

Preface

You will be astonished when I tell you what this curious play of carbon amounts to. A candle will burn some 4, 5, 6, or 7 h. What, then, must be the daily amount of carbon going up into the air in the way of carbonic acid! ... Then what becomes of it? Wonderful is it to find that the change produced by respiration ... is the very life and support of plants and vegetables that grow upon the surface of the earth.

*Michael Faraday,
Course of Six Lectures on
the Chemical History of a
Candle, 1861.*

Once a marvel, now a nightmare. What a nice balance that has been observed by Michael Faraday in 1861: burning a candle produces carbon dioxide (CO₂), a greenhouse gas, which in turn feeds plants, algae and later all life. This equilibrium was perfect because at that time candles were made with renewable resources such as beeswax and tallow from beef and mutton fat (<http://en.wikipedia.org/wiki/Candle>). In other words the amount of carbon entering the atmosphere as CO₂ was balanced by the amount of carbon fixed by plants and algae. Now candles are made with paraffin wax from fossil fuels that are non-renewable on a human time scale. There would be no real issue if only a couple of fossil fuel candles were burning because plants could still absorb the excess atmospheric CO₂. However the burning of fossil fuels by society has increased too fast for plants to capture CO₂, resulting in the fast increase of atmospheric CO₂ concentrations, and, in turn, global warming (http://en.wikipedia.org/wiki/Keeling_Curve). Noteworthy this trend has been foreseen as early as 1889 by the Nobel prize Svante Arrhenius who pointed out a ‘greenhouse effect’ in which small changes in the concentration of CO₂ in the atmosphere could considerably alter the average temperature of a planet. There is thus an urgent need to use biofuels, to decrease CO₂ emissions and to sequester carbon in plants, waste, soils, sediments, and other materials (Fig. 1).

This book presents advanced reviews on carbon management, pollutant toxicity and remediation. Chapters 2, 3 and 6 review methods to address global warming



Fig. 1 Greenhouse gas emission sampling from a compost pile (*left*, Sánchez et al. This book). Crops for bioenergy: Giant Miscanthus in New Zealand (Renquist and Keckhoffs, DOI 10.1007/978-94-007-5449-2_5, 10.1007_s13593-012-0114-9)

by limiting CO_2 , CH_4 and N_2O emissions from organic wastes, using biofuels and photochemical reduction of CO_2 . Chapters 1, 5 and 10 discuss water pollution by chlorine by-products and fluoride, then propose remediation tools and alternatives. Agricultural pollution by heavy metals, selenium and transgenes are addressed in chapters 5, 7 and 8. Chapter 9 details air pollution by foundries, and propose control methods.

Thanks for reading

Eric Lichtfouse¹, Jan Schwarzbauer and Didier Robert

Founders of the journal Environmental Chemistry Letters and of the European Association of Environmental Chemistry

E-mail: Eric.Lichtfouse@dijon.inra.fr, Jan.Schwarzbauer@emr.rwth-aachen.de, Didier.Robert@univ-lorraine.fr

¹ Author of the best-selling textbook “Scientific Writing for Impact Factor Journals”

CO₂ Sequestration, Biofuels and Depollution

Lichtfouse, E.; Schwarzbauer, J.; Robert, D. (Eds.)

2015, XIII, 388 p. 48 illus., 29 illus. in color., Hardcover

ISBN: 978-3-319-11905-2