

## Solutions to Plastics in the Ocean – the Baltic and Beyond

**Date:** 13 June (afternoon) – 14 June (full day) 2019

**Venue:** Stora hörsalen, the Swedish Museum of Natural History,  
Frescativägen 40, Stockholm

**Host:** The Environmental Committee of the Royal Swedish Academy of Sciences  
and the International Union for Conservation of Nature



The oceans are final deposits for huge quantities of plastics and there is great concern regarding its environmental impact, including the toxicity to living organisms. It has been estimated that out of twelve million tons of plastics that enters the oceans annually only 1% is found at the surface. Where and in what forms is the rest? We know that the vast majority of the plastics in the oceans is in the form of small particles, often less than a millimetre. Many of these small particles, known as micro-plastics, are produced as such, i.e. tiny plastic spheres used in body washers, toothpaste, etc. Other plastics that enter the oceans will become micro-plastics with time when they are exposed to the forces of nature that cause degradation.

Much research is focused on tracing the fate of plastics in the oceans but there are still large gaps in our knowledge about how fast plastics are degraded and which processes are at hand. For instance, how important are light radiation and microbial activity? And are the processes different for different kinds of plastics? A critical question related to micro-plastics in the marine environment is its toxicity. It is known that filter-feeding organisms ingest plastic particles that are gradually moved up the food chain when these organisms are consumed by others. It is not only the plastic polymers that constitute risks, but also many chemicals that are added during the manufacturing process have toxic effects.



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Multipronged approaches are likely to be required in order to reduce plastic pollution in oceans and other ecosystems. Novel strategies may include degradation of polymers using engineered enzymes with enhanced efficiency that have been introduced into naturally occurring organisms. Can such systems be developed for safe use?

This symposium will bring together researchers and other experts to exchange knowledge about micro-plastics in marine environments regarding distribution and toxicity. Possible solutions and ways forward to achieve degradation of plastic pollutants as well as regulations to restrict the dispersion of plastic products will be discussed. Development of pathways to solve the degradation of plastic pollutants in the oceans will be discussed including use of tertiary water treatment plants to minimize the flow of plastics. Biosafety concerns as well as financial needs will also be considered.

#### Lectures by:

- **Stefan Bertilsson**, Uppsala University
- **Bethanie Carney Almroth**, University of Gothenburg
- **Martin Hassellöv**, University of Gothenburg
- **Ignacy Jakubowicz**, Research Institute of Sweden (RISE)
- **Verena Reiser**, Novozymes
- **Joao Sousa**, the International Union for Conservation of Nature (IUCN)
- **Kristian Syberg**, Roskilde University

The symposium is free of charge and open to the public, but registration is required for all participants. Limited number of seats. For more information and registration: [www.kva.se/plasticoceans](http://www.kva.se/plasticoceans).

Please state eventual food preferences or allergies in the registration form.

This symposium is funded by Svenska Postkodstiftelsen.





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## 13 June 2019 – Day 1 – Micro-plastic distribution and toxicity

### 12.00 Registration

### 12.45 Welcome

*Dan Larhammar, President of the Royal Swedish Academy of Sciences*

### 12.55 Introduction of Symposium Objectives

*Minna Epps, Director for the Global Marine and Polar Program, IUCN*

### 13.05 Distribution of micro-plastics in the marine environment

*Martin Hassellöv, University of Gothenburg*

### 13.50 “Balticus Plasticus”: Micro-plastics in the Baltic: Outcomes of IUCN report on micro-plastic pathways, country footprints and impacts on biodiversity

*Joao Sousa, IUCN*

### 14.35 Coffee/tea

### 15.15 What do we know about the toxicity of micro-plastics in the marine environment?

*Bethanie Carney Almroth, University of Gothenburg*

### 16.00 PANEL DISCUSSION: Toxicity; human health & ocean plastics

Panel members: *Bethanie Carney Almroth, University of Gothenburg, Martin Ogonowski, Swedish University of Agricultural Sciences,*

Moderator: *Dan Larhammar, the Royal Swedish Academy of Sciences*

### 17.45 Drink for all Participants at NRM





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## 14 June 2019 – Day 2 – Exploring solutions and way forward

### 09.00 Introduction

Chair: *Martin Jakobsson, the Royal Swedish Academy of Sciences*

### 09.15 Formation of micro-plastics by degradation and their fate in the marine environment

*Ignacy Jakubowicz, RISE*

### 10.00 Coffee/tea

### 10.30 Microbes and micro-plastics in aquatic systems, is there a link?

*Stefan Bertilsson, Uppsala University*

### 11.15 Enzymes and degradation of micro-plastics

*Verena Reiser, Novozymes A/S*

### 12.00 Lunch

### 13.30 Risk assessment and regulation of micro-plastics

*Kristian Syberg, Roskilde University*

### 14.15 PANEL DISCUSSION: **Bioengineered solutions; microbial and fungal enzymatic degradation** Panel members: *Kari Koivuranta, Principal Scientist at VTT Finland, Stephanie Wright, Kings College, London.*

Moderator: *Carl Gustaf Lundin, IUCN*

### 15.30 Concluding remarks and Next Steps

*Leif Anderson, the Royal Swedish Academy of Sciences and Carl Gustaf Lundin, IUCN*

