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Scientists solve marine carbon cycle mystery

From ANI

Washington, Jan 16: A new research has provided new insights into the mystery of the marine carbon cycle, which is undergoing rapid change as a result of global CO2 emissions.

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The research reveals the major influence of fish on maintaining the delicate pH balance of our oceans, vital for the health of coral reefs and other marine life.

Until now, scientists have believed that the oceans' calcium carbonate, which dissolves to make seawater alkaline, came from the external 'skeletons' of microscopic marine plankton.

This study estimates that three to 15 per cent of marine calcium carbonate is in fact produced by fish in their intestines and then excreted.

This is a conservative estimate and the team believes it has the potential to be three times higher.

Fish are therefore responsible for contributing a major but previously unrecognised portion of the inorganic carbon that maintains the ocean's acidity balance.

The researchers predict that future increases in sea temperature and rising CO2 will cause fish to produce even more calcium carbonate.

To reach these results, the team created two independent computer models which for the first time estimated the total mass of fish in the ocean.

They found there are between 812 and 2050 million tonnes (between 812 billion and 2050 billion kilos) of bony fish in the ocean.

They then used lab research to establish that these fish produce around 110 million tonnes (110 billion kilos) of calcium carbonate per year.

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Calcium carbonate is a white, chalky material that helps control the delicate acidity balance, or pH, of sea water.

pH balance is vital for the health of marine ecosystems, including coral reefs, and important in controlling how easily the ocean will absorb and buffer future increases in atmospheric CO₂.

This calcium carbonate is being produced by bony fish, a group that includes 90 percent of marine fish species but not sharks or rays. These fish continuously drink seawater to avoid dehydration.

This exposes them to an excess of ingested calcium, which they precipitate into calcium carbonate crystals in the gut.

The fish then simply excrete these unwanted chalky solids, sometimes called 'gut rocks', in a process that is separate from digestion and production of faeces.

The study reveals that carbonates excreted by fish are chemically quite different from those produced by plankton.

This helps explain a phenomenon that has perplexed oceanographers: the sea becomes more alkaline at much shallower depths than expected.

The researchers predict that the combination of increases in sea temperature and rising CO₂ expected over this century will cause fish to produce even more calcium carbonate.

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