Mixed – not separated: material identification in medical technology.

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Industries (A-Z)
Medical technology

Objectives
Fast material overview in case of complex matrix

Materials
Composite material, product preparation

Analytical Methods
^{1}H-NMR
(Nuclear Magnetic Resonance)

Supplementary Methods
Extraction

Related Topics
Purity determination, release testing

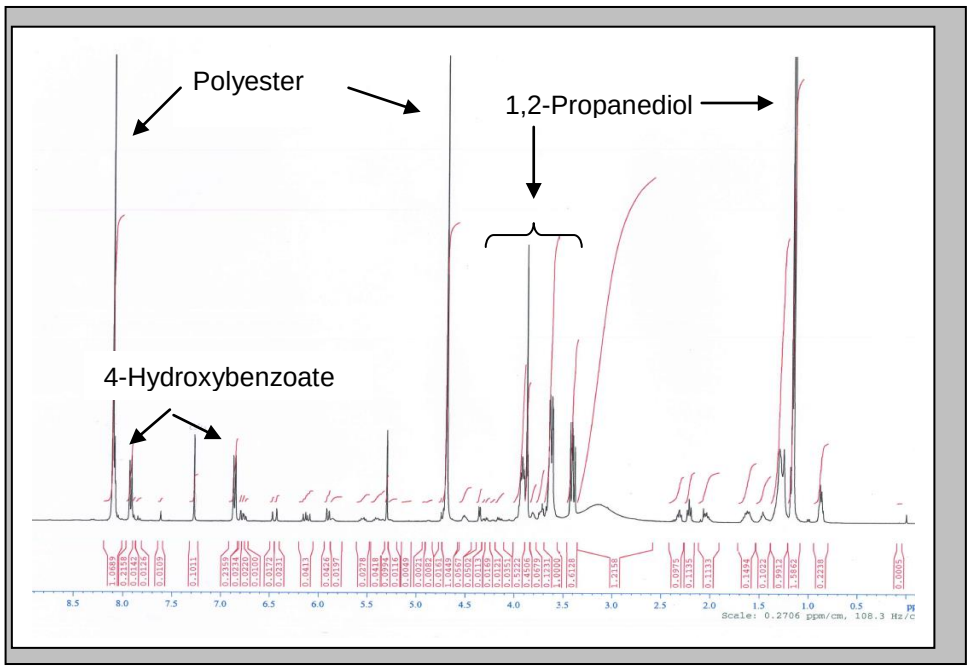
The problem:
A wide spectrum of analytical and physical methods is often required to characterize medical products or the starting materials used. This typically results in a large amount of time for analysis. But frequently one just needs fast material information first to be refined by later more detailed analyses.

The solution:
The high-resolution NMR spectroscopy is a versatile method in order to get a fast overview on a medical product. It is a method for detailed structural determination and quantification of organic substances. The NMR spectroscopy is therefore applicable to all kinds of organic compounds including polymers. Mixtures can be quantified, and impurities can be detected.

Example heat plaster

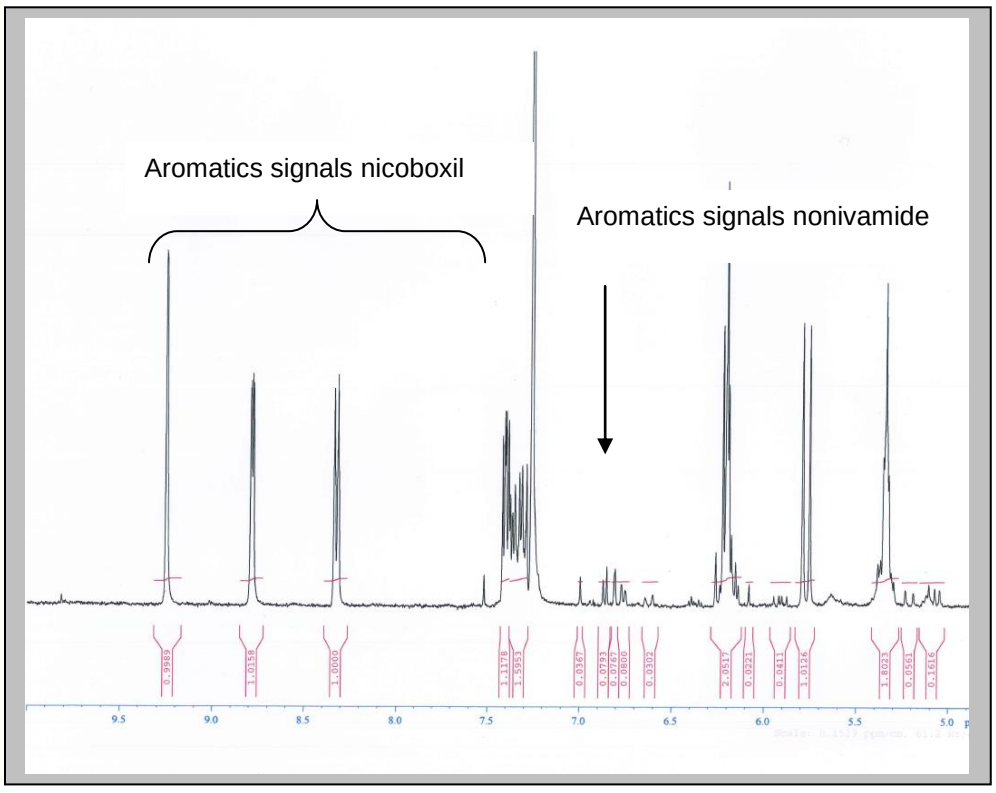
The example shown here refers to a commercially available heat plaster. Its active ingredient nonivamide is detectable in the spectrum already after a simple extraction with dichloromethane.

In addition, the spectrum also gives information on the carrier fluid (1,2-propanediol), the preservative agent (4-hydroxybenzoate), the glue (acrylate) and the tissue material (polyester).



Example warming cream

For comparison, a spectrum cut-out (aromatic compounds only) of the $CDCl_3$ extract of a warming cream is shown. Its active ingredients nicoboxil and nonivamide can be identified and roughly quantified – and all this without a preceding processing of the cream material and in spite of the presence of the cream base. From the spectrum, the proportion nicoboxil vs. nonivamide is calculated as about 91:9; the package leaflet of the warming cream specifies a proportion of 86:14.



The examples show that the NMR spectroscopy is not limited to structural determination of pure substances. It can also play an important role in product identification of material mixtures.

Interested?
The spectroscopy group of the Analytical Services Obernburg is ready to answer your questions and to help you.

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