Sea spray exposure to man: initial risk-benefit assessment

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**Sea spray aerosol (SSA) production**

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**Biogenic products**

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**Threat: risk of “red tide aerosols”**
Adverse respiratory effects observed during specific harmful algal blooms (HABs) and high phycotoxin air concentrations (e.g. brevetoxin, okadaic acid).

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**Benefits: Biogenics hypothesis**
Regular exposure to low concentrations of biogenic compounds (e.g. polyphenolics, phycotoxins, vitamins), via SSAs, positively affect human health (Moore, 2018).

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**Quantification of harmful toxins in SSAs & human risk assessment**

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**Combination of analytical methods & approaches**

- **ICP-OES²**
- **MART¹**

**Indirect quantification**

- of okadaic acid (OA)

**Target analysis for 7 phycotoxins**

- **July 2017**
- **0.6 – 42 pg m⁻³**
- **OA dose in 43h**
- **0 ≤ 11 ng**

**OA**

- **43h exposure**
- **MTT assay**
- **IVIVE**²² of EC₅₀⁵ lung cell viability data

- **Effect level**

- **MOS⁶ = Exposure level**

- **MOS⁶ for adverse effects of 18 000x 43h of ***

**Risk assessment**

Based on the MOS (<10) for the quantified phycotoxin (OA), together with the current knowledge on toxic HABs, we do not expect a human health risk due to phycotoxins in SSAs at the Belgium coast.

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**In vitro analysis of potential benefits for natural & realistic SSA exposure**

**Dosing of SSA extract related**

- to 4x 43h
- of ***

- **SSA sampling in period with average wind speed = 15m sec⁻¹**

**Inhibited expression of:**

- PCSK9 gene
- Genes related to the mTOR pathway

**Inhibitory relation with:**

- LDL cholesterol
- Diabetis-2, cancer & inflammations

**Conclusion**

Based on this research, the current knowledge regarding HABs and the aerosolisation of marine biogenic products, we conclude that the chance of beneficial human health effects of marine biogenics in sea spray at the Belgium coast is larger than the potential risk for adverse effects.