EUropainfo

DAS MAGAZIN DES EU-UMWELTBÜROS 1/15

Mit einem Exklusivbeitrag von EU-Kommissar Karmenu Vella

Mikroplastik & Umwelt

P.b.b., Verlagsort 1080 Wien, Zulassungsnummer: GZ 09Z038176 M

EU Umweltbüro

Sehr geehrte Damen und Herren!
Liebe Leserinnen und Leser!

Wir leben im Zeitalter des Plastiks. Seit der Entwicklung der ersten synthetischen Polymere gegen Ende des 19. Jahrhunderts hat Plastik in allen Bereichen unseres Lebens Einzug gehalten.

Plastik ist billig, langlebig und komfortabel für uns. Die Schattenseiten wurden lange ignoriert. So wird die Langlebigkeit von Plastik zu einem großen Problem, wenn es in die Umwelt gelangt, wo es sich schlussendlich im Meer ansammelt. Langlebigkeit bedeutet aber nicht, dass es sich nicht verändert: Verschiedene Prozesse führen dazu, dass größere Plastikteile zu sogenanntem Mikroplastik, also Plastikpartikeln kleiner als 5 mm, zersetzt werden. Diese Mikroplastikpartikel sind besonders problematisch, weil sie von vielen Organismen aufgenommen werden und Schadstoffe an ihre Oberfläche binden.

Das Ausmaß und die Folgen von Mikroplastik sind schwer abschätzbar: Standardisierte Methoden zur Analyse fehlen oder werden von der Industrie erfolgreich verhindert, potenzielle Auswirkungen auf Ökosysteme und Organismen sind komplex und schwierig zu erheben. Erschwert wird die Forschung dadurch, dass Mikroplastik nicht gleich Mikroplastik ist – in Wahrheit handelt es sich um ein extrem heterogenes Gemisch aus Partikeln mit verschiedensten Eigenschaften.

Warum gerade jetzt ein EUropainfo zu Mikroplastik? Im letzten Jahr gelangte das Thema zunehmend in den Fokus der Öffentlichkeit, der Wissenschaft und Politik. Auch auf europäischer Ebene entsteht langsam Bewegung: Auf Initiative Österreichs fand im Mai 2015 eine Konferenz zum Thema „Eliminating Plastic and Microplastic Pollution – an urgent need" statt, bei der Stakeholder diskutierten, wie ein EU-weites Vorgehen gegen Mikroplastik erreicht werden kann.

In dieser EUropainfo-Ausgabe wird das Thema Mikroplastik von vielen Seiten beleuchtet. Im ersten Teil wird der aktuelle Stand zu **Ausmaß, Quellen und Folgen von Mikroplastik in der Umwelt** präsentiert. Im zweiten Teil wird, unter anderem von **EU-Umweltkommissar Karmenu Vella**, erläutert wie **Politik und Umwelt-NGOs** dem Problem der Mikroplastik-Verschmutzung begegnen und welche Maßnahmen dringend gesetzt werden müssen.

Mit freundlichen Grüßen,

Bernhard Zlanabitnig
Leiter EU-Umweltbüro

Die hier vertretenen Meinungen der AutorInnen sind nicht notwendigerweise die des EU-Umweltbüros.

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Microplastic – A View from Marine and Freshwater Systems

Plastic and microplastic in aquatic system are a serious environmental problem that has only recently become a focus of scientific interest. To address the problem of plastic pollution at European level, we need a consistent scientific approach and systematic monitoring. Furthermore, coordinated action is required to combat plastic pollution at European and global level. A first step has already been taken with the development of global and regional action plans. By Stefanie Werner und Jan Koschorreck

Microplastic: Definition, Freshwater Systems and Sources

Plastics in the aquatic environment include microplastic particles (< 5 mm), mesoplastic particles (5-25 mm) and macroplastic particles (> 25 mm). First reports on litter in the marine environment were published in the 1960s. Since then, the reported quantities of marine litter have increased tremendously. Marine litter is dominated by plastics and it has been estimated that a minimum of 5.25 trillion plastic particles weighing 268,940 tons are afloat in the sea (Eriksen et al. 2014). These numbers do not include litter on the seafloor and litter that has been washed on beaches or is bound in biota. In a time series conducted in the North Atlantic, plastic debris was identified in 62 % of surface plankton net tows, with plastic particles reaching maximum densities of 580,000 particles per km2 (Law et al. 2010). A study carried out in the Baltic Sea found up to 4 fibres and 32 other anthropogenic micro-litter particles per liter seawater (Magnusson & Noren 2011). A ratio of microplastic particle to zooplankton of 1:2 has been observed in accumulation areas in the North Western Mediterranean (Collignon et al. 2012). Ingestion of microplastics has been verified for more than 250 marine species. Beside physical consequences such as internal blockages and injuries, the consequences of exposure to chemicals associated with plastics are currently being investigated.

Unlike plastic pollution in marine systems, which has been receiving attention for some time, plastic in freshwater environments has only recently become a matter of interest. To this date, only a small number of European freshwaters systems have been systematically investigated for plastic contamination, with most of the exposure data coming from Central Europe and Scandinavia. Just recently, the first screening report on pollution from plastic litter in EU rivers and its inputs into four regional seas was published for the European Commission (van der Wal et al. 2015). The available data indicate the widespread exposure of rivers and lakes to plastic fragments, and have triggered increasing attention from scientists and regulators as well as the media and the public. Several academic and governmental institutions worldwide are now working on research projects about plastics in the freshwater environment.

Primary microplastic particles are manufactured and can enter the environment from several sources (e.g. cosmetics, clothing, industrial processes). Secondary microplastic particles are derived from the breakdown of larger plastic particles in the aquatic environment, and from land-based sources such as tire abrasion from road traffic. Microplastic particles enter the marine environment from a variety of sources including inputs from rivers, sewage treatment plants and stormwater overflows; however the majority originates from the degradation of larger plastic litter.

Action Plans and Research Needs

The urgency to act is widely recognized by international and regional groups such as the Group of Seven (G7), the UN Conference on Sustainable Development (Rio+20), and the Regional Seas Conventions for the Protection of the North-East-Atlantic, the Baltic and the Mediterranean Sea (OSPAR, HELCOM, MEDPOL), which committed themselves to strive for substantial reductions of marine litter. Accordingly, Regional Action Plans to combat land- and sea-based sources and to remove existing litter from the marine environment have been adopted in recent years. On the occasion of the G7 summit on 7/8 June 2015, the G7 countries have agreed on an Action Plan as well. At European level, the Marine Strategy Framework Directive calls on EU Member States to prevent and reduce marine litter by 2020 to ensure that it causes no harm to the coastal and marine environment.

To ensure that measures to combat plastic pollution are suitable and effective, continuous monitoring data and a consistent scientific approach to assess the extent of pollution through consideration of ecological effects and impacts are required. Both are currently lacking for freshwater environments, and to a lesser extent also for marine systems. Size definitions and standard operating procedures for sampling and analysis of plastics are currently insufficiently developed for the marine environment, and not available for freshwater systems. There is work ongoing to improve these deficiencies, but more coordinated effort is needed to achieve a coherent approach valid for the aquatic environment. In addition, discussions on reliable monitoring data, sources, effects, and potential action plans are needed among the various stakeholders in this field, but also under consideration of other relevant media such as soil and air, including scientists, plastic producers and downstream users, water resource managers, waste managers, policy makers and the public.
Further research priorities from the

perspective of water protection include:

- the degradation of different types of plastic to microplastic particles in marine and freshwater environments;
- the extent and composition of micro- and macroplastic in lakes and rivers;
- the effluent- and land based sources of micro- and macroplastic;
- potential effects of micro- and macroplastic in limnic and marine food-webs;
- contribution of riverine micro- and macroplastic to the marine compartment;
- the risk for transportation of invasive species through floating litter;
- the standardization of monitoring protocols. ●

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Overview and Prioritization of Microplastic Sources and Emissions

Microplastics in the environment, and their potential harmful effects on ecosystems and organisms, have received increasing attention in the past years. We have conducted a study to evaluate the most important sources of microplastic and to identify measures that could be taken to reduce microplastic pollution. Although our study refers to the situation in the Netherlands, we believe that the results can serve as an indicator for important sources of microplastic on the European level.

By Anja Verschoor

The National Institute for Public Health and the Environment (RIVM) in Bilthoven conducted a study[1] in 2014 to evaluate the most relevant sources of microplastic in surface water bodies in the Netherlands, and to identify the most effective and feasible measures that can be taken to reduce microplastic pollution. Experts from the RIVM, the state agency Rijkswaterstaat and the independent research institute Deltares followed a systematic approach to indicate and prioritize microplastic sources. Our focus was on land-based sources, which are responsible for about 80 % of the microplastic found in surface water. Although our study refers specifically to the situation in the Netherlands, we believe that the results can also serve as an indicator for important sources of microplastic in other EU countries.

Selection of Sources

To this date, there is no generally accepted definition of the term „microplastic“ in the scientific community. Most studies agree on an upper limit of 5 mm for the particle diameter, which is also the size limit that was chosen for our study. Primary microplastic particles are those particles that are manufactured intentionally and added to products such as cosmetics to serve as abrasives, thickeners or carriers of active ingredients. Secondary microplastics, on the other hand, are particles that are formed by the breakdown and wear of larger plastic debris or products.

Our study took into account both primary and secondary sources. Likely sources of microplastic were selected from the Dutch National Emission Registration, which is a template containing more than 15.000 products, production processes or routes that can result in the emission of all kinds of substances to water (see Figure 1). The list was supplemented with sources mentioned by experts and information in the literature and on the internet. By integrating this information, we selected 56 sources, activities or routes that we considered most important for the release of microplastics into the environment. Each source was then coupled to an intervention target or an actor, for instance water treatment plants, consumers or the industry.

Prioritization

We performed a Multi Criteria Analysis (MCA) to assign a priority to each microplastic source. The MCA included relevance (volume of emission), feasibility of measures (alternatives, possibility of „quick win“) and perceived urgency (media attention, action perspectives for consumers[2]). A group of experts assigned scores (0, 1 or 2) to the criteria that reflected low, medium or high relevance, feasibility and urgency. The scores were combined with a total score from 0 to 10 to determine the priority of the respective microplastic source. A high score indicated a high priority.

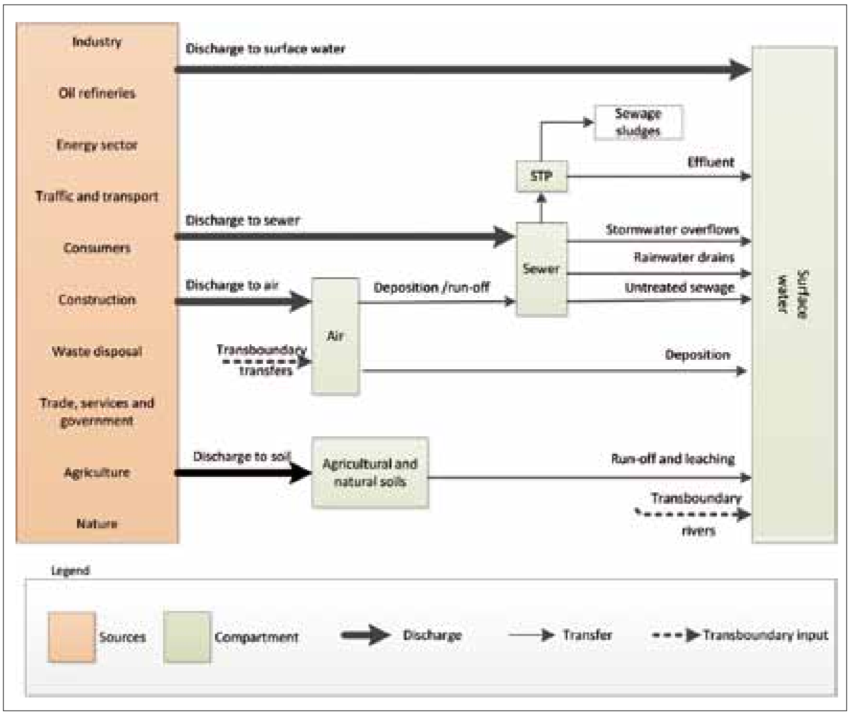

Figure 1: Sources and routes of plastic and microplastic to surface water (http://www.emissieregistratie.nl). The figure shows the most important sources of plastic/microplastic and how it is transported to surface water. „STP“ refers to Sewage Treatment Plant.

Conclusions

Our results show that the largest source of secondary microplastic emissions in the Netherlands is plastic debris, which consists largely of packaging materials and disposable products (score 8-9 on the 1-10 scale). Other sources of secondary microplastics with a relatively high score (6-7) were fibers and textiles, roadway runoff (including tire dust), dust from construction sites, agricultural plastic and input from abroad via rivers. Waste water, sewage sludge and compost (score 6) contain primary as well as secondary microplastic from sources with emissions to the sewer system. Important examples are household emissions of fibers through the washing machine and of microbeads used for personal care and cosmetic purposes (score 7). The emission of microplastics from toys and party accessories, such as balloons, was also estimated to be relatively high, but received a lower priority (score 4) on account of the low risk perception and the high action perspectives of consumers. With regard to primary microplastics, the highest priorities were assigned to cosmetics and pigments in paints, followed by microbeads used for polishing or cleaning.

Our study provides a quick overview and prioritization of microplastic sources based on the emission volume and on the feasibility of countermeasures. It can therefore serve to support decisions about suitable policy measures of governments and other policymakers to reduce microplastic pollution in the environment. We recommend follow-up studies to receive more detailed process- and industry-specific information as well as monitoring data on sources that have been assigned a high priority. ●

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[2] *Action perspectives include the options that consumers have to prevent an emission. This requires that they know that (micro) plastics are contained in the product, that they may avoid the product or choose an alternative product, or that they have access to proper waste disposal facilities.*

Foto: © Universalmuseum Joanneum/flickr

Es fließt, es fließt... Plastik in der Donau

40 Tonnen Plastik transportiert die Donau jährlich bei Hainburg. Zu diesem Ergebnis kommt die europaweit einzigartige Studie „Plastik in der Donau" des österreichischen Umweltbundesamtes, der Wiener Universität für Bodenkultur und ViaDonau. Die ForscherInnen analysierten, wieviel Plastik die Donau in Österreich befördert und woher es stammt. Im Fokus stand Mikroplastik in einer Größenordnung größer 0,5 mm.
Von Karl Kienzl

Aktuelle Studien zeigen, dass etwa 80 Prozent des Plastiks in den Meeren über Flüsse dorthin transportiert wird. Probleme machen vor allem kleine und kleinste Kunststoffteilchen, die sich in der Nahrungskette anreichern und letztlich im Menschen landen können.

Doch woher stammt dieses Plastik und welche gesundheitlichen und ökologischen Auswirkungen hat es? Die Datenlage dazu ist in Europa noch sehr schwach. Vor allem Untersuchungen in der fließenden Welle, das heißt in Quer- und Tiefenprofilen von Fließgewässern, fehlen oder wurden mit unterschiedlichen Methoden analysiert und liefern daher keine vergleichbaren Daten. Neue Maßstäbe setzt die Studie „Plastik in der Donau" von Umweltbundesamt, Universität für Bodenkultur und ViaDonau. Sie ist die europaweit erste, bei der die Probensammlung systematisch quer über die Breite der Donau und bis in die Tiefe erfolgte.

Mikroplastik – Kein kleines Problem

Im Auftrag des Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft und der Bundesländer Oberösterreich, Niederösterreich und Wien untersuchten die ExpertInnen den Plastikgehalt der Flussproben und analysierten mögliche Eintragspfade. Da es keine international anerkannte Methodik zur Messung von Kunststoffpartikeln in Fließgewässern gibt, wurde von der Universität für Bodenkultur eine geeignete und wiederholbare Methodik entwickelt, getestet und angewendet. Außerdem wurde bei unterschiedlichen Wasserständen gemessen, um die zeitlichen Unterschiede beim Plastiktransport zu ermitteln. Die Messungen wurden in Aschach (OÖ) und Hainburg (NÖ) durchgeführt. Die Ergebnisse zeigen, dass bis zu 40 Tonnen Plastik jährlich über die Donau aus Österreich abtransportiert werden. Die Menge der gefundenen Kunststoffe ist stark vom Durchfluss abhängig. Bei Niedrigwasser war der Transport in Aschach und Hainburg etwa gleich. Bei höherem Durchfluss wurde in Hainburg mehr transportiert.

Etwas mehr als zehn Prozent des analysierten Mikroplastiks stammen aus industriellen Prozessen. Der Großteil dieser Kunststoffpartikel kommt jedoch aus diffusen Quellen. Das Plastik gerät zum Beispiel durch unachtsames Hantieren, absichtliches Wegwerfen oder über Windverfrachtung in die Umwelt. Durch mechanische Einflüsse wird es zerkleinert, landet im Abwasser und gelangt durch Abschwemmungen in die Flüsse.

Vom Meer auf den Teller?

Studien zu Auswirkungen von Plastik bzw. Mikroplastik auf Lebewesen im Süßwasser sind kaum verfügbar. Ökologische Auswirkungen auf die Tierwelt sind im marinen Bereich beschrieben. Die Effekte reichen von physikalischen Auswirkungen (Strangulieren, Verschlucken etc.) bei größeren Plastikteilchen bis zu physiologischen Effekten bei kleinem Mikroplastik. Zur Wirkungsweise von Mikroplastik bestehen Wissenslücken. Die untersuchte Stichprobe von Donaufischen war frei von Plastikteilchen.

Europäische Antworten gefordert

Da Flüsse – und das Plastik, das sie transportieren – nicht vor Ländergrenzen Halt machen, forciert Österreich gemeinsam mit anderen EU-Ländern europaweite Maßnahmen zur Eliminierung der Plastikverschmutzung in Flüssen und Meeren. Als wichtiger Schritt auf dem Weg zu einem gemeinsamen Vorgehen fand am 11. und 12. Mai 2015 die Konferenz „Eliminating Plastic and Microplastic Pollution – an urgent need" in Brüssel statt, bei der neben dem österreichischen Umweltminister Andrä Rupprechter auch Karmenu Vella, EU-Kommissar für Umwelt, Meerespolitik und Fischerei, sowie VertreterInnen der Industrie, des Netzwerks der europäischen Umweltagenturen, der EU-Kommission und von NGOs teilnahmen und konkrete Schritte diskutierten. Ziel ist eine europaweit koordinierte Vorgehensweise zur drastischen Reduktion von Plastik in der Umwelt. ●

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Microplastics: Exposure of the Environment and Humans

Plastic litter and microplastic particles represent a hazard to many organisms. To assess any potential risks of microplastics to human health is a special challenge. Some plastic types consist of monomers that are classified as mutagenic or carcinogenic, and plastics are known to adsorb many organic and inorganic contaminants. The implications for human health issues are unclear, but a perspective on the issue should be maintained.

By Scott Lambert

It has been recognised for some time that the high production and consumption of plastic materials has led to large volumes of plastics entering the environment. From the early 1970s to the present, concerns have been raised that plastics represent a hazard to organisms through entanglement, ingestion, suffocation, and general debilitation. Indeed, the recent leaders' declaration from the G7 summit (June 2015) in Germany stated the following regarding marine litter: „We acknowledge that marine litter, in particular plastic litter, poses a global challenge, directly affecting marine and coastal life and ecosystems and potentially also human health.“

Accordingly, increased effectiveness and intensity of work is required to combat marine litter striving to initiate a global movement. The G7 commits to priority actions and solutions to combat marine litter (...), stressing the need to address land- and sea-based sources, removal actions, as well as education, research and outreach. „Further to this, once in the environment weathering processes act to cause plastic materials to disintegrate into increasingly smaller particles that are commonly termed 'microplastics'.“

Microplastics and Potential Risks for Human Health

Assessing any potential risks of microplastics to human health represents a special challenge. The toxicological profiles of several monomers and additive compounds used in the production of certain plastic types are generally well known. Plasticised PVC is often considered the most hazardous of plastics because of its high chloride and additive content, and the formation of dioxins during manufacturing and incineration processes.[1] In a recent environmental and health hazard prioritization exercise, Lithner et al.[2] evaluated 55 polymers based on a hazard ranking model of their monomers. This model used hazard classifications based on the EU Classification, Labelling and Packaging Regulation (CLP) that reflect the hazardous properties of a substance. The polymers that ranked as most hazardous were made of monomers classified as mutagenic and/or carcinogenic and belong to the polymer families of polyurethanes, polyacrylonitriles, polyvinyl chloride, epoxy resins, and styrenic copolymers.[2]

The ingestion of microplastic particles by plankton-feeding species creates the potential for these particles to be passed up the food chain. Evidence that this occurs is seen from microplastics recovered from fur seal scats on Macquaire Island.[3] It was hypothesized by the authors that these particles were consumed by a pelagic fish species, Electrona subaspera, which were then consumed by fur seals.[3] The studies that have investigated the occurrence of plastics in fish[4,5] and larger marine species[6] generally examine the stomach and intestine content, but since these are organs that are not usually eaten by humans, conclusions cannot be made on the human exposure of microplastics through this route.

Plastics are also known to sorb co-occurring organic contaminants, such as polycyclic aromatic hydrocarbons, and polychlorinated biphenols, to a high degree.[7,8] These compounds can cause chronic human health effects, including disruption of the hormonal system. Other compounds such as the chlordanes, DDT, and heavy metals such as mercury, zinc, and lead, have also been found to adsorb to microplastics.[9,10]

Long-term Effects Unclear

What remains unclear is, once microplastics are ingested by an organism, to what extent their additive compounds, and any sorbed co-occurring contaminants, leach into tissues and what are the long-term toxicity issues for organisms. A study by Browne et al.[11] using the mussel Mytilus edulis indicated that small microspheres (3.0 µm) can be translocated from the gut to the circulatory system within three days and then persist in circulation for over 48 days. The short-term exposure used in this study did not find any significant biological effects. However, environmental exposure will occur over a longer time period and the formation of microplastics in this size range during plastic degradation is highly likely.[12]

The implications for human health issues in relation to these matters are unclear, but a perspective on the issue should be maintained. There is now a large and growing body of literature dealing with the human health issues of engineered nanoparticles, and a lot could be learned from this area of research as to any potential health effects of submicron plastic particles. ●

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Microplastic in Freshwater Ecosystems – Can we Expect Ecotoxicological Effects in Aquatic Biota?

The plastic age started in 1907 with the development of Bakelite, a completely synthetic polymer, by the chemist Leo Baekeland. Since then, more than 20 different groups of plastics in even more varieties were developed, leading to the use of approximately 260 million tons of plastic per year. Within the past few years, the effect of plastic particles on our environment, organisms, and finally human health, came into the focus of research. Besides accumulation of microplastic in biota, it is necessary to understand its effects in the field of ecotoxicology in order to identify research gaps and help decision makers to set the necessary priorities. By Stephan Pflugmacher

Microplastic is becoming an increasing concern and therefore a prominent research focus. To understand possible ecotoxicological effects, we first have to define what microplastic is. Plastic origin or size can be used as a defining parameter.

By definition, the upper size limit for classification as microplastic is 5 mm (Wagner et al., 2014). In addition, a lower size limit needs to be established to distinguish microplastic particles from nanoparticles; here, a lower size margin of 333 µm has been suggested due to detection limits (Arthur et al., 2009).

The so-called primary microplastic is manufactured intentionally, e.g. resin pellets or additives for personal care products, whereas secondary microplastic is a degradation product of larger plastic items formed by mechanical events (waves) or UV light. What we call microplastic is really a highly heterogeneous group: the composition of microplastic particles depends not only on polymer types and ingredients of the plastic, but also on environmental conditions that influence the breakdown process, the most important factors being time and UV light intensity. Hence even microplastic particles created from the same original compound can have different effects.

Microplastic fragments and particles can be ingested by many aquatic organisms. For the marine environment, ingestions were already proved in vertebrates such as seals (Eriksson & Burton, 2003), in invertebrates such as bivalves (Ward & Shumway, 2004, von Moos et al., 2012), sea cucumber (Graham & Thompson, 2009) and crustaceans (Murray & Cowie, 2011).

The aim of the present study was to investigate the effects of microplastic ingestion on the physiology of the freshwater clam Corbicula javanicus, specifically looking at biotransformation and the oxidative stress enzyme system. To this end, we investigated the activities of the glutathione S-transferase (GST) system (biotransformation) and of the catalase system (oxidative stress) after exposure of the clams to plastic particles.

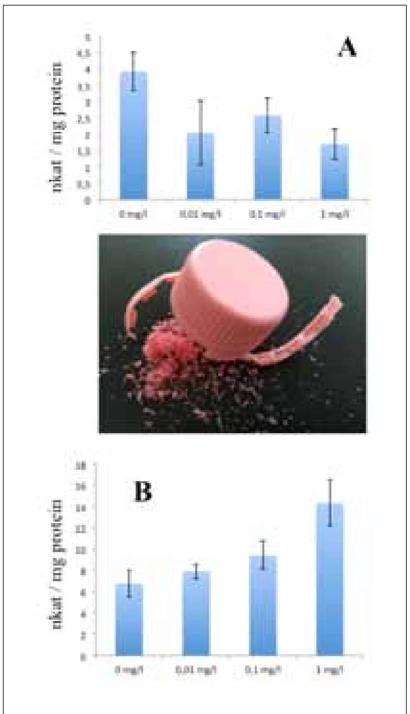

Figure 1: Activity of (A) cytosolic glutathione S-transferase (GST), an enzyme involved in biotransformation reactions, and (B) catalase, an enzyme involved in oxidative stress response, in the clam C. javanicus exposed to different amounts of microplastic particles. The activity of GST was inhibited in exposed clams compared to untreated controls, whereas the activity of catalase was elevated.

The used microplastic, at a particle size of < 5 mm, was made out of commercially available polypropylene plastic bottle lids (pink colour) by mechanical pulverization with liquid nitrogen. The clams (60 individuals) were exposed to microplastic „concentrations" of 0.01, 0.1 and 1.0 mg/L for 24 hours. The enzymes were then extracted from whole clam tissue and their activity was determined photometrically.

Results and Discussion

Exposure of the clams to three different amounts of microplastic resulted in an inhibition of the glutathione S-transferases (GST). This inhibition was dose-dependent and resulted in a decrease of GST activity by more than 50 % in clams exposed to 1.0 mg/L microplastic (Fig. 1a). As GSTs are an important part of the biotransformation enzyme system, which is responsible for the detoxification of organic contaminants (such as microplastics), this inhibition might be very contraproductive for exposed organisms in the long term.

In contrast, the activity of catalase was elevated by 35 % in the treatment with the highest microplastic concentration compared to untreated controls. This elevation of catalase activity was dose-dependent as well: the effect increased with increasing microplastic concentration (Fig. 1b). Elevation of catalase activity suggests oxidative stress, which the organisms developed after the uptake of the microplastic into their intestine.

Exposure to microplastic was thus shown to have an effect on the activity of both measured enzymes. But now the „Big Bang" questions are really only starting:

- Do the effects come from the microplastic itself, or from compounds leaching out of the plastic or bound to the plastic surface? Brominated compounds that are used in plastic production are known to inhibit the activity of GSTs (Ploemen et al., 1993), so the observed inhibition might actually be an effect of such chemicals leaching out of the microplastic. The elevation of catalase, on the other hand, could be caused by the leaching of bisphenol A, a compound frequently used in plastic products (Talsness et al., 2009) that has already been shown to increase catalase activity (Kharrazian, 2014).
- Do the observed effects come from inflammation reactions that are the result of mechanical injuries caused by ingestion of microplastic? Inflammation goes hand in hand with the production of reactive oxygen species (ROS), the starting point of oxidative stress. Catalase is one enzyme to combat this stress, which could explain the elevated activities in exposed clams (Thring et al., 2011).
- Do these effects originate from physiological side effects, such as disturbed or inhibited digestion? Will we see the same effects with aged microplastic particles, or are these effects only seen using „fresh" microplastic?
- Do the effects depend on the leaching time and concentration?

More experiments are definitely needed to clarify at least some of these questions – and more questions will arise as more research is done. Interesting times are ahead within this plastic age. ●

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Acknowledgement
The author would like to thank Lucille Buchenhorst and Tamara Knecht for great laboratory work, as well as Dr. Maranda Esterhuizen-Londt for helpful discussions on the manuscript.

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Tackling the Problem of Plastics in our Seas

Litter is the scourge of our seas. All over the planet, it winds its way to marine and coastal habitats, where it floats in the water, piles up on the sea bed, or is cast back ashore. It has been estimated that some ten per cent of all the plastics we produce – or 23 million tonnes in 2009 – end up in the ocean, slowly degrading into ever smaller particles. An overview on EU efforts to address the problem of microplastics in the marine environment.

By Karmenu Vella

So-called 'plastic soups', accumulation zones found in subtropical oceanic gyres, continue to grow, and our own Mediterranean has been identified as a hotspot.
In Europe, a large proportion of the plastic waste found in marine litter is packaging material, predominantly bottles and bags. Most of this plastic originates on shore, and its presence at sea is usually a result of poor waste management practices. But some marine litter such as fibres from washing clothes or deposits from car tyres already enter the sea as microparticles, carried by sewage, rainwater and wind. Cosmetic products such as sunscreen also contribute to the presence of microplastics in the marine environment, but their contribution needs to be further investigated. My services are working on this.

Research, Innovations and Targets

Plastics are certainly harming marine life – they have been found in the stomachs of birds and turtles – and could also affect human health since many marine animals end up on our plates as food. Microplastics are of particular concern due to their potential toxicity and size.
A number of EU measures aim to tackle this problem. We are investing in research and innovation to better understand and reduce the impacts from marine litter. Through the work of the European Marine Observation and Data Network we will build up a clearer picture of the scale of the problem.
We are also setting targets. The Marine Strategy Framework Directive obliges Member States to draw up plans to bring their waters up to good environmental status by 2020. The Directive looks at all pollution sources, in an effort to ensure that marine litter does not cause harm to the coastal and marine environment. It also obliges Member States to take account of trends in the amount and distribution of microplastics. This year is a milestone in the implementation of the Directive, as Member States have to adopt measures to protect the marine environment, to enter into force in 2016. Marine litter needs to be addressed, as part of a contribution to the regional action plans that have already been developed. A baseline for marine litter quantities is being developed, to help evaluate progress in marine litter reduction.
We are supporting incentives for fishermen to bring the litter they collect in their nets ashore for recycling or incineration both through the European Maritime and Fisheries Fund and through a „Guardians of the Sea" pilot action, which is encouraging fishermen to examine eco-friendly activities to compensate for declining fishing activity. Other EU funding programmes, such as LIFE, also contribute to a better understanding of how to tackle marine litter. We are looking at the effectiveness of reception facilities for ships' waste in Europe's ports.
But we won't solve the problem with these measures alone. We need to tackle the problem at source, and ensure that our legislation prevents litter from entering the marine environment. Measures to reduce the use of light-weight plastic bags are now on the way. We are also looking at the bigger picture, as part of the circular economy debate.

Global Action to Combat Marine Litter

Marine litter is one of the clearest symbols of a resource-inefficient economy. Potentially valuable materials could be pumped back into our economy instead of polluting our beaches and damaging our environment. This is one reason why the European Commission will present an ambitious circular economy strategy by the end of 2015.
We want to look beyond waste, address the full cycle of the circular economy and better reflect the reality of the situation in all Member States. We aim to present an ambitious plan to initiate the transition towards a more circular economy, including specific actions on eco-design. Product design can influence marine litter because it can reduce the use and facilitate separation and recycling of plastics.
The good news is that while the problem remains, awareness and the political will to tackle it are growing all the time. Europe is not acting alone. The G7 recently acknowledged the urgency of the issue, and noted the potential threats to human health. We can now look forward to stronger global action to combat marine litter, wider efforts to address land- and sea-based sources, and education, research and outreach.

As the European Commissioner for Environment, Fisheries and Maritime Affairs I will continue to collaborate closely with Member States, the EU Institutions, and regional and global organisations, to coordinate our efforts for effective and united action against marine litter. ●

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Karmenu Vella is the European Commissioner for Environment, Fisheries and Maritime Affairs.

Kleines Plastik braucht große Lösungen

Plastik gehört nicht in die Umwelt. Flüsse und Meere machen nicht vor Ländergrenzen halt. Maßnahmen gegen die Plastik- und Mikroplastikverschmutzung erfordern daher eine gemeinsame Vorgehensweise auf EU-Ebene. Vereinzelt wurden bereits Initiativen gesetzt, weitere Schritte müssen folgen.
Von Elisabeth Köstinger und Andrä Rupprechter

Mikroplastik, das Produkten wie beispielsweise Kosmetika beigefügt wurde oder beim Zerfall größerer Plastikobjekte entsteht, löst weltweit Besorgnis aus. Einmal in die Umwelt gelangt, sind Plastikpartikel hunderte Jahre nachweisbar. Kunststoffrückstände werden bereits in den entlegensten Gebieten der Erde nachgewiesen.

Mikroplastik in der Umwelt – eine globale Herausforderung

Durch unsachgemäße Verwendung und Entsorgung gelangen nach Schätzungen jährlich Millionen Tonnen Plastikabfälle in die Weltmeere – Tendenz steigend. Kunststoffe zerfallen im Meer im Laufe der Zeit zu Mikroplastik und können so in die Nahrungskette gelangen. Auch aus Alltagsprodukten werden Mikroplastikpartikel ins Abwasser freigesetzt. Die Verschmutzung von Ökosystemen ist nicht nur ein Umweltproblem, sondern verursacht auch hohe Kosten, weil Wirtschaftszweige wie Fischerei und Tourismus direkt von einer sauberen Umwelt abhängen.

Grundlage ist die Europa 2020-Strategie und ihre Leitlinie „Ressourceneffizientes Europa“

Europa ist bei vielen Ressourcen, unter anderem bei Erdöl, zu stark vom Rest der Welt abhängig. Die Steigerung der Ressourceneffizienz, die Erschließung eigener alternativer Ressourcen und die Entkoppelung des Ressourcenverbrauchs vom Wirtschaftswachstum sind daher wichtige Ziele der EU. In der Europa 2020-Strategie und der darin formulierten Leitinitiative für ein ressourceneffizientes Europa wurde die Grundlage dafür gelegt. Eine ressourceneffiziente, umweltschonende, wett¬bewerbsfähige und CO2-arme Wirtschaft ist auch im 7. EU-Umweltaktionsprogramm eines der prioritären Ziele.

Investments in Umweltpolitik schaffen Arbeitsplätze

Umweltschutz und Wirtschaftswachstum sind kein Widerspruch – im Gegenteil: nach Schätzungen der EU-Kommission würde beispielsweise allein die Umsetzung der EU-Abfallziele 180.000 neue Jobs schaffen und gleichzeitig die EU wettbewerbsfähiger und unabhängiger von Rohstoffen machen.

Anreize sind notwendig

Anreize für Forschung und Entwicklung sind notwendig, um die EU zu einer „Innovationsunion“ zu machen. So können etwa aus heimischen Rohstoffen wie Holz Kunststoffe für vielfältige Anwendungen hergestellt werden. Der Anteil biobasierter Kunststoffe an der weltweiten Kunststoffproduktion ist zwar noch sehr gering, steigt aber rasant. Neben der Herstellung von Plastik-Alternativen sind verbessertes Produktdesign und neue Technologien, etwa im Bereich Verwertung und Recycling, wichtige Innovationsfelder.

Die EU ist Vorreiter und hat bereits wichtige Schritte gesetzt

In ihrer Strategie über Kunststoffabfälle in der Umwelt hat die EU-Kommission verschiedene Handlungsoptionen für die Eliminierung der Plastikverschmutzung aufgezeigt.
Meeresabfälle – die zum Großteil aus Plastik bestehen – wurden in die EU-Meeresrahmenrichtlinie als einer der Indikatoren für den „guten Umweltzustand“ aufgenommen. Die Zahl der Untersuchungen über die Plastikverschmutzung in Europas Flüssen und Meeren steigt, jedoch sind die Daten aufgrund unterschiedlicher Methoden derzeit oft noch schwer miteinander vergleichbar. Hier besteht Handlungsbedarf.
Effiziente Minderungs- oder Vermeidungsmaßnahmen für Mikroplastik müssen vor allem an der Quelle ansetzen. Eine Quelle sind Produkte, denen Mikroplastikpartikel beigesetzt wurden, etwa um einen Reinigungseffekt zu erzielen. Auf Initiative Österreichs hat sich beim Umweltrat im Dezember 2014 eine Reihe von Mitgliedstaaten für ein EU-weites Verbot von Mikroplastik in Kosmetika und Reinigungsmitteln ausgesprochen. Der Ball liegt jetzt bei den Herstellerinnen und Herstellern, die den freiwilligen Ausstieg aus der Verwendung bis Ende 2015 angekündigt haben.
Mit der Verabschiedung der „Plastiksackerl-Richtlinie“ wurde im Frühjahr 2015 ein weiterer wichtiger Schritt zur europaweiten Eindämmung von Einwegplastik gesetzt. Mehr als 90 % der Europäerinnen und Europäer befürworten diese Maßnahme.

Die Rolle des neuen EU-Pakets zur Kreislaufwirtschaft

Eine Kreislaufwirtschaft, die Ressourcen für eine optimale Dauer im Lebenszyklus hält und Abfall minimiert, nützt der Umwelt und der Wirtschaft. Es ist daher wichtig, dass die EU-Kommission Ende 2015 ein wirklich ambitioniertes Kreislaufwirtschaftspaket vorlegt. Dies fordert auch das EU-Parlament, das derzeit seine Position zur Kreislaufwirtschaft erarbeitet. Es gibt viele Möglichkeiten, den Lebenszyklus von Kunststoffen zu optimieren, etwa durch geändertes Produktdesign oder den Ersatz problematischer Stoffe. Vor allem landet in vielen Ländern noch immer viel zu viel Abfall in Deponien, statt als wertvolle Ressource recycelt oder verwertet zu werden. Aus ökologischer Sicht ist Recycling aber nur der zweitbeste Weg; die höchste Priorität hat die Vermeidung. Nicht zuletzt hat es jede Konsumentin und jeder Konsument selbst in der Hand, beim Einkauf Einfluss auf das Angebot zu nehmen, Plastik richtig zu entsorgen oder im Idealfall ganz zu vermeiden.

Weitere Schritte müssen folgen – europäische Lösungen bevorzugt

Zukünftige konkrete Schritte für die Eliminierung der Plastik- und Mikroplastikverschmutzung wurden im Mai 2015 in Brüssel bei einer vom Österreichischen Umweltministerium in Zusammenarbeit mit Partnerinstitutionen organisierten Stakeholder-Konferenz[1] diskutiert. Als wichtige zukünftige Handlungsfelder wurden identifiziert: die Aufnahme von Mikroplastik in den nächsten Umweltzustandsbericht der Europäischen Umweltagentur, weiterführende Schritte um zu einem europaweiten Bild über Vorkommen, Quellen und Wirkung von Mikroplastik zu kommen, und die Frage der Definition. Thema waren auch der europaweite Mikroplastik-Ausstieg bei Produkten und das zukünftige Kreislaufwirtschaftspaket. Besonders wichtig wird in Zukunft die verstärkte Zusammenarbeit zwischen EU, Ländern und anderen Akteurinnen und Akteuren sein. Gemeinsam können wir die Vision von einer plastikfreien Umwelt umsetzen! ●

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[1] *Stakeholder-Konferenz „Eliminating Plastic and Microplastic Pollution – an urgent need", 11./12. Mai 2015, Brüssel.*

Plastic Waste in the Marine Environment – Failure by Design

As public awareness of the seriousness of the marine litter problem grows, political pressure for legislative solutions is essential to end the flow of waste from land to sea. Emma Priestland of the Brussels-based marine environmental NGO Seas At Risk discusses the difficult changes that need to be made to tackle this problem. By Emma Priestland

Our society, for the past seven decades of mass plastic production, has wilfully ignored what happens at the end of life of this super-durable substance. Cheap, convenient, and for a long time regarded as a throwaway product, plastic has changed our lives in a multitude of ways.

As we wake up to the accumulation of vast amounts of plastic in the seas and the damage being wrought by this, and many begin to question the wisdom in the ways we use plastic, we are still hesitating to make the changes necessary to tackle it.
The speed with which we have trashed the oceans is alarming to say the least; plastic marine litter was first reported in the 1970's, and now we are finding it in oceanic trenches, Arctic ice, and in the bodies of hundreds of species. So far, 557 marine species have been reported to either become entangled in marine debris, or to ingest it.[1] While larger marine animals are often found with whole items in their stomachs, more worrying are the species at the bottom of the food chain, who readily mistake tiny plastic particles, or microplastics, as food. As plastic production continues to increase, so too will the amount of plastic waste entering the marine environment.

Prevention is Key

We know that the key to dealing with plastic pollution in the marine environment is preventing waste from being created and reaching the sea, as it is close to impossible to efficiently clean up the debris once it is there. Yet this seems to be the missing element that everyone is scared to talk about. Prevention means waste minimisation, which means using less stuff, and that means changing the way we live our lives and, the very structure of our consuming throwaway society. It is no coincidence that packaging and single use plastic items feature heavily in the top 10 items found during beach litter monitoring across Europe. If we were to stop using single use plastics all together, one can imagine the beneficial effect this could have on the oceans. Instead, new uses of plastic emerge regularly, many of them badly thought out in terms of environmental impact. One of the most notorious and concerning recent examples is plastic beads in personal care products and cosmetics.

These products actually end up being washed down the sink, along with the plastic contained in them. Waste water treatment facilities are not designed to filter them out, and so the microplastics head out to the ocean, a ready-made size for ingestion by oysters, mussels and fish.

A survey of the industry association Cosmetics Europe found that 4.360 tonnes of plastic microbeads were used in 2012 by their members across Europe.[2]

This represents a significant source of plastic emissions into the environment, one which can easily be stemmed at source, but not afterwards. Many companies are voluntarily phasing out these ingredients from their products, but legislation would ensure that they are removed completely.

Currently there is only one piece of European legislation that deals directly with marine litter: the Marine Strategy Framework Directive (MSFD). Considering the scale of the problem, the current implementation ambition of member states is low, as was demonstrated during the Commission's Article 12 assessment of implementation.[3] We are seeing qualitative target setting, and uninspired programmes of measures from member states, that are supposed to tackle marine litter and ensure that European seas reach Good Environmental Status. Too often the lists of measures are extremely simplistic, and fail to address the very heart of the problem – our overconsumption and misuse of plastic. Clearly more imagination is needed from governments to find solutions through better product policy, waste management, shipping and fisheries. To help this process of building synergies and addressing the multitude of sources, several EU laws need to be adapted to compliment the MSFD and make the goal of Good Environmental Status more attainable for the member states.[4]

European Reduction Target Needed

So what do we think is really needed? A European legally binding, ambitious marine litter reduction target of at least 50 % would be a good start. This would provide the impetus for strong action, and hopefully ensure that the next round of MSFD measures will make an impact. The headline reduction target proposed by the EU Commission in the Circular economy communication is an excellent opening position, but if it is to be effective, it must be made legally binding – something which Seas At Risk will be strongly advocating.

The European Union recently passed legislation designed to severely reduce the use of single use plastic bags and cited the problems that they cause when they end up as marine litter as one of the justifications for this. Now the Commission must show global leadership and extend these measures to other types of single use items, including plastic microbeads in cosmetics.

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1 Kühn et al., 2015: "Deleterious Effects of Litter on Marine Life" in Bergmann et al. (eds.), Marine Anthropogenic Litter (Springer, 2015).

2 Gouin et al., 2015: "Use of Micro-Plastic Beads in Cosmetic Products in Europe and Their Estimated Emissions to the North Sea Environment", SOFW Journal (English Edition) 3/2015.

3 European Commission Website on the assessment of the implementation of the MSFD: http://ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/reports_en.htm

4 Report "How to improve EU legislation to tackle marine litter", Institute for European Environmental Policy: www.seas-at-risk.org/images/pdf/FINAL_IEEP_2013_marine_litter.pdf

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The OSPAR Marine Litter Regional Action Plan

The OSPAR Convention has been addressing marine litter, including plastic and microplastic litter, for many years, but the extent of pollution in many areas of the North East Atlantic is still unacceptable. In 2014, OSPAR adopted a comprehensive Marine Litter Regional Action Plan to combat the sources of plastic pollution and remove litter from the environment.
By John Mouat

Marine litter is an issue that affects many different marine species with countless individuals ingesting or becoming entangled in debris. Larger items as well as microplastic fragments, particles and fibres (below 5 mm) can lead to physical injuries, reduced digestion, assist chemical transfer and bioaccumulation of pollutants and ultimately result in death of marine organisms. In addition, marine litter can have significant social and economic impacts on coastal communities that rely on industries such as fisheries or tourism. The OSPAR Convention for the Protection of the North East Atlantic has been addressing marine litter for many years but in 2010 OSPAR Ministers still noted that: „quantities of litter in many areas of the North-East Atlantic are unacceptable, and therefore we will continue to develop reduction measures and targets".

The OSPAR indicator on plastic particles in seabirds' stomachs, specifically the Northern Fulmar (Fulmarus glacialis), highlights that litter fragments at the top end of the microplastics scale are not decreasing in the North Sea region. Since 2002, an increase in the percentage of birds with more than 0.1 g of plastic in their stomach has been observed in most regions (Figure 1).

For this reason, OSPAR adopted the first Marine Litter Regional Action Plan (RAP) for the North East Atlantic in 2014. Its aim is to develop joint measures and targets to reduce the harm to the marine environment caused by litter. The RAP is divided into four themes: A) actions to combat sea-based and B) actions to combat land-based sources of marine litter; C) actions for the removal of existing litter from the marine environment; and D) actions for education and outreach on the topic of marine litter.

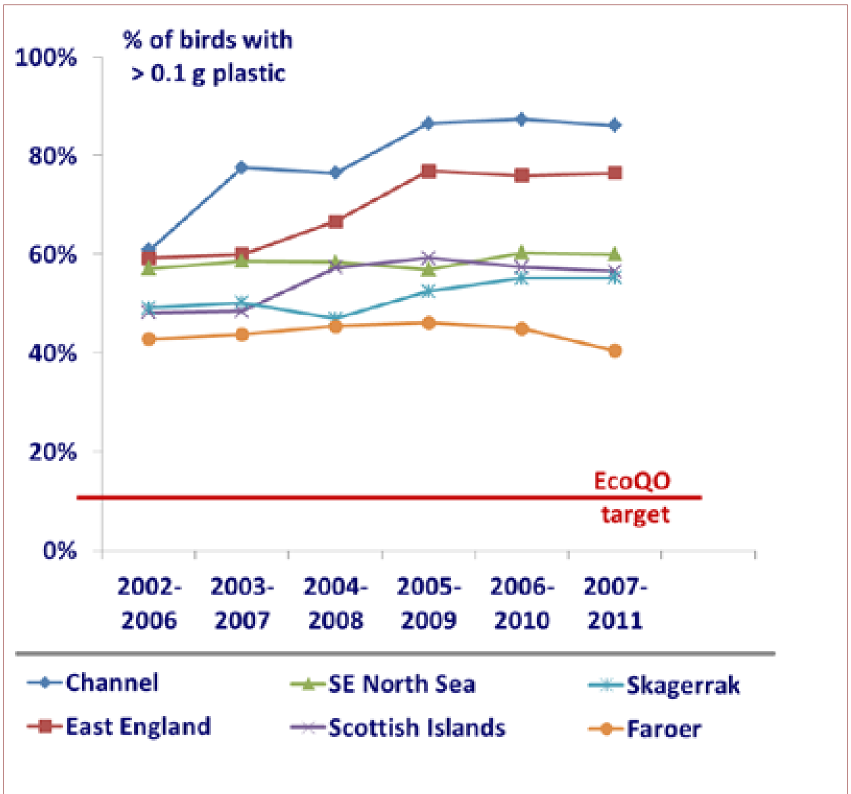

Figure 1: Percentage of individuals of the species Northern Fulmar (Fulmarus glacialis) found with more than 0.1 g of plastic in their stomach. The percentages are significantly higher than the 10 % target according to the Ecological Quality Objective (EcoQO).

The majority of the actions foreseen by the RAP contribute to the reduction of microplastics as they aim to reduce the total amount of plastic litter – which ultimately gets broken down into microplastics – entering the marine environment. These include actions addressing sources of litter such as waste management, fisheries, shipping, aquaculture, tourism, packaging, and plastics manufacture.

In addition, there are three actions in the RAP that either specifically target microplastics used in products and processes or aim to prevent microplastics reaching the marine environment. These actions are:

- to evaluate all products and processes that include primary microplastics and to act, if appropriate, to reduce their impact on the marine environment;
- to engage with all appropriate sectors (e.g. manufacturing and retail) to explore the possibility of a voluntary agreement to phase out the use of microplastics as a component in personal care and cosmetic products or, should a voluntary agreement prove to be insufficient, to prepare a proposal for OSPAR to call on the EU to introduce appropriate measures to achieve a 100 % phasing out of microplastics in personal care and cosmetic products;

- to investigate and promote with appropriate industries the use of Best Available Techniques (BAT) and Best Environmental Practice (BEP) to develop sustainable and cost-effective solutions to reduce and prevent sewage-related and storm water-related waste entering the marine environment, including microparticles.

The lead countries are actively developing these actions. For example, a number of background studies to clarify the relative importance of different types of microplastics sources have been undertaken. These studies have highlighted that sources of microplastics can include: fibres from clothes washing, tyre abrasion, paints, personal care products, household and city dust, detergents, shot blasting, fisheries and loss of granulates during plastics manufacture.

The next steps to further quantify the inputs of microplastics and develop specific measures to reduce their impact on the marine environment are now ongoing. OSPAR has also entered into a dialogue with the cosmetics industry with a view to increase the number of voluntary agreements on phasing out microplastics in personal care and cosmetic products, and will continue to work constructively with the industry over the coming year.

The RAP will be implemented over the period 2014 to 2021. It will then be reviewed based on the outcomes of the OSPAR Quality Status Report, which will assess the status of the marine environment in the North East Atlantic, including marine litter, and assess whether the impact of the measures taken has been sufficient.

The OSPAR Marine Litter Regional Action Plan is available for download at www.ospar.org. ●

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Mikroplastik aus Textilfasern – Die unsichtbare Gefahr

Mikroplastikkügelchen in Kosmetika sind ein ernstzunehmendes Problem, aber bei weitem nicht die größte Quelle von Mikroplastik in der Umwelt. Was wenige wissen: synthetische Kleidung verliert bei jedem Waschgang tausende kleine Plastikfasern, die schlussendlich im Meer landen. Die Zeit für eine Lösung drängt – wir müssen handeln, wenn wir in Zukunft nicht von Plastikmeeren umgeben sein wollen!
Von Nunu Kaller

Mikroplastik in Gewässern ist weltweit ein großes Problem, ob in Flüssen oder Meeren. Es wirkt als „Magnet“ für verschiedene Schadstoffe, die sich auf der Oberfläche dieser granulatartigen Partikel ablagern, und wird von der Meeresfauna mit Plankton verwechselt und gefressen. Es besteht also die Möglichkeit, dass dieses Mikroplastik oder zumindest die Schadstoffe, die nicht im Magen der Tiere bleiben, auf unseren Tellern landen.
In den letzten Jahren fand das Thema zunehmend Beachtung durch die Öffentlichkeit. Seither erschienen viele Studien weltweit; so gibt es inzwischen allein zur Donau in Österreich zwei verschiedene Studien, die die Menge von Mikroplastik beziffern.
Der erste große identifizierte Verursacher war die Kosmetikindustrie. Verschiedene Kosmetikprodukte enthalten Plastikkügelchen, die beim Zähneputzen oder beim Duschen einen „Peeling“-Effekt auslösen, nach einmaliger Verwendung einfach weggespült werden und von konventionellen Kläranlagen kaum aufgehalten werden können. Das wurde weltweit sehr schnell zu einem berechtigten Skandal: diese Kügelchen sind nämlich schlicht und einfach überflüssig. Peeling-Effekte kann man durch natürliche Materialien genauso erreichen und das Plastik richtet viel zu viel Schaden an um bedenkenlos eingesetzt zu werden. Die Kosmetikindustrie reagierte schnell: viele Unternehmen versprachen Produktauslistungen und neue Rezepturen innerhalb der kommenden Monate und Jahre. Ein schöner Erfolg, aber nur ein erster Schritt – denn industriell hergestelltes Mikroplastik in Kosmetikprodukten macht weniger als 1 % des gesamten Mikroplastiks in Gewässern aus.

Die Hauptquelle für Mikroplastik ist Reifenabrieb, wie immer mehr Studien verschiedener Forschungseinrichtungen feststellen. Was jedoch wenige wissen: auch unsere Fleecejacken und Polyestershirts gehören zu den größten Problemgruppen, was Mikroplastik im Wasser angeht.
Wie das geht? Kleidung verliert bei jedem Waschgang Fasern. Bereits 2011 stellte ein Team rund um Mark Anthony Browne von der Universität Dublin fest, dass sich in Abwässern viele Fasern aus Textilien

befanden. Es dominierten Fasern aus Polyester und Acryl, die aus Waschgängen in Privathaushalten stammen. Die ForscherInnen führten daraufhin Waschtests durch und stellten fest, dass ein einziges Kleidungsstück über 1900 Fasern pro Waschgang (!) verlieren kann; bei Fleece-Produkten sind es sogar um 180 % mehr. Browne beobachtete auch, dass aufgrund des erhöhten Waschaufkommens im Winter die Fasermenge in Gewässern in dieser Zeit um bis zu 700 % ansteigt.

Der globale Fasermarkt ist in Bewegung, mit einer immer größer werdenden Tendenz zu erdölbasierten Fasern wie Polyester oder Acryl. Die Fasermarktstudie 2013, die von der gemeinnützigen Organisation Textile Exchange durchgeführt wurde, spricht von einem Anteil der erdölbasierten Fasern am Weltmarkt von 61,7 %, die Tendenz ist steigend. Dieser Trend ist auch in den Modeläden Europas zu beobachten: je billiger, desto Polyester, lässt sich umgangssprachlich sagen. Günstige Modeketten wie Primark und Co. haben aufgrund der billigeren Produktionsweise einen hohen Anteil an Polyesterprodukten, von der Bluse über die Leggings bis hin zur Herbstjacke.

Plastikfasern aus Textilien sind noch um Einiges kleiner als die Mikroplastikpartikel, die im Fokus der meisten aktuellen Studien (wie etwa der obengenannten Untersuchungen der Donau) stehen. Dass sie zunehmend zum Problem werden, wird aber bereits von einigen Seiten wahrgenommen: die OSPAR-Konvention, ein völkerrechtlicher Vertrag zum Schutz von Nordsee und Nordostatlantik, nennt Textilfasern als eine der sieben wichtigsten Mikroplastikquellen im Meer, das niederländische Institute for Public Health listet ebenfalls Fasern und Kleidung als Auslöser für Mikroplastik, und die norwegische Umweltagentur nennt Textilien als eine der wichtigsten landbasierten Quellen für Mikroplastik in Norwegens Buchten, gleich an dritter Stelle hinter Reifenabrieb und synthetischen Farben.
Leider ist in diesem Fall die Lösung nicht so einfach wie bei der Kosmetikindustrie. Eine Reduktion dieser Fasern gelingt nur durch effiziente Kläranlagen sowie neu zu entwickelnde Filter in Waschmaschinen, ein konsequentes Durchgreifen und Handeln der Politik und ein Umdenken im Konsumverhalten bei den VerbraucherInnen. Was jedoch nicht passieren darf, ist ein gegenseitiges Zuschieben des schwarzen Peters zwischen diesen verschiedenen AkteurInnen. Mikroplastik aus Textilfasern ist ein unsichtbares, aber deshalb nicht weniger ernstzunehmendes Problem – die Zeit für eine Lösung drängt, wenn wir in Zukunft nicht nur von Plastikmeeren umgeben sein wollen. ●

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Impressum:
Herausgeber und Medieninhaber:
Umweltdachverband
Strozzigasse 10/7-9, 1080 Wien, Austria
ZVR-Zahl 255345915
Offenlegung gem § 25 MedienG
www.umweltdachverband.at/uwd/gremien
www.umweltdachverband.at/uwd/leitbild
www.eu-umweltbuero.at/30.htm

Für den Inhalt verantwortlich:
EU-Umweltbüro im Umweltdachverband
Strozzigasse 10/7-9, 1080 Wien
E: office@eu-umweltbuero.at
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Redaktion: Bernhard Zlanabitnig, Karoline Klaus
Layout: Katharina Kammerzelt, Manuel Grebenjak
Druck: Fairdrucker GmbH, 3002 Purkersdorf
Titelbild: © Bo Eide Marine Litter flickr_0e510f6228_k

Gedruckt nach der Richtlinie des Österreichischen Umweltzeichens „Schadstoffarme Druckerzeugnisse"
Erscheinungsweise: periodisch, Auflage: 1.400 Exemplare, Erscheinungsort: Wien
Ausgezeichnet mit dem Umweltzeichen für Bildungseinrichtungen

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