# First epigenetic insights in the diatom *Haslea ostrearia* exposed to UVR and diuron

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It has long been known that pollutants accumulate in the oceans. For instance, diuron used as weed killer in agriculture or as antifouling agent against algae in ship hull, results in considerable accumulation in seawater. Diuron inhibits photosynthesis by blocking electron transfer around PSII. It is therefore important to know the impact of this pollutant on photosynthetic organisms, especially diatoms, which are the basis of most food chains in aquatic ecosystems. Epigenetic modifications, which correspond to mechanisms that interfere with gene expression without modifying gene sequence, allow studying transgenerational impacts.

Marennine

*Haslea ostrearia*

Greening

*Haslea ostrearia*

Genome size : 100 Mb
Size : 50 ~ 120 µM
Sequenced but not published

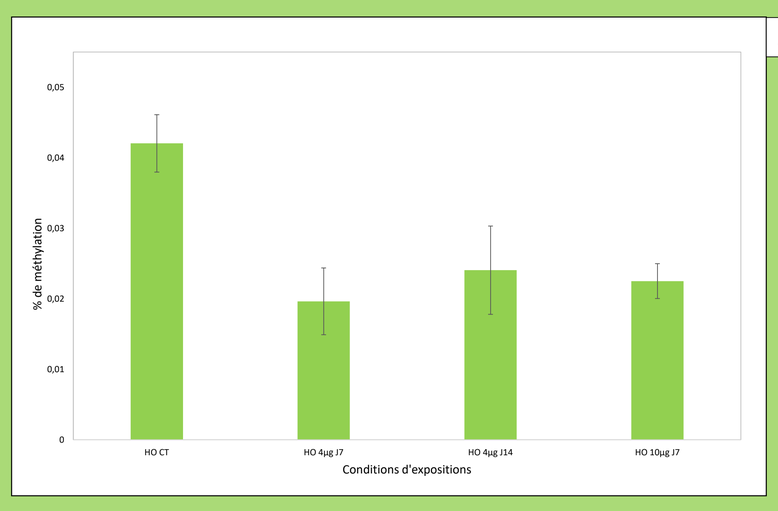
*Phaeodactylum tricornutum*

Genome size : 27,4 Mb
Size : 10 µM
Sequenced and published


5mC

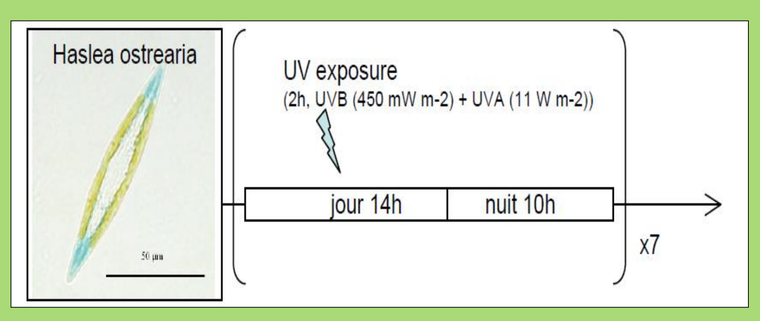

Differences in overall methylation of the genomes of *Haslea ostrearia* and *Phaeodactylum tricornutum* according to exposure conditions: CT - control without diuron; 4µgJ7 - 4 µg/L diuron 7 days exposure; 4µgJ14 - 4 µg/L diuron 14 days exposure; 10µgJ7 - 10 µg/L diuron 7 days exposure. Results are means ± SE, n=3.

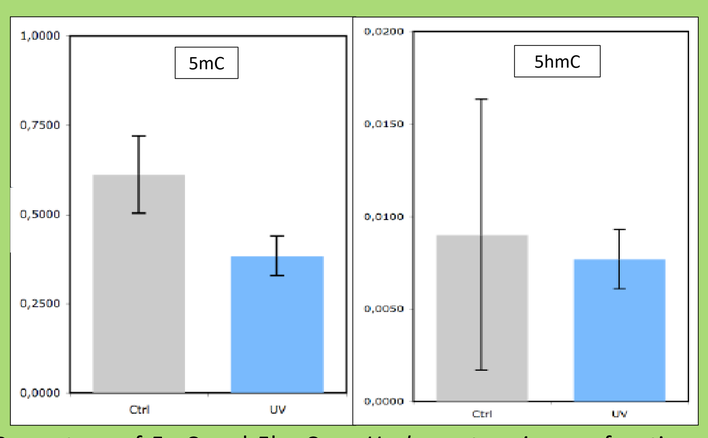
5hmC





Percentage of 5hmC on *Haslea ostrearia* and *Phaeodactylum tricornutum* species as a function of increasing diuron concentrations: CT - control without diuron; 4µgJ7 - 4 µg/L diuron 7 days of exposure; 4µgJ14 - 4 µg/L diuron 14 days of exposure; 10µgJ7 - 10 µg/L diuron 7 days of exposure. Results are means ± SE, n=3.



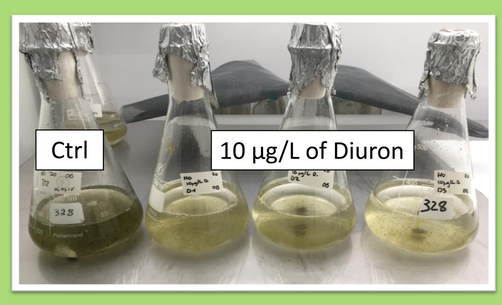




Percentage of 5mC and 5hmC on *Haslea ostrearia* as a function of increasing exposition of UVs. Results are means ± SE, n=3.

Why *Haslea* ?
It is capable of achieving sexual reproduction, which makes it possible to study transgenerational effects.

Hypomethylation of DNA in *Haslea ostrearia* and *Phaeodactylum tricornutum*.

Visible effect on cultures




*Haslea ostrearia* with 10 µg/L of diuron


*Phaeodactylum tricornutum* with 10 µg/L of diuron

DNA hypomethylation has been observed in both microalgae exposed to diuron (4 and 10 µg/L). A similar response was observed in *H. ostrearia* exposed to UV radiation. These epigenetic marks result in an overexpression of some genes, a phenomenon that, in humans, is responsible for the appearance of diseases as cancer. More studies are needed to better characterize the importance of epigenetics for gene expression in diatoms, and to estimate the impact for the food web on the longer term.

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