

Scrambling for climate change solutions

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The food industry generates a lot of waste products, but one of these, eggshells, could help combat climate change, according to research published in the *International Journal of Global Warming* this month.

Basab Chaudhuri of the University of Calcutta and colleagues have demonstrated that the membrane that lines an eggshell can absorb almost seven times its own weight of the [greenhouse gas](#) carbon dioxide from the atmosphere. The carbon dioxide thus trapped could be stored in this form until energy-effective methods of using the gas could be found that would not compound the environmental problems associated with [carbon emissions](#). Carbon dioxide is widely used in the chemical industry for the preparation of a wide range of products as well as in some settings as an alternative to toxic solvents. It might also one day be possible to efficiently convert trapped carbon dioxide into a clean fuel.

[Atmospheric carbon dioxide](#) levels have been rising since the mid-nineteenth century when fossil fuels - coal, oil, and gas - first began fuelling the industrial revolution. The rise in average global temperatures seen in recent decades is due mainly to the increasing concentration of greenhouse gases in the atmosphere. In 2005, carbon dioxide levels were more than a third higher than they had been prior to the industrial revolution; rising from 280 parts per million by volume of gas to 381 ppm. As of October 2010, the concentration is 388 ppm. To put these numbers into perspective, almost 300 billion tonnes of carbon have been released into the atmosphere through the burning of fossil fuels and cement production since 1751, but half of this carbon has been released since the mid-1970s.

The Calcutta team explains that eggshell comprises three layers, a cuticle on the outer surface, a spongy calcium-containing middle layer and inner layer. The second and third layers are composed of protein fibers bonded to [calcium carbonate](#). The membrane is just below the shell and is about 100 micrometers thick. Separating the membrane from the cuticle is currently not an efficient process. But, given that India alone consumes 1.6 million tonnes of eggs each year, there is certainly an incentive for improving on this situation in order to use the membrane material in [climate change](#) amelioration.

Chaudhuri and colleagues have demonstrated that a weak acid can be used to separate the membrane from the shell for use as a carbon dioxide adsorbant. The researchers point out that a mechanical separation method would be needed to make the process viable on an industrial scale. However, Chaudhuri also muses that we could all help reduce CO₂ levels by exposing our egg membranes to the air after eating our eggs.

More information: "Utilisation of eggshell membrane as an adsorbent for carbon dioxide" in *Int. J. Global Warming*, 2010, 2, 252-261

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