

## ABSTRACT

Land use practices near river ecotones result in numerous inputs of terrestrial materials into the river ecosystem. While macroinvertebrates population metrics is widely used in monitoring water quality changes, including those induced by humans, the use of lipid profiles in these organisms to monitor influence of land use practices is rather ignored. The aim of this study was to determine lipid profile in macroinvertebrates as potential indicator of human influence in Sagana River Basin, a high altitude tropical highland stream in Kenya. Sites were selected based on differences in land use activities delineated: forest with minimal land use activities, while cropland and saw milling areas had varying degrees of land use activities, with urban areas designated as sites with most human impacts. The macroinvertebrate metrics such as occurrence, abundance, diversity, percentage of oligochaetes and chironomids (%OC), as well as the Ephemeroptera, Plecoptera and Trichoptera (%EPT) index differed relative to land use changes. Variation in the Fatty Acids (FAs), alcohols and sterols in benthic macroinvertebrates was related to the land use activities along the stream. Evidently, streams traversing the urban areas had higher concentrations of Phospholipid fatty acids (PLFA), while streams traversing croplands had the highest neutral lipid fatty acids (NLFA). The dominance of monounsaturated FAs (MUFAs) in forest, shortchain FAs (SCFAs) and polyunsaturated FAs (PUFAs) in croplands and longchain FAs (LCFAs) near urban areas clear indicate different sources of these materials, mainly from terrestrial sources. Individual fatty acids, alcohols and sterols profiles discerned difference in land use changes. The concentrations of SCFAs, MUFAs, LCFAs, TeoH, 27 $\Delta$ 5,22, 28 $\Delta$ 5,24, 28 $\Delta$ 5,22, 29 $\Delta$ 5,22 and 29 $\Delta$ 5,22 in the benthic macroinvertebrates samples were positively associated with OC%, EPT, total abundance and eH'. Meanwhile the concentration of phytol, AqOH, 27 $\Delta$ 5 and SCOH were associated with Simpson index. The current findings support the combination of macroinvertebrates species composition, abundance, diversity and lipids profiles to detect land use activities at the riverine scale. While implementing catchment-based river management and conservation activities should incorporate lipid analysis as a management tool. There is need for continuous monitoring of long term trends in land use activities on the changes in lipid content of the macroinvertebrates.