TECHNICAL BULLETIN

Faecal Sterols

Australian Water Quality Centre

Analysis for:
Faecal Sterols

Limit of Reporting:
20ng/L (for 20L sample)

Components:
9 major Sterols

Sampling Requirements:
Ideally samples should be filtered in the field using specially prepared filters supplied by AWQC.
If not practical, samples should be iced or refrigerated post collection until receipt at AWQC.

FAECAL STEROLS

Faecal sterols are excreted by animals and humans as by-products of digestion of dietary sterols. The particular distribution of sterols found in faecal matter is influenced by factors such as diet, intestinal microflora and the animal's ability to synthesise its own sterols. The combination of these factors determines 'the sterol fingerprint'. The most commonly known faecal sterol, coprostanol, is produced in the digestive tract of humans by microbial hydrogenation of cholesterol. By drawing on the differences in the sterol profile of humans and animals, it is possible to distinguish the source of faecal contamination.

METHODOLOGY

Water samples are filtered and extracted with solvent. Following a series of separation and derivatisation steps, the extracts are then analysed by GC/MS to identify and quantitate the sterols. The relative ratios of the sterols is calculated and used to determine the sources of faecal contamination.

IMPORTANCE OF ANALYSIS

Contamination of Australia's inland and coastal waterways with animal and human waste is a major cause of excessive nutrient levels and diminished water quality. Inputs may come from human sewage, farm animals, native birds and animals, and domestic pets. The faecal pollution often enters our waterways in appreciable amounts after heavy rain. Distinguishing sources of faecal pollution in aquatic systems forms an important part in the overall management of our waterways. Faecal sterols as biomarkers provide a valuable tool in the investigation of the sources and fate of faecal contamination in the environment. Faecal contamination from humans, dogs, birds and herbivores such as cattle, sheep, kangaroos, etc. may be differentiated from each other through the identification and relative abundance of the various sterols, in combination with microbiological analysis.

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In some areas, widespread human faecal contamination of waterways may be an indicator of run-off from septic tank overflow. The results from faecal sterols analysis can be of tremendous benefit to environmental managers in pin-pointing sources of faecal pollution in our environment. The information gained from such analysis may be used to better manage water catchments, stormwater and effluent disposal systems to safeguard the quality of our waterways and thus provides an important tool to the water industry.

FAECAL STEROLS BY AWQC

The AWQC utilises modern GC/MS instrumentation for the identification and quantification of the major sterols necessary for accurate discrimination of faecal contamination. Measurement of single indicators such as coprostanol or faecal coliform bacteria in isolation is inadequate to fully distinguish faecal contamination.

The AWQC is able to provide a comprehensive service for the complete suite of indicators required - E.Coli, Coliforms, Sulphite Reducing Clostridia, Enterococci, Clostridium Perfringens and Campylobacter in combination with sterols analysis - as required to fully discern the source of faecal contamination.

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