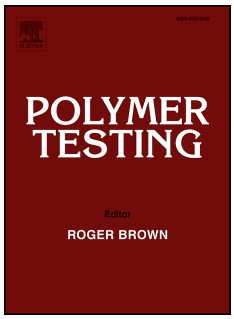
Accepted Manuscript



Extraction, confirmation, and screening of non-target compounds in silicone rubber teats by purge-and-trap and SPME combined with GC-MS

Di Feng, Huimin Yang, Donglei Qi, Zhenzhen Li

PII: S0142-9418(16)30789-9

DOI: 10.1016/j.polymertesting.2016.09.021

Reference: POTE 4773

To appear in: *Polymer Testing*

Received Date: 10 August 2016

Accepted Date: 20 September 2016

Please cite this article as: D. Feng, H. Yang, D. Qi, Z. Li, Extraction, confirmation, and screening of non-target compounds in silicone rubber teats by purge-and-trap and SPME combined with GC-MS, *Polymer Testing* (2016), doi: 10.1016/j.polymertesting.2016.09.021.

Analysis Method

Extraction, confirmation, and screening of non-target compounds in silicone rubber teats by Purge-and-Trap and SPME combined with GC-MS

Di Feng*, HuiminYang, Donglei Qi, Zhenzhen Li

College of Food Science, Beijing Technology and Business University, Beijing Higher Institution Engineering Research Center of Food Additives and Ingredients, Beijing Laboratory for Food Quality and Safety, Beijing, China

Abstract

As a food contact material, the safety of silicone rubber teats for infants is very important. This analysis of non-target compounds in silicone rubber teats is a prospective work on the safety evaluation and early warning mechanism for similar polymer materials. In this study, two “green” analytical approaches were applied to extract non-target compounds in 30 silicone rubber teats based on the purge-and-trap method and solid phase microextraction. A total of 140 extracted compounds were separated and identified by gas chromatography-mass spectrometry, coupled with three qualitative methods, namely, matching with the mass spectra library, retention index (RI) and standard confirmation. Chromatographic peak area normalization was used to approximate the relative content of each component. A database containing 140 compounds in 12 categories was established. To identify the noteworthy compounds that could migrate and endanger infant health, all compounds were filtered by a three-step screening process based on the detection rate, RI and relative content. Finally, the 53 selected compounds included alkanes, siloxanes, aromatics, aldehydes, trimethylsilanol, butylated hydroxytoluene, *N*,*N*-dibutylformamide and benzothiazole. Given their higher detection rate, higher relative content or potential toxicity, these compounds should be further investigated for safety evaluation.

Keywords: Silicone rubber teats; Non-target compounds; Purge-and-trap; Solid phase microextraction; Gas chromatography-mass spectrometry; Retention index; Food contact material

*Corresponding author. E-mail: fengdi0618@126.com