

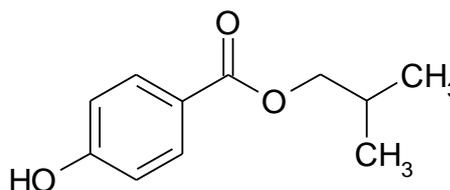
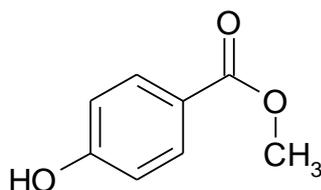
Identification and quantification of preservative chemicals in common household products

Session 2 Pre-Laboratory exercise

In Session 2, you will begin to carry out the extraction, identification and quantification of the individual parabens that are commonly found in household products.

Before Session 2, you will need to complete the following tasks before you are able to continue with the subsequent laboratory work.

1. Draw the structures of methyl paraben and isobutyl paraben using chemical drawing software.



2. Paraben is a common name for a group of preservative chemicals. What are their other names?

methyl *para*-hydroxybenzoic acid
methyl paraben
methyl *para*-hydroxybenzoate

ethyl *para*-hydroxybenzoic acid
ethylparaben
ethyl *para*-hydroxybenzoate

3. Read the 3 journal articles listed (**REFERENCES**) and decide which of methods A to D are suitable for extracting and analysing parabens from household products (e.g. toiletries and cosmetics).

~~A: dilute some shampoo with water and use GC for analysis~~

B: extract parabens from shampoo using solvents, purify the extract and analyse the purified extract using HPLC.

C: extract parabens from shampoo using solvents, purify the extract and analyse the purified extract using GC.

~~D: analyse some shampoo using IR spectroscopy.~~

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4. With reference to Article 4 (p. 5) of the EU COUNCIL DIRECTIVE 76/768/EEC, decide in which of the substance categories (c to f) parabens should be placed.

Using annex VI of the directive (p. 108 - 118), identify the key quantitative guidelines for the use of parabens in cosmetic formulations.

9	Inorganic sulphites and hydrogen-sulphites (*)	0,2 % expressed as free SO ₂		
▼MS2				
▼MI1				
11	Chlorobutanol (INN)	0,5 %	Prohibited in aerosol dispensers (sprays)	Contains chlorobutanol
12	4-Hydroxybenzoic acid and its salts and esters ▶MS1	0,4 % (acid) for 1 ester, 0,8 % (acid) for mixtures of esters		

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In summary, 0.4 % for a single paraben, 0.8 % for a mixture.

REFERENCES

Harvey P.W. and Darbre P. Endocrine disrupters and human health: Could oestrogenic chemicals in body care cosmetics adversely affect breast cancer incidence in women? A review of evidence and call for further research. *J Appl Toxicol* **24**, 297-306 (2004)

Shen H.Y., Jiang H.L., Mao H.L., Pan G., Zhou L., Cao Y.F. Simultaneous determination of seven phthalates and four parabens in cosmetic products using HPLC-DAD and GC-MS methods. *Journal of Separation Science* **30**, 48-54 (2007).

Canosa P., Rodríguez I., Rubí E., Negreira N. and Cela R. Formation of halogenated by-products of parabens in chlorinated water. *Analytica Chimica Acta* **575**, 106-113 (2006)

The text of the 76/768/EEC DIRECTIVE is available at:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1976L0768:20070919:EN:PDF>

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