Origin of fecal contamination in waters from contrasted areas: Stanols as Microbial Source Tracking markers

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Résumé en anglais	Improving the microbiological quality of coastal and river waters relies on the development of reliable markers that are capable of determining sources of fecal pollution. Recently, a principal component analysis (PCA) method based on six stanol compounds (i.e. 5β-cholestan-3β-ol (coprostanol), 5β-cholestan-3α-ol (epicoprostanol), 24-methyl-5α-cholestan-3β-ol (campestanol), 24-ethyl-5α-cholestan-3β-ol (sitostanol), 24-ethyl-5β-cholestan-3β-ol (24-ethylcoprostanol) and 24-ethyl-5β-cholestan-3α-ol (24-ethylepicoprostanol)) was shown to be suitable for distinguishing between porcine and bovine feces. In this study, we tested if this PCA method, using the above six stanols, could be used as a tool in “Microbial Source Tracking (MST)” methods in water from areas of intensive agriculture where diffuse fecal contamination is often marked by the co-existence of human and animal sources. In particular, well-defined and stable clusters were found in PCA score plots clustering samples of “pure” human, bovine and porcine feces along with runoff and diluted waters in which the source of contamination is known. A good consistency was also observed between the source assignments made by the 6-stanol-based PCA method and the microbial markers for river waters contaminated by fecal matter of unknown origin. More generally, the tests conducted in this study argue for the addition of the PCA method based on six stanols in the MST toolbox to help identify fecal contamination sources. The data presented in this study show that this addition would improve the determination of fecal contamination sources when the contamination levels are low to moderate.

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