTM-2.5N, Eco-cup