

## Microbial yield estimation for anaerobic biodegradation of polycyclic aromatic hydrocarbons

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### Abstract

Anaerobic degradation of polycyclic aromatic hydrocarbons(PAHs) is great importance in the use of in situ bioremediation technologies. The stoichiometric relationships in anaerobic conditions for the microbial degradation of some PAHs were estimated theoretically using a half-reaction method based on microbial energetics. The group contribution theory for the estimation of the standard free energy of formation and the modified half-reaction method were applied. Naphthalene, fluorene, and phenanthrene as electron-donor substrates and nitrate, sulfate, carbon dioxide, Mn(IV), and Fe(III) as electron-acceptor substrates were used in the stoichiometric calculations. The cell yield, electron acceptor requirement, nitrogen requirement, and mineralization ratio were obtained from the overall stoichiometry. The results in anaerobic conditions were compared with those in aerobic conditions also. Additional electron-donor substrates including acetate, glucose, n-decane, hexadecane, and toluene were estimated and compared to the results in the literature. The theoretical yield values were compared to the data obtained from anaerobic treatment experiments.

### References

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