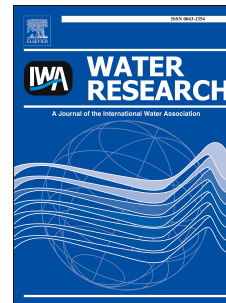


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Electron bifurcation mechanism and homoacetogenesis explain products yields in mixed culture anaerobic fermentations

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# 1     **Electron bifurcation mechanism and homoacetogenesis explain products** 2                                   **yields in mixed culture anaerobic fermentations**

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## 14    **ABSTRACT**

15    Anaerobic fermentation of organic wastes using microbial mixed cultures is a promising avenue  
16    to treat residues and obtain added-value products. However, the process has some important  
17    limitations that prevented so far any industrial application. One of the main issues is that we are  
18    not able to predict reliably the product spectrum (i.e. the stoichiometry of the process) because the  
19    complex microbial community behaviour is not completely understood. To address this issue, in  
20    this work we propose a new metabolic network of glucose fermentation by microbial mixed  
21    cultures that incorporates electron bifurcation and homoacetogenesis. Our methodology uses  
22    NADH balances to analyse published experimental data and evaluate the new stoichiometry  
23    proposed. Our results prove for the first time the inclusion of electron bifurcation in the metabolic  
24    network as a better description of the experimental results. Homoacetogenesis has been used to  
25    explain the discrepancies between observed and theoretically predicted yields of gaseous H<sub>2</sub> and  
26    CO<sub>2</sub> and it appears as the best solution among other options studied. Overall, this work supports  
27    the consideration of electron bifurcation as an important biochemical mechanism in microbial

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