

Biomarker Focus

Alkylphenol ethoxylates

Alkylphenol ethoxylates, in particular **nonylphenol** and **octylphenol ethoxylates**, are widely used **non-ionic surfactants**. They are high production volume chemicals. The use patterns of these surfactants, which range from individual household type applications to large-scale industrial processes, result in their **discharge to the environment via sewage treatment plants as well as directly from untreated effluents**.

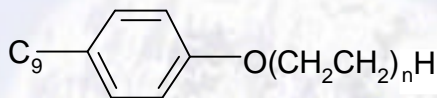


Fig.: General structural formula of 4-nonylphenol ethoxylates.

Toxicology

Alkylphenols and their ethoxylates have **potential effects on endocrine function** in fish and aquatic invertebrates. Although the data in the literature are scattered among many species, different test methods and chemicals, there is a consistent pattern in the toxicity. **Nonylphenol** and **octylphenol** are both **acutely toxic** to fish (17-3000 µg/L), invertebrates (20-3000 µg/L) and algae (27-2500 µg/L). There is an **increase in the toxicity with decreasing chain length**.

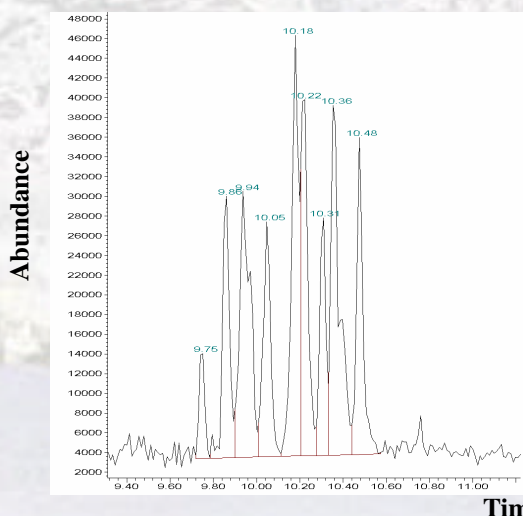
Alkylphenols and their ethoxylates **bind to the estrogen receptor** resulting in the expression of several responses both *in vitro* and *in vivo*, including the **induction of vitellogenin**. They also affect the growth of testes, alter normal steroid metabolism, **disrupt smoltification** and **cause intersex** (ova-testes) in fish.

For these reasons, nonylphenol and its ethoxylates are on the second **Priority Substances List (PSL2) of the Canadian Environmental Protection Act**. In many countries specific **actions, bans or restrictions** are established or in preparation.

Chiron offers

- CHIRON offers a unique broad range of **single isomers and multicomponent mixtures of alkylphenol ethoxylates as solutions standards**. They can be used as calibration standards for GC-MS analysis of waste water and waste water sludges. In addition we offer **neat material in mg and g scale** for exposure and toxicological studies.
- CHIRON have reference standards for **73 branched alkylphenols (C0-C10)** in **neat or as solutions**.

➤ *Please, inquire for special needs*



RA²

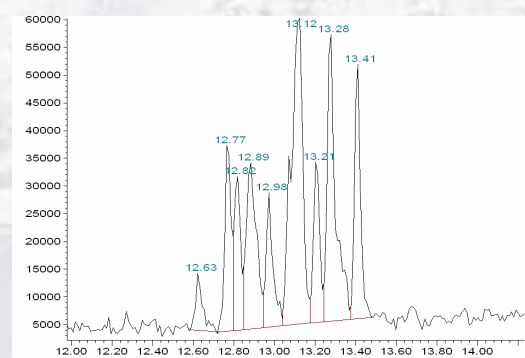


Fig.: GC-MS chromatograms of nonylphenol mono- and diethoxylates, provided by RA-2, The Central Sewage Plant, Strømmen, Oslo, Norway.

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