

# Calorimetry

Calorimetry is the science of measuring quantities of heat or energy content in a substance using an instrument known as a calorimeter. Biological samples such as fish or invertebrates are dried, ground, weighed, and a subsample is placed in a calorimeter vessel or oxygen bomb. The vessel is placed in a bucket holding a known quantity of water that is surrounded by an insulated calorimeter jacket and is ignited. After combustion, the increase in temperature in the surrounding water bucket is proportional to the sample energy content and can be converted to energy density or Joules per gram (dry), which can be converted to calories per gram (wet) using the dry to wet weight ratio of the sample. A calorie is the heat energy required to raise the water temperature 1°C and is equal to 4.184 Joules. Information on energy density has been used widely in ecology and fisheries management to understand energy flow in biological systems, describe body condition, bioenergetics models used to predict fish growth or consumption, and to evaluate contaminant uptake.

## Key Citation:

Paine, R.T. 1971. The measurement and application of the calorie to ecological problems. *Annual Review of Ecology and Systematics* 2:145-164.

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