**Reviewer Comments:**

l. 132-133: It is not clear from these two sentences what was measured: Should this mean that POX was measured using DOPA and peroxidase using DOPA + H2O2? Or where both enzymes measured additionally measured using another substrate? „activity of dihydroxyphenlyanaline“ –this is the substrate, not the enzyme – peroxidase activity (also figure 4)?  The substrate is abbreviated as DOPA, which is not used any more, and the peroxidase is abbreviated as DOPAH2 or DOPA-H2O2, which is explained only in the legend to Figure 4; please be consistent.  
  
l. 134f: Please explain the used indices more detailed: recalcitrant carbon in l. 134 presumably means only POX, not peroxidase or both; please include whole equation in the brackets. LCI: As far as I know, this index is derived directly from lignin and cellulose values, not enzymatic activities; please give reference for the equivalence of these indices (the paper by Sinsabaugh and Follstad Sha referenced in this sentence does not indicate LCI as a measure of enzymatic activity, as far as I can see). Please include equation for CQI (which enzyme for recalcitrant carbon is used?) and explain abbreviation.

**Submitted Text:**

Biofilm collected from tiles deployed in the buried and open reaches was analyzed for extracellular enzyme activities (EEA). Microbial assemblages produce extracellular enzymes to degrade organic matter and to acquire nutrients from their environment, and the activity of those enzymes serves as an index of environmental resource availability (Sinsabaugh & Foreman, 2001). Acquisition of labile carbon compounds was measured as -D-glucosidase (BG) activity, and acquisition of recalcitrant carbon compounds was measured as polyphenol oxidase (POX) activity using the DPOA assay (Sinsabaugh & Foreman 2001; Sinsabaugh & Follstad Shah 2011). A biofilm carbon quality index (CQI) was estimated as:

CQI=lnPOX/(nBG+lnPOX)

where the natural logs of POX and BG are proxies for the relative abundances of recalcitrant C and labile C, respectively. The CQI is proportional to the amount of recalcitrant C in stream biofilms and thus characterizes the overall quality of the DOM pool (analogous to the lignocellulose index or LCI) whereby values greater than 0.5 indicate greater effort to acquire recalcitrant carbon and values less than 0.5 indicate greater effort to acquire labile carbon (Sinsabaugh & Follstad Shah, 2011). Nitrogen acquisition was measured as the activity of -N-acetylglucosaminidase (NACE: EC 3.2.1.50; Sinsabaugh & Foreman 2001.

**Reviewer Comments:**

l. 198: Using molecular methods (qPCR) indicates that samples should be taken under sterile conditions. Was this removal using a toothbrush sterile?

**Submitted Text:**

We deployed unglazed clay tiles for six weeks at all sites to provide a standardized surface for algae and bacteria to colonize. Biofilm on tiles was removed with a toothbrush and razor blade, rinsed into a bottle with site water, and stored on ice until analysis. Subsets were analyzed for algal abundance using a Palmer-Maloney counting cell (Charles, Knowles & Davis, 2002), total bacterial counts using qPCR, and extracellular enzyme activity assays. Detailed methods for these analyses are described in Beaulieu *et al.* (2014).

**Can you confirm this revision?**

**Reviewer Questions**

l. 86-88, 197: How many samples were taken? One per stream, reach and season (18) or were replicates analysed? How many clay tiles per site (here or in l. 197)? Six weeks (l.197) or >6 weeks (l. 88)?

**My revision**

We collected one water sample from the downstream and upstream end of each buried and open reach of each stream (n=36) to characterize dissolved organic matter quality in summer and autumn 2011 and in spring 2012. Concurrently, we collected biofilms for extracellular enzyme activity analysis from unglazed clay tiles that had been deployed in the streams (n=X per stream) for 6 weeks.