HOUSE OF COMMONS

Environmental Audit Committee

Oral evidence: Environmental impact of microplastics, HC 179

Wednesday 8 June 2016

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Written evidence from witnesses:

- The UK Cosmetic, Toiletry and Perfumery Association (CTPA)
- Cosmetics Europe
- Professor Richard Thompson

Watch the meeting

Members present: Mary Creagh (Chair), Geraint Davies, Zac Goldsmith, Carolyn Harris, Peter Heaton-Jones, Caroline Lucas, John Mc Nally.

Questions 165 - 286

Witnesses: **John Chave**, Director General, Cosmetics Europe, and **Dr Chris Flower**, Director General, The Cosmetics, Toiletry and Perfumery Association, gave evidence.

Q165 Chair: We are now in public session. On behalf of the Committee, can I welcome our two witnesses today, John Chave, Director General of Cosmetics Europe, the European trade association representing the interests of the cosmetics industry, and Dr Christopher Flower, Director General of the UK Cosmetics, Toiletry and Perfumery Association, which is the national trade association for manufacturers and importers of cosmetic products? We are obviously very disappointed that the five major brands that we invited to give evidence today haven't decided to attend or have decided not to attend for their own reasons. We will be asking you a series of quite detailed questions, I think. I wondered if you could begin by just giving an overview of what proportion of your individual membership—so nationally and internationally—have committed to phasing out plastic microbeads. Can we start with the national situation please?

Dr Flower: Certainly.

John Chave: If you start with the national situation.

Dr Flower: Yes, certainly. To be frank, I haven't been through and counted, however we do have a European declaration, in fact, recommendation, that all the members should be

out of plastic microbeads by 2020, and every one of our members should be complying with that.

John Chave: I can add to that. So the coverage of Cosmetics Europe is about 90% of the European market. I think, as the Committee is aware, in October last year we made a recommendation to our members to phase out solid plastic particles in cosmetics products and wash off cosmetics products, and that applies to 90% of our membership. As you are also aware, some of the companies, which perhaps you referred to in your question, have made individual commitments actually prior to our recommendation.

It is worth bearing in mind an important point here that our membership is made up of large multinationals, household names like Unilever and Johnson & Johnson that the Committee will be aware of, and some of those companies have made public commitments on the microbeads issue. But we represent more than 4,000 companies. A lot of cosmetics manufacturers are small and medium enterprises who are members of our national associations, so it is difficult to say exactly the proportions you are talking about but, in a nutshell, we are talking about a recommendation to 90% of our membership. That includes the vast majority of the familiar household name cosmetics companies but, also, the small and medium enterprises that are less well known on a European scale but are indirectly members of Cosmetics Europe.

Q166 Chair: So 90%. Why are we waiting until 2020 to reduce this plastic pollution?

John Chave: Well, I think that the answer to that question is hidden in my last response. It does take some time to reformulate products. Remember, when you reformulate a product you have to go through various safety assessments and various procedures, and while some of the bigger companies are perhaps better geared up to do that—remember as I just said in my last response—a lot of the companies who are indirectly members of our association are relatively small companies and do not have the same scale. Chris will probably know a little bit more about that.

Dr Flower: That is very true. The small companies would find it very difficult to react very quickly for a number of reasons. They will have contracts already in place for buying the material. Reformulating isn't simply a "take that ingredient out, replace it with something else". The interaction between ingredients can mean that you have to completely start from scratch and build a new formula to replace the original product. Then of course there is the availability of the replacement ingredient. You have to set up a supply line and ensure that that will then enable you to continue to supply your product to the retail trade.

Chair: I am sure it is all very complicated.

Dr Flower: Yes, sadly.

Q167 Chair: But some brands have already done it, am I right?

Dr Flower: Yes.

Q168 Chair: Body Shop, which everyone thinks is a very environmental brand, has phased them out in 2015.

John Chave: Yes, in fact it is worth saying that, while 2020 seems a relatively distant horizon, we expect the vast majority of plastic microbeads to be phased out before that. This is an issue we might come on to because, as you are aware, we undertook to follow up our recommendations. It is one thing to make a recommendation and then leave it stuck in a desk drawer, but we are following up our recommendation to make sure that it is being acted on. One of the things we might discuss in this session is the extent to which our recommendation has had an effect, and we think that well before 2020 the majority of these materials will be phased out.

Q169 Chair: But 10% of your membership has not signed up to it and you are unable to say how many of the UK perfumery importers have done it, so perhaps you could write to us with that information afterwards. I think that would be helpful.

John Chave: Certainly.

Q170 Chair: Can you tell us how long these beads have been in personal care products?

John Chave: Apparently there is a patent for these materials that goes back to the 1970s, but I understand—and this is referred to in the Eunomia report that you will be aware of—the mass production of these materials started in the 1990s, and now of course it has started to go into decline.

Q171 Chair: About 4,500 tonnes a year is going into our oceans and seas, is what we have talked about. Over the next five years that is 20,000 tonnes of potentially harmful microplastics.

John Chave: Only if you assume that we are not making serious inroads into phasing out the materials and—

Q172 Chair: But what is the evidence that you are making serious inroads into it?

John Chave: What we have done is—as I said, it is one thing to make a recommendation and we don't want to make a recommendation just to appear to be acting—we decided that we should follow up the recommendation, so that we could come to sessions like this and speak to policymakers and the public to show that the action was actually having an effect. What we decided to do was to survey our membership, so we have begun surveying our membership. Now, remember, the recommendation was in October. We are starting to get the results of our survey in now. We expect them in probably by the summer, and we will write to the Committee with the final results of the survey on the issue of plastic microbeads in wash off products, which is the scope of our recommendation. However, I can say that preliminary results suggest that we are phasing out about three-quarters of them, and remember, even in the Eunomia report—

Q173 Chair: When? When are you phasing them out? You are or you have?

John Chave: Have.

Q174 Chair: Have phased out three-quarters of what? Product lines?

John Chave: Of the use of plastic microbeads in the products. So this figure of the 4,000 tonnes, we reckon on our preliminary results—and I would urge the Committee to recognise this is not the final result and I commit to write to you on the final result at the proper time—we have now gone to fractionally over 1,000 tonnes.

Q175 Chair: So you have taken out 75% by volume not by product line?

John Chave: Yes, it is by tonnage.

Chair: So it is a tonnage thing, not different types of brands?

John Chave: Yes.

Q176 Chair: How many brands have phased it out because in the evidence we got from the large brands we had two brands from *L'Oréal*, Biotherm and Body Shop, again, which most consumers would be unaware contained microbeads, that phased out in 2013 and 2015, and I couldn't see in the other written evidence that we had evidence that—I saw Unilever has phased it out, so does that mean that by volume Unilever is the biggest UK cosmetics company? So if they phased it out you have to 25% or 30% of your volume. Is that correct or—

John Chave: Well, you have to be a little careful because we are not surveying on individual products and individual brands. We are taking the aggregate data and I think, as a trade association, you have to be a little bit careful about focusing on brands. The second aspect of that is, of course, there are thousands or hundreds of thousands of brands on the market in the European Union, so we concentrating on the aggregate tonnage. So if the implication of your question is if you take out one company then that drives down the numbers, well, that must be partially true but, of course, it would be wrong to say that one company is completely monopolising the market in microbeads. The use of microbeads has spread across several companies. Again to cross-refer to the Eunomia report, there is a section there on manufacturers' commitments, which lists some of the major brands and their commitments that have been in place, well, since at least 2013.

Q177 Chair: Can you give us the UK context, please, Dr Flower?

Dr Flower: It is very much the same. What we have not done is isolate the UK reduction. It is very much part of the aggregate total. The companies do not count what is sold in the UK separately from what is sold in each other country. They are reporting into Cosmetics Europe of the total reduction in aggregate tonnage of use of microbeads.

Q178 Chair: Can't you reverse engineer from those replies, given that the UK will account for a certain percentage of EU consumer spend?

Dr Flower: One could but there is no guarantee that it would be absolutely accurate because of the way the distribution network works. Some products are made in one country and sold in another. That happens a lot, and they will be shipped around from one country to another across Europe. So it would make it extremely difficult to say, "This number of tonnes have been taken out of the UK production".

Q179 Chair: Right. What have they phased out?

Dr Flower: Hard plastic microbeads, the ones that are used in the rinse off scrub products and toothpastes. They are the ones that are going down the drain.

Q180 Chair: Microbeads defined as what?

Dr Flower: Effectively, we are using the same definition as everyone else, which is a hard plastic bead or particle less than 5 millimetres in size. In practice ours will be very, very much smaller than that because 5 millimetres is about the size of a small pea and they would be inappropriate for a cosmetic. Roughly, most of ours will be around a 10th of a millimetre in size but that is a ballpark figure.

Chair: Thank you. That is helpful. Geraint, you have a supplementary.

Geraint Davies: No, I am all right.

Q181 Peter Heaton-Jones: I just wanted to pick up on what was said about the use of the aggregate figures. Is there any way that a consumer going out this afternoon can be sure whether or not the product, the individual product that he or she is about to buy, contains microbeads or not?

Dr Flower: At the moment, no.

Peter Heaton-Jones: No.

Dr Flower: However, by looking at the website, they will see whether that manufacturer has made a public declaration and whether or not they have made a statement about how far along they are in moving away from microbeads.

Q182 Peter Heaton-Jones: But even if a manufacturer had done that, unless that manufacturer is breaking down that information in respect of the individual named products that the consumer would be picking off the supermarket shelf or the chemist shelf, the consumer has no way of knowing whether that box or tube or bottle of stuff that he or she is about to buy this afternoon contains microbeads or not?

Dr Flower: That is correct.

Q183 Peter Heaton-Jones: Is the industry working to clarify that?

Dr Flower: To be honest, I think by the time we did that we would already be at the point where we have moved away from their use. The relabelling or some sort of other indication would take longer than the phase out is projected to take.

Q184 Peter Heaton-Jones: Chair, if I may, just another one. You are confident that we are moving to a position where—well, 2020 is the stated aim although you have said, I think already in evidence, that it will be sooner than that—a consumer can go to a shop and be sure that the product that he or she buys does not contain microbeads?

Dr Flower: Yes.

John Chave: Yes.

Q185 Geraint Davies: Can I have a supplementary on the rate of change? Because you were talking about 90% and then you were talking about the numbers rather than the volumes, and you did mention of course that 75% of tonnage now—

John Chave: The 90% was the coverage of cosmetic share in terms of company membership, yes.

Q186 Geraint Davies: That is in volume not in the number of members, isn't it?

John Chave: Yes, you are correct. It is 90% of the market in volume, yes.

Q187 Geraint Davies: Yes, and that is what I am more interested in. It is obviously the case that the market is dominated by a number of big players, like Unilever, Procter and Johnson & Johnson, and so on. You have already suggested that they have the capacity to reduce very quickly, so wouldn't it be possible to have a two-tier support? Couldn't you guarantee that 95% of microbeads would be taken out within the next year, for instance, because of the strength of the big players in doing that and then just have a tail off?

John Chave: A guarantee is a little bit difficult. Remember, we made a recommendation to our members and, let's be honest, the recommendation is not absolutely binding. It is not a legally binding effect. We have already said that prior to the recommendation a lot of those big companies that you referred to were already phasing out, and those companies are in a position to phase out very quickly. Frankly, companies don't have a great deal of incentive to stay in using that material as once, frankly, we recognised that there is an industry standard that we are going to phase them out.

What we can do—and I again commit to do this—is when we have the final results of our follow up to the recommendation I think that one of the ideas was that we wouldn't just follow up in the year after the recommendation but, going forward, up until the deadline, come back to the Committee and say, "Well, this is the state of play we are in", and if you want to drill down into some of those questions, within the limitations that trade associations naturally have, we could probably do that. I reiterate the point: we think that voluntary action is a good way to address this problem, but voluntary action in itself needs to be followed up as people will—

Q188 Geraint Davies: Is it possible to provide a list of who is doing it when, of companies?

John Chave: We can certainly provide a list of those companies who have publicly stated that they are phasing out microbeads. It is difficult to do that on a global basis for the reason I gave at the start because, while often people associate our industry with these big household names, there are literally thousands of smaller companies, and to do that in respect of every one of those companies is, well, a little bit challenging.

Q189 Geraint Davies: But you could tell us what the situation was with *L'Oréal, for example?*

John Chave: Oh, yes, I think so.

Q190 Chair: Can I just ask does the pledge to phase it out apply to all of the markets in which the company is active or is it just for the EU market?

John Chave: We represent the EU market, so our pledge, our recommendation, is for the European market. As the Committee will be aware, there is a slightly situation in the United States where many of the bigger companies are selective.

Q191 Chair: So they have already phased it out in the US?

John Chave: We are talking about the European market in our recommendation.

Q192 Geraint Davies: On the Chair's point there, is there a danger, as with tobacco companies, they will just dump all these microbeads on developing markets and clean up their act in the EU and the global environmental impact will be continuing to deteriorate, or is this a universal ban that all these big companies are introducing?

John Chave: I think that once you go into alternatives then you want to produce on sufficient scale to meet the market demand. There is not a great deal of incentive to produce in different ways for different markets in the way that you suggest, and certainly, if you look at the bigger markets globally, like the United States, they simply do not have the option to do that anymore because of the United States ban, similarly with Canada and similarly, probably in future, with Australia and so forth so we would expect this to evolve into a global venture.

Q193 Geraint Davies: You have the production capacity and it is all geared up for microbeads, and so if you cannot sell it over here you could sell it over there. I mentioned tobacco, because obviously the tobacco companies are very much gearing up to exploit developing markets in Africa and the Middle East, as the West realises it is killing them you know.

John Chave: I think the thing that you need to remember, a key point here, is that we think that we are a responsible industry, we want to be perceived as a responsible industry, and we want to do the right thing by sustainability. That is why we have taken voluntary action. It would be a little bit inconsistent with that overall approach to ensuring that we have a reputation for sustainability and doing the right and ethical thing, if we were making this differentiation between those countries that we could get away with it and those countries that we couldn't.

Q194 Geraint Davies: Because they are not doing that? Is that what you are saying? I know you have given an argument why they might not, but you are saying they are not exporting into other markets microplastics?

John Chave: That is not part of our survey but I am happy to follow up with that with the Committee if you think that would be appropriate.

Q195 Chair: Isn't two years long enough? Why is it 2020?

Dr Flower: That is to cope for this large number of very small companies. As we were saying, the large companies can very quickly react. They have the volume, the capacity and the manpower to innovate the new formulations necessary to cope with the

replacement materials. The small company will be committed to buying certain ingredients. They will have a long programme and to—

Q196 Chair: Are you saying they are going to buy more than four years away on a global market?

Dr Flower: The actual time taken to reformulate is surprisingly long. You have to start to look for a new ingredient. You have to ensure that it is available. You have to then create the product. You then have to assess whether it works. You then have a safety assessment to do. There is then all the repackaging, because you will have different ingredients to go on the label. At the same time, you have to sell that into the trade because it is a different product and small companies struggle already to ensure that they are not pushed out from the shelf space. So for them to try to accelerate that would be very difficult for their continued business and, therefore, we have allowed a longer time than is necessary for the large companies to accommodate the small companies and avoid, in effect, being accused of bullying them out of the market.

Q197 Chair: How many companies do you represent in the UK?

Dr Flower: In the UK we have about 180 companies in membership.

Q198 Chair: How many of them are SMEs?

Dr Flower: That is something around 120 and we represent around 85% of the UK cosmetics market by value.

Q199 Chair: There is 15% that you do not represent that are outwith all of this activity anyway?

Dr Flower: Yes.

Chair: That is helpful. Thank you very much.

Q200 John Mc Nally: During the last hearing we heard from Fauna & Flora International that seven major multinationals brands field at least one of the seven criteria for a robust and meaningful and voluntary commitment. How sufficient are your members' existing commitments to achieving a microbead phase out?

John Chave: Correct me if I am wrong, I understand the survey work undertaken by Fauna & Flora was prior to our recommendation. I have not seen the research that Fauna & Flora have undertaken. Suffice to say, from the point of view of our recommendation we have a single definition and a single worded recommendation, so there is less room for manoeuvre if people want to approach the phase out in a slightly different way.

John Mc Nally: Would you like to—

Dr Flower: Very much the same because our members are effectively members of Cosmetics Europe through being members of CTPA and we are a member association of Cosmetics Europe, and the same criteria apply. It is the same recommendation and again

the same lack of opportunity for manoeuvring, whether you are complying with this very clear recommendation or you are not.

Q201 John Mc Nally: So to what extent have your members committed to this phasing out the broad range of microbead types rather than just certain types of plastic? For example, there are certain definitions that take a microbead ingredient, and I did some research on this and some of the plastics marketed as biodegradable are too durable to actually degrade or require an awful lot of UV light to degrade, so in that case when they get into the marine environment they lose that biodegradable quality.

Dr Flower: I think the concept of biodegradability is evolving. It is obviously a very scientific and technical issue. What we once thought of as being readily biodegradable now appears not to be quite so readily biodegradable because, indeed, if microparticles or any other plastic material sinks then the majority of it would have been broken down by UV light when it is floating on the surface. When it sinks then there is a limit to how much further degradation will readily take place.

Q202 John Mc Nally: Yes. I am aware that some will stay at the top, some will be middle, and some will fall to the bottom.

Dr Flower: Yes, and some of it is up and down.

John Mc Nally: It is the actual understanding of what microbeads actually are and within that context, so they have been marketed as biodegradable but it seems when you go into the research they are not all biodegradable, and I think that is a huge concern for all of us here.

John Chave: As you will be aware, in our recommendation we referred to non-biodegradability and I think we are clear at least at Cosmetics Europe—I am happy to clarify this in writing—that our benchmark of biodegradability is with natural organic products. That is what we aspire to for biodegradability.

Q203 John Mc Nally: To what extent are your members committed to the certain criteria listed by Fauna & Flora International? You say you don't have that information at the moment.

Dr Flower: No, we don't. We haven't surveyed them alongside the Fauna & Flora criteria. With our survey we are looking at the compliance with our voluntary recommendation.

Q204 John Mc Nally: We did hear that there has been inconsistency in your membership's understanding of the organisation. They have all combined the different approaches that have been taken by them, so I think the Committee would be—

John Chave: Can I point to a general problem in this whole issue that perhaps caused a little bit of confusion? The definitions of what is a microbead, for example, and what is a microplastic and so on, and you refer to a little bit of that in your question. I think to ease the debate going forward—and this is something that we are working on as an industry—we need to bring some clarity to what exactly we mean by microbead. You sort of kicked off that issue when you asked your original question. It is not clear to me, and I state honestly to the Committee that I am not aware of these criteria that the organisation

referred to has provided, but we are very happy to sit down for the sake of bringing clarity to the debate and say, "Well, let's, before we start arguing and so forth, agree on what we mean by these terms", and honestly there has been a little bit of lack of that in the whole debate over the last few years.

Dr Flower: Yes. There has been a lot of talking at cross purposes about what is a microbead, what is microplastic, and whether one is a large proportion of the other or not. So you are right, clarification of what we are talking about and what is the problem in the ocean really does need to happen.

Q205 John Mc Nally: I still think we need clarity on—whether it is a microbead or not—if they are all biodegradable. Some are masquerading as biodegradable and I think that is the big thing that is interesting most of us.

John Chave: Let's be clear that under the terms of our recommendation you cannot masquerade as biodegradable. That is the key point for us.

Q206 Chair: Just to be clear, the Fauna & Flora International survey is still ongoing, so it is not something that they have done before or after your survey. The survey is ongoing and their criticisms of the voluntary phase out was the different approaches taken by different companies, whether we agree on the size or the definition I think we can agree on a bottom line which is putting plastic into the oceans with consequences on marine life, and potentially on human health, is probably not a good thing. Do you think that is a base line from which we can all work?

Dr Flower: Yes. I would say that the objective then is to stop doing that, even if the approach taken by different companies is not the same. If the end result is that we are no longer putting hard plastic microbeads into the sea then that is achieving what we are setting out to do.

John Chave: I think it is worth raising the issue—and perhaps you intended to come on to this issue anyway, going forward—that you see some of the media reports, which I absolutely respect, around this issue is frequently an equation with the problem purely with cosmetics and personal care products. If there is an academic consensus around anything, it is that we are a very small part of the problem. We think between 0.1% and 1.5% of the marine litter attributable to plastic microbeads is from cosmetics products. You have bigger causes, for example, tyre abrasions, which you don't read about so much in the press. So, while I absolutely respect and, as I have said, our responsibility in the industry is to phase out these materials, if we phase out these materials—which we will, and we have shown reasonable progress so far—we are still going to be left with a pretty serious problem because you are talking even at very high estimates not more than 0.5% and far lower than that.

Q207 Zac Goldsmith: I want to go back to a point that Dr Flower made earlier. Are the positions that you take an accurate reflection? Are you guided by your members in any kind of obvious and unarguable formula?

Dr Flower: Yes, indeed.

Q208 Zac Goldsmith: So what you are saying today is a reflection of what you have been asked to say by your members, more or less?

Dr Flower: It is both what I have been asked to say by the members but also what I believe the members should be doing, so it is—

Q209 Zac Goldsmith: Is it the case then, and are you able to demonstrate—just going back to the point you made earlier about the bigger members that you have—that the bigger companies are relaxed about even calling for an earlier phase out and that the smaller companies have been asking for a delayed phase out to 2020?

Dr Flower: The smaller companies have not actually come to me and said, "We cannot achieve an earlier phase out". What we have done is estimated how long it would take the smaller companies to achieve a phase out, and then—

Q210 Zac Goldsmith: Are the larger companies asking for an earlier phase out or are they—

Dr Flower: They have said that they can achieve an earlier phase out but they, too, recognise that it would be perhaps unfair to impose their ability on smaller companies who would not be able to compete.

Q211 Zac Goldsmith: But the smaller companies have not asked you for that delayed phase out?

Dr Flower: That is correct. If we achieve a complete phase out before then the survey will indicate that.

Q212 Chair: But there will still be 15% of cosmetics importers who are not covered by you as an association who will carry on regardless if a purely voluntary approach is continued. Is that correct?

Dr Flower: It is possible they will carry on regardless. However, I would like to think that they could see exactly what the environment is like for the use of plastic microbeads and recognise that that position is untenable for the future.

Q213 Chair: Only with a highly educated consumer population that understands the formulations on the back of packages and understands the plastic formulations, which most of us don't speaking personally.

Dr Flower: I suspect there will be people who will be looking to see whether or not there are products still on the market that contain plastic microbeads and then raising that awareness with the public.

John Chave: I think it would be a bit of a stretch to assume that they would just carry on regardless. People don't join cosmetics organisations just because they want to avoid recommendations or avoid industry standards. They may have various reasons for doing that. We think that this will become an industry standard and, therefore—as Chris has exactly said—it will be quite difficult to avoid, particularly in the climate we face where there is legitimate concern about the issue.

Q214 Geraint Davies: That brings us on to the issue of a legislative ban. I think, Dr Flowers, in your evidence you said that, because the phase out is already under way, there wouldn't be much impact in having a ban and it would be sort of pointless, but wouldn't you accept that there is a real risk, from what we have heard already, that some companies—maybe the 15%, maybe the others—would simply carry on regardless, and the consumer might not be aware that there was a risk at all, as has been pointed out, and even if they were aware they would wrongly think that, "Oh, everybody has apparently agreed to a ban so there is no risk", when some companies would just carry on regardless?

Dr Flower: Under those circumstances I cannot obviously absolutely guarantee that everybody would follow the recommendation. There is the possibility that there may be products imported that would not comply. In practice, I would expect that to be a vanishingly small quantity. What we have focused upon is removing the overwhelming majority of plastic microbeads from products as quickly as possible.

If we were to have a ban, there then comes in the question of how it would be enforced. There is a risk of having a legislative ban that is not well enforced, as opposed to perhaps a much more "public awareness" approach that says, "There are products that you should not buy because they are still containing ingredients or plastic microbeads, which have been recommended no longer to be used".

Q215 Geraint Davies: My understanding from the evidence from Fauna & Flora is that microplastics are in the products of 11 of the 20 global beauty companies. Obviously this is a very widespread, worrying thing. The consumer does not really know what is in their products. The only other point that you made was about enforceability but presumably the Environment Agency or whatever could, in theory, test whether microplastics were in samples of product. It would not take that long. I know there are a lot of them but you do not have to test them all because obviously they are all going to be the same for each product line, aren't they? You just close down the ones that are not obeying or destroying the environment.

Dr Flower: In theory, yes. There would be a practical issue to it, certainly, but in principle, indeed, an enforcement agency could run tests and relatively easily identify the presence of hard plastic particles by a filtration of dissolved product, for example.

Q216 Geraint Davies: Again, the point has been made that the bad may undercut the good and disincentivise the rate of change, namely if I am producing, Zac is producing and there are microbeads, and I suddenly stop but he does not, for argument's sake, and he undercuts me, I might think, "Hold on, I better wait until he gets on with it" and all the rest of it. But obviously if there is a deadline everybody knows that you have to do it by then and it is enforced. Surely that must be the best approach. That is what they are doing in the States, isn't it?

Dr Flower: Again, there is a time element involved as well. Legislative changes do not happen overnight. They take a lot of work to construct. We believe that the overwhelming majority of this material would be out of the products used in Europe long before we could bring in a legislative ban.

Q217 Geraint Davies: What do you think, Mr Chave? Do you think the Government should have a middle line and say something like, "If you do not have 97% or whatever it is out within two years, we will legislate and ban it anyway" to give a bit of oomph, minimally, rather than just ban it?

John Chave: There are a couple of issues with banning it. I think we have made our position quite clear. We prefer voluntary action. About everybody agrees in this debate that plastic microbeads are really only a small part of the problem. There is a question of proportionality there.

Q218 Geraint Davies: Can I pick you up on that point? You have made it a number of times now. I know the Chair did refer to the general problem of plastics, which is fair enough, but what we are talking about, microplastics, are resilient little balls of plastic within certain parameters, from 5 millimetres down. They do not go away, they get in the ecosystem and stop oysters reproducing. We do not know what it is doing but we know it is not doing any good and we want to get rid of it. It may constitute 0.5% of all plastics but that is what we are focused on. It is a big problem.

John Chave: Our view is between 0.1% and 1.5%, just to clarify.

Q219 Geraint Davies: Yes. It is a massive problem, yes? You could say it is not as big as Trident missiles but that is not the point.

John Chave: It is a small fraction of an overall serious problem, I acknowledge that, but it is only a small fraction of the problem. If I could come back to the issue of the ban—

Q220 Geraint Davies: What is the problem with a ban, then?

John Chave: The difficulty with a ban is that, first, we think it is a little bit disproportionate given our contribution to the problem. The second point is that if we are going to address these kinds of issues, not just this issue but a range of environmental and other issues, we need to be incentivising and encouraging voluntary action. If we can find a way to address problems through voluntary action, we can probably save a significant amount of time and effort.

Also, do you not feel there is a little bit of risk that if you are going through with a ban on these products, which, as I say, are generally acknowledged to be a fractional part of the problem, you think, "We have solved the microbeads problem in the oceans. Let us move on to the next thing"? In reality, we would not have solved it at all because you would still have the tyre abrasions, you would still have the textiles and so on. Don't you think that going for a ban on one fractional part of the problem may distort the overall picture of what we want to address? If we can get voluntary action, let's do it the voluntary way.

Q221 Geraint Davies: You could have a comprehensive range of mandating change, couldn't you? You shouldn't do this and you shouldn't do that, according to the latest evidence on environmental harm. I do not understand the argument. You are saying, "You have banned one thing. There are other bad things you have not banned. That is not good enough". That could be an argument for banning everything, of course. Doing something in isolation that is good, is good, even if you do not solve the world.

John Chave: My argument was that if you have an industry that is clearly taking quite significant voluntary action, as we are, then you have gone some way to solving the problem. That voluntary action should be encouraged. It should be monitored and it should be followed through—we do not dispute that because we are doing that ourselves—but that should be incentivised and encouraged rather than necessarily going for a ban that, by general consensus, would not really tackle the bigger problem.

Q222 Chair: That is your general consensus. It may not be ours.

John Chave: It is a general consensus that we are only a small fraction of the problem. That is not disputed.

Chair: Can I just make a point? We are having trouble hearing you over the thunder and rain. We have closed the window and we might need to close the other window. If we can ask everybody to speak up because it is a bit of a challenge. Peter, you wanted a follow-up?

Q223 Peter Heaton-Jones: If I may, Chair, pick up precisely on what we have just been saying, I have to say I also don't understand the evidence we have just heard from you gentlemen, for a slightly different reason than Mr Davies says. That is that if the industry believes, as it apparently does, that it is important to phase out microbeads—you have told us how much work you are doing voluntarily to do so—you clearly therefore think the argument is that microbeads have to be eliminated. What is the problem with a ban?

John Chave: I go back to the point that voluntary action should be shown to be effective. I completely sympathise. If you take voluntary action and it does not work, then you are in new territory. It puts a little bit of an onus on the industry for us to come along to sessions like this and give you the evidence that in fact it does work. If you have voluntary action that is working and is applying to what we agree is a small part of the overall problem, then I simply say, "Why don't we concentrate our legislative guns on the bigger problem?"

You mentioned the situation in the United States, which is interesting. I thought you might raise the fact that in the United States you have a federal ban. There is a possibility in Europe, in theory, of a UK ban, national bans in different countries or a European Union ban. In the United States, you had a situation where you had lots of statewide bans and even county-level bans, going beyond the level of the state. You were in a slightly absurd situation where a manufacturer producing for the whole of the United States market would have to send completely different products to Illinois than it would send to Michigan or whatever. The ban in the United States, which is exactly in the scope of our recommendation, was to ensure a level playing field across the whole market.

I would say that in Europe, perhaps in future, if you can show that our ban is ineffective, we might be getting to that situation. I acknowledge that. But we are in a slightly different position to the United States. We do have strong voluntary action. We are being transparent with our data about whether it is working. I should add, perhaps, a point Chris has already alluded to. If we were to go beyond a UK ban to an EU ban, with the time it takes for the European Union machinery to click into action and go through—which those of us who live and work in Brussels are very familiar with and I am sure you are as well—then by the time they get the ban through they will have finished with the product.

Q224 Chair: Are you saying then that you would prefer an EU ban to a UK unilateral ban?

John Chave: No. From the Cosmetics Europe perspective, we prefer voluntary action with the proviso that—

Q225 Chair: You have made that very clear. If a ban is to be done, which would you prefer? You have just talked about the absurdity of county-wide and statewide bans in the United States. Do your members make for one market? They presumably manufacture and distribute across all markets.

John Chave: They do. We are not there yet. You are probably aware that there has been some discussion of a ban in France. Obviously there is discussion about the potential for a ban in UK. I think God is approving of my replies, or disapproving, I do not know. If you want to speak entirely theoretically, if there were completely different bans in every country in the EU-28 then it would make our lives impossible. We are not there yet.

Q226 Chair: It would or it would not?

John Chave: It would be difficult because effectively the EU single market in cosmetics will have collapsed.

Q227 Zac Goldsmith: I am interested in knowing how strongly you object to a ban. Is this a position that you feel so strongly about that you will apply pressure on the Government to not impose a ban or is it a fairly light opinion?

John Chave: Put pressure on the Government not to impose a ban?

Q228 Zac Goldsmith: How strong is your conviction on this issue? How much does it matter to your association members?

John Chave: It matters quite strongly because, to reiterate the point, we are quite concerned to be perceived as a responsible industry. A precondition of being perceived as a responsible industry is that when you identify a problem, you get off your backside and do something about it. We want to be able to say to people like you that we were doing something about it before we even consider a ban.

Q229 Zac Goldsmith: What is confusing about this is that you recognise the problem, you are committed to phasing these things out and you believe that you should be phased out, so we are all on the same page in terms of the issue. You have not given us, I believe, a clear, strong reason for opposing a ban other than preferring voluntary action. You have not given us a strong reason for opposing a ban and yet you are saying that you, as an organisation, strongly oppose a ban. It is hard to avoid a feeling of suspicion, if you add it all together, that the industry is not as committed as you say the industry is to phasing these things out. It is very hard to understand why else it would oppose a ban.

John Chave: Can I make two points in response to that? The first point is that if, as we believe, we are very substantially phasing it out—in other words, our voluntary commitment is successful—then if a ban were to be instituted you are talking about a

fraction of a fraction of a fraction of the problem. Currently, we are a fraction of the problem. If our voluntary action—

Q230 Zac Goldsmith: 100% is made up of 100 1%s. It is not an argument against dealing with that 1%.

John Chave: In terms of the time and resources, perhaps, that would be necessary to put in place a ban, it is a large weapon to attack what is a very small part of the problem.

Q231 Zac Goldsmith: That is the strongest argument you are putting forward and I have to tell you, it does not sound like much of an argument to me. I am trying to understand why, as a trade body, you would be so strongly opposed to the ban. I cannot think of any reason other than the fact that the industry is perhaps not as committed as you, unless you can give us a clear argument.

John Chave: Can I just reply to that point? I am prepared to go on record and say that if we cannot demonstrate that the ban is effective, then of course your argument is entirely valid and it is a different ball game. What we are asking for is time to show that our ban is effective. We have been transparent on this. Again, to go back to the point, if we were just verbally to make a ban, sit back and not follow it up, not be transparent with the outcome, then I think you would have very legitimate grounds to say, "They have promised voluntary action and it is not happening. Now we need a ban". We are not there yet.

Q232 Chair: Given that 11 out of 20 global brands still have microplastics and given that we have 680 tonnes a year going into the UK marine environment from UK manufacturing processes alone, is that not already enough of an argument? Are 680 tonnes of microplastics a year not a lot? Your argument seems to be that we ought to be doing things on tyres and on plastic bags. We understand all the other sources of marine pollution because we had the academics in and we have another academic coming to talk to us. We do understand that it is a small percentage of the plastic pollution but is it not worth still phasing it out, given that over 50% of global beauty brands still contain these pollutants?

Dr Flower: There is another element here that slightly goes back to the earlier question about whether or not a ban is an appropriate way forward. As an industry, we are taking what we believe is responsible action on this and should indeed be successful. Maybe not 100%, which goes back to the earlier point, but so close to being 100% that you possibly will not notice the difference. The concern I have, from the UK perspective, is the impression it gives that the industry is unable to take responsible action and has to be legislated against. That is a public perception that would then be picked up. It would be an unfair reflection on the action that we are trying to take.

Q233 Carolyn Harris: You have talked about the ban in America and you have talked about they would be able to provide one product in one place and one product in another. Presumably those products would do similar jobs. Why produce the products with microbeads in the first place if you can produce products that do a similar or the same job without the pollutants in?

John Chave: That is a good question. If you go back into the history of this issue, we find that before we identified the problem—we will all accept that there was a state of

knowledge at a particular time when we did not realise that not all of these were being picked up by the wastewater plants and so on—companies, who are constantly trying to improve their products like all competitive industries do, found that the particular abrasive qualities of plastic microbeads in scrub-off products were particularly good.

However, there are alternatives. In some of the evidence that you have already seen, you have talked about apricot kernels. I think the Eunomia report refers to walnuts. There is also silica. There are alternatives, you are quite right. You can replace plastic microbeads in scrubbing products with other products. That of course is what we are doing. Exfoliation as we know it is not going to disappear because of this voluntary action. Other products that are biodegradable and not pollutants, as you say, will go into the product.

Q234 Carolyn Harris: I understand you have to protect your industry but is the environment not more important?

Dr Flower: Yes, but what we are doing with the voluntary action is achieving what a ban would achieve but quicker. This is the basic argument.

Q235 Caroline Lucas: Just going back to your point about your reputation, you were making the case that in a sense, if you had to have a ban it would look as if it was not good enough and you did not have your own will to have the voluntary agreement. Now you are in the position, ironically, of opposing a ban, which is probably the worst of all worlds. As far as your reputation is concerned, that is far worse.

Dr Flower: I am not opposing a ban. Let us make it clear. What I am saying and what I think we are both saying is that we should allow our voluntary action to be shown first to be ineffective, in which case we would have no grounds for opposing a ban.

Q236 Caroline Lucas: If you are concerned about your reputation, as far as anybody outside these four walls is concerned, right now you are not in favour of a ban. For whatever good reasons you may think, I would simply put it to you that if reputation is one of your big concerns, you stand to risk far more reputational damage from being perceived to be against a ban.

Dr Flower: It is two sides of the same coin. To be honest, however we handle this there will be media outlets who will present us in a gloomy light. They will say, "The industry have made a voluntary recommendation but clearly it cannot work because there has to be a legislative ban". What we are seeing is that we can make it work. We are making it work. We will make it work. Therefore, there is no need for a legislative ban. We have made the point that if an inspection shows that we cannot do that job properly, then we would have no grounds for opposing a legislative ban.

Q237 Caroline Lucas: We have begun to talk about question 5 as well, the famous apricot kernels. Prior to synthetic microbeads, manufacturers were using naturally abrasive materials including the apricot pips, the cocoa beans and ground almonds. Why did we move to plastic in the first place?

Dr Flower: All of those natural materials have problems. There are consistency of supply issues and there are purity issues. They are natural materials so there is huge variability. If you have a bad season, you might not have the ingredient you want. When they are

delivered, they are not sterile. They have to be sterilised. They are also brown, which is not a good colour for cosmetics generally, so there are issues with that too. At the time, when somebody came along and said, "Look, we can replace this with something that is clean, consistent, easy to formulate and sterile," it seemed like a very sensible thing to do.

Q238 Caroline Lucas: Was any analysis given to the environmental impact at that time?

Dr Flower: With hindsight, which is of course 20/20 vision, nobody was thinking very much about the environment in all sorts of respects at that time.

Q239 Caroline Lucas: There was no warning at the time when the decision was being made?

Dr Flower: At the time, there was an advantage in that those were also very safe ingredients. If they were in products that were ingested either deliberately or accidentally—by deliberately I am thinking of toothpaste, for example, where you cannot avoid some ingestion—then they are inert. They are also very stable, which is part of the problem that we now recognise. Within the product formulation it meant that you had a shelf life that was not as critical as you have with a natural ingredient, where the granules can soften over time and therefore the performance of the product varies. That changes the whole distribution pattern.

Q240 Caroline Lucas: Of those different reasons for moving away from the more natural products to the synthetic, is it possible to say what was the most important?

Dr Flower: It would depend on the product type and the individual manufacturer, but largely it would be consistency of supply, ease of formulation and quality of the performance of the ingredient in the product. You can manufacture those pieces to be as abrasive or non-abrasive as you wish and as large or as small as you wish. They are very consistent.

Q241 Zac Goldsmith: I will just go the other way around. On this issue, the impact of microplastics is not fully understood. I think most people agree with that. The impact of marine plastic litter has been understood for many years, going back to the 1990s, which is when microbeads were first introduced. I just wonder why the industry did not consider that at the time that microbeads were being introduced and being flushed down a toilet. There must have been some consideration at the time. It must have been thought through a bit.

Dr Flower: To be honest, I do not think there was. Nobody was thinking about what we do with plastic in those days. You are right, it was the early days of looking at what is going into the ocean. People were starting to see large containers washed up on beaches and so on but this is the early days of thinking and it simply had not filtered through to the sort of discussion we are having today.

Q242 Zac Goldsmith: Just going back to the point that Caroline Lucas was making, how easily can the industry revert back to those older forms of microbeads, the apricot kernels and everything else?

Dr Flower: It is not easy, which is why it does take some time. The larger companies will find it much easier. They have people they can dedicate to reformulating. The smaller companies will take longer but then their turnover and—

Q243 Zac Goldsmith: I am sorry for interrupting. Given the progress that has already been made by a number of firms, have they not already made that transition?

Dr Flower: The large ones have, yes, indeed.

Q244 Zac Goldsmith: If they have already made the transition, the work has been done and the research has been done, the technology has been fine-tuned, what work is there for the other companies now to do? Surely the trailblazers have done that work for them.

Dr Flower: They will have to do it themselves. It is a very competitive industry and if you have now carved out a niche for yourself, it is unlikely that you would willingly give it away to your competitors.

Q245 Zac Goldsmith: Will the companies themselves be producing their own alternatives or will they be going to suppliers of those alternatives?

Dr Flower: They would be going to suppliers for those.

Q246 Zac Goldsmith: The suppliers will want to be supplying all the competitors as well, surely.

Dr Flower: Certainly. It is incorporating that into the finished formulation. That is where the real skill lies. You can now buy the ingredients because there will be suppliers gearing up to provide these.

Q247 Zac Goldsmith: Going back to the very early point, when I came in slightly late—I apologise—and you were talking about the difficulties for smaller businesses, those smaller businesses will still be going to those same suppliers and buying the same products?

Dr Flower: Yes.

Q248 Zac Goldsmith: I am still struggling to understand why, for them, this is a big disadvantage.

Dr Flower: It is constructing the formula in which to put them. You cannot simply take out the microbeads and slot in something else. The product may not work. It may completely fall apart as an emulsion. It may not last. You may find that the preservatives you have in one product simply do not work when you are using a different ingredient. It can be a very complicated thing. Experts within large companies will have had the experience to know some of the obvious tracks to take. Some of the smaller companies will not even have their own in-house expert, they will be buying in the expertise and they may be at the end of a queue for that.

Q249 Zac Goldsmith: In the first hearing we had, Dr Van Sebille said that producing the alternatives was not so much a cost issue as a shelf life issue. Can you give us some examples of products that have overcome that shelf life problem and are succeeding?

Dr Flower: I can't but I could imagine that overcoming the problem would be by reorganising your distribution to ensure that you do not have stock in warehouses or in distribution centres for as long as would be okay with a more stable formulation. You need a faster throughput, which requires a lot more attention to stock control and distribution.

Q250 Zac Goldsmith: The last question is that for all the alternatives that are out there, like the apricot kernels and the other examples that have been given, has there been any work done on the wider implications of a rush towards those products in terms of sustainability, environmental safety, ethical trade and so on? Has that research been done? If so, what are the wider implications?

Dr Flower: I do not know of that having been done. I would imagine that the suppliers are very well aware of those sorts of questions because if they are now facing a dramatically increased demand for that sort of replacement material, they will need to know whether or not they can sustainably supply that. It may be that currently the material they would be supplying is effectively a waste material or it may be that it also currently has another use, in which case there would be a cost fight as to who gets the material.

Q251 Carolyn Harris: I too would like to apologise for coming in late. My inbox alerted me to this problem and then I did a little bit more investigation. I downloaded an app to my phone called Beat the Microbeads. Then I went into my bathroom and I scanned all the products, and all the ones that did not comply were binned. People who are not aware of this will not know that these products are dangerous. They are not going to be able to read the back and say, "That is not right. That is not right. That is not right." What do you believe the industry should be doing to raise awareness for the consumer?

Dr Flower: One of the problems with those apps, and it is something I have discussed with Fauna & Flora International, is how they identify the product. It is usually by the barcode. Is that correct? Yes. The barcode may not change when the formulation changes if the product is essentially the same. You will have binned a product where the microbeads have been taken out and replaced with something else.

Q252 Carolyn Harris: That is even more reason for you to take responsibility to mark the products to raise awareness.

Dr Flower: This goes back to the answer we gave earlier, which is that, in effect, changing labels in that way will take longer for the large companies than phasing out, which they are well on track for doing anyway.

Q253 Carolyn Harris: That is not an answer to raising awareness for people who do not want to buy the products that contain microbeads. The fact that they do not know what is in it is unfair. There should be a way the industry can allow this information to be out there. A small jar of product, 150 millilitres, can contain over 3 million plastic beads. I do not want that kind of jeopardising influence in my bathroom. Do you not think the industry should be making people aware of this?

Dr Flower: Currently, the only way to do that would be effectively to post an advert saying, "Do not buy my product".

Carolyn Harris: What about putting something on the packaging? Something simple? A sticky label?

Q254 Chair: You are happy to keep selling this stuff as long as people are ignorant of what they contain.

Dr Flower: No, far from it. We are already—

Q255 Chair: You are saying that people will not buy it if they know. If they do know, they will not buy it and you do not want to tell them.

Dr Flower: The problem would be how to tell them. There is product out there that is—

Carolyn Harris: Marked packaging.

Q256 Peter Heaton-Jones: Chair, if I may, this is exactly the point that I was asking about when I questioned you first. As you say, packaging. We are well down the road of consumers being able to understand quite clearly and make their own decisions based on information given to them on packaging. We have that now on all edible products. We are told how much fat, how many sugars are in it. Surely consumers can be trusted to make their own sensible decisions if you can give them the packaging?

John Chave: Can I just interject? Many of our companies, as you know and as we have discussed at some length in this session, are going to be phasing out microbeads. That being the case, you are absolutely right. We fully agree consumers have a right to know that the company has made the decision to phase out. We expect to be in a position relatively shortly, before 2020, where the vast majority of these products will not contain microbeads. Many of the big producers have already said their products do not contain microbeads. It would be wrong in principle if, given that voluntary action that the industry has undertaken, consumers were afraid that there were microbeads in the products. In fact, it would be completely contrary to the companies' interests if they had gone down the road of reformulation, which we know in fact that they are doing. You make a perfectly valid comment there.

Q257 Carolyn Harris: What of the consumers' interests? Are we ignoring the consumers' interests?

John Chave: Absolutely, I am talking about the consumers' interests. It is absolutely important that consumers should be aware that the product does not have microbeads when the companies have phased them out, so there is no confusion.

Q258 Carolyn Harris: I asked about the companies with products that do have them in. Should not the responsibility be with the company to make sure the consumers are aware that that product contains microbeads?

Dr Flower: I do not know whether it is a competitive issue. It is certainly a challenge. I fully understand the point you are making, of course, but the practical side of it may well

be extremely difficult to implement and it may take longer than simply following through the recommendation that these are phased out.

Q259 Geraint Davies: So the idea would be you would just say, "Warning, microbeads" and of course not many people want to buy it; obviously they might have to trade down the price, but that would be very strange. You would be encouraging it.

John Chave: In fact, with the rise of the mobile apps that we have been talking about, which is a phenomenon that is only going to grow and grow and grow, then it would be relatively easy to expose the companies that are continuing to include microbeads in their products. I know they made the point about the effectiveness of the ban, because of—

Q260 Chair: Are they the ones that did not accept the invitation to appear here today? All five of them, the big five, refused to accept.

John Chave: I understand that you have had some written submissions from companies.

Q261 Chair: Including from companies that have apparently phased out completely, so they do not want to come and talk about the good story.

John Chave: I understand that you have had written submissions from companies that were invited to attend, and between Chris and I, we represent the UK market and the European cosmetics market so we are broadly speaking about the entire market, which must be of some value.

Chair: Minus 15% in the UK of SMEs, and we still have not had the answer about this 11 out of 20 brands that still have them in and so on. A final supplementary from John. He has been waiting very patiently.

John Mc Nally: No, I am quite happy. I can wait until Carolyn has finished anyway. Do you want me to ask?

Chair: Yes.

Q262 John Mc Nally: It was interesting, the talk about small businesses being unable to react quicker than the big companies. I have done a bit of research in my own area of Falkirk, where we have a company called Scottish Fine Soaps, and they are not a global name but they are quite a successful small/medium business. They export fairly well all over the world, and I believe they use castor oil products quite a lot, and they have phased out all the microbeads plastics completely, and they are trading, as far as I know, quite successfully. That would seem to suggest that, yes, it can be done at a small-scale business.

John Chave: We did not say it could not be done. We said we wanted to give a longer time. Can I just make a general point about this, about our association? You have to remember that we are a huge coalition of companies with diverse products, diverse sizes, obviously diverse countries, diverse markets. What we wanted to do was come together with a single recommendation that would apply across the board. That implies a little bit of give and take and a little bit of compromise so that we can finally get the deal done. We did decide to put what you might call wiggle room or whatever in there. We are not saying—to avoid misunderstanding—that it cannot be done. We did not want to get in a

situation, as Chris has said, where we were squeezing smaller members, where we know there might be a problem. I am delighted that the company in your constituency has managed to do that, and that is great. You can be fairly sure it will not always be so easy. It depends on the products. It depends on some of the factors that Chris has underlined.

Chair: I think we are going to leave the session there because we have a vote at 4 pm and we have another witness that we want to interview. We are going to go into private session for five minutes, so can I ask people to leave the room? We will call you back in four and a half minutes' time. Thank you very much indeed, gentlemen. It has been very interesting.

Examination of Witness

Witness: **Professor Richard Thompson**, Professor of Marine Biology, Plymouth University, gave evidence.

Q263 Chair: Professor Thompson, sorry to keep you. We were having a very interesting discussion. Professor of Marine Biology at Plymouth University. Thank you for taking the time to be with us today. I know it is quite a journey from Plymouth, so thanks for being with us.

In 2004, your team described the impact of microplastics on the marine environment. You coined the phrase; you are perhaps the godfather of microplastics. How far has our knowledge developed in the 12 years since then, and what level do you think our knowledge is at now, compared to those times?

Professor Thompson: In 2004, we knew already that there were small pieces of plastic in the ocean, and our paper really described pieces that were truly microscopic, less than the diameter of a human hair, and that is what started this trend of researching what is now described as microplastics. I have listened to the earlier evidence sessions, and I think is important that we think about the definitions and what we are talking about. The most broadly accepted definition is now pieces less than 5 millimetres, which is not what you might consider to be truly microscopic, but that was brought in by NOAA. It is more or less universally acknowledged, but there would be some that would say maybe less than a millimetre would be a better recognition. There are some issues with definitions.

A lot of what I have heard in terms of the discussions by this panel have related to microbeads, which of course is something that you might or might not want to legislate about, but they are an aspect, a subcategory, of microplastic, and sometimes I have heard the words used a little bit interchangeably. Microplastic is small bits of plastic. Microbeads from cosmetics are one contributor to that.

To answer your question of what we have learnt, we have learnt that microplastics in general are widely distributed in the marine environment. They are present on shorelines across all of the continents. They are present in remote regions, including the Arctic. They

are very abundant in remote habitats such as the deep sea. They are widely distributed in marine organisms. In some populations, we are talking about 85% to 90% of individuals containing microplastic, but at relatively small quantities. We have a fair picture of distribution.

Our understanding of sources is patchy, and I think it is based largely on estimates of what might be their relative importance. We could certainly weight the likely importance of fragmentation of larger items, which are progressively breaking down into these smaller pieces, against, let us say, microplastics from cosmetics, which I would perfectly agree is a smaller proportion of the total.

In terms of the harm that the microplastics might cause, we know from laboratory experiments that creatures will ingest this material quite readily. There is some evidence of retention. There is some evidence of physical effects. There has been concern raised about the possible transfer of chemicals from plastics to organisms on ingestion. At the moment, the evidence base there is less certain, in my view, and it may well prove that its physical effects are the ones that, going forward, are more definite and categorical ones relating to harm, or it could be that it is some combination of the two, its physical effects and biological effects. Our scientific understanding of the harm is in its infancy, I would say, and a lot of the laboratory experiments, even some of the best ones, are probably using doses that are higher than you would find typically in the natural environment. That is not an unreasonable way to proceed but it is the state of the evidence at the moment.

Q264 Chair: When you came in 2013 to the Science and Technology Committee, you said the evidence is still relatively new and our knowledge is limited. Why do you think our knowledge is progressing so slowly in this area? Is it just that 2004 was when we realised it was an issue, and then we are just 10 years in, which means effectively it is in its infancy?

Professor Thompson: I think there has been a lot of experimental work done. It is quite a challenging issue. It depends also to some extent on the interplay with the policy need: what kind of evidence is there that is required from this perspective? Obviously a greater understanding of harm, but then if you consider that a lot of the microplastics are resulting from larger items that are fragmenting into smaller pieces, we already know that some of those larger pieces are causing harm, and what you are talking about is a continuum of litter from very big pieces down to pieces that may be smaller than a few microns in diameter, and you are talking about a complex mixture of many different polymers, different shapes, different sizes, possibly with different additive chemicals. It is quite a complex thing to try to disentangle. You also have the possibility of co-contaminants attaching to the plastic and then potentially being released. The number of permutations here in terms of understanding harm is quite substantial. It maybe has not helped the science that there are so many different possibilities. There is considerable concern that you could give an all-clear when there was not actually an all-clear; it was a question of the few examples that you had chosen to look at. It is a question of trying to study things in the round and consider all the possibilities.

Certainly a lot more work has been done. If you look at the scientific publications since 2004, it is an exponential curve, so there is a lot more known but maybe not as categorical as you might like in terms of hard and fast evidence. One of the questions that policymakers often put to me is: is plastic causing a population-level negative effect? That

is going to be almost impossible to answer because there are so many other environmental challenges that face the natural environmental that isolating the effect of plastic on its own, let alone microplastic, is going to be almost impossible and I would argue perhaps prohibitively expensive. In the context of MSFD, where we are wanting to move towards a status of no harm, what is the definition of harm that we are working to? To some extent there is a question of: what is the evidence that is needed? I think that discussion with scientists would be useful in terms of what are the critical tipping-points from a policy point of view. Certainly we realise there is a need to gather more evidence on harm, and that is what we are trying to do, but if there was an aspiration to get evidence at a population level, then that is going to be almost impossible to obtain.

Q265 Chair: You talked about physical and biological effects. When you talk about biological effects, is that the bit where the chemicals accrue into the plastics and then potentially harm the fish?

Professor Thompson: Sorry if there was confusion there. We have physical effects from the mere presence of the plastic itself, and there is also concern of chemical toxicity associated with the transfer of chemicals from the plastics to the organisms after they have ingested them.

Q266 Chair: From the plastics to the organisms. That is the biological, chemical—

Professor Thompson: I would say they are both biological. We have physical and chemical toxicity. At the moment, the evidence is clearer in terms of harm from the physical presence of plastics. The issue with the chemical toxicity is not that the chemicals will not transfer; it is a question of trying to set that into a wider context. Of course, the environment is heavily contaminated with all manner of chemicals, including some of the chemicals that are latched on to the plastic, so separating the additional role of the plastics as a vector in the transfer is the challenge there. It is not challenging to establish that plastics can transfer. They do. What is challenging is to understand exactly how much worse does the presence of plastic make things in terms of chemical transfer.

Chair: Thank you for clarifying that.

Q267 Peter Heaton-Jones: I want to go back, Professor Thompson, to the terminology stuff that we talked about to start with, the very basic stuff. Forgive me for the simplicity of these questions, but what proportion of all the plastic that is washing around in our oceans is microplastic?

Professor Thompson: It depends whether you want to do the sums by abundance or by weight.

Q268 Peter Heaton-Jones: Which would you prefer?

Professor Thompson: If we take them by abundance, which is particularly important if we are thinking about a risk assessment because it will link to encounter rate—the more of something there is, the more likely are these creatures to encounter it—then there is clear evidence that microplastics are the most numerous fraction. If you take that by weight, then you will get a different answer because there are still some very large items of plastic that might only be one or two in number but they are weighing a lot. A lot of the data that

we have on marine litter in general is by numerical abundance rather than by mass. There are complications with mass because some of the litter is wet, some of it is fouled by marine organisms, so it is harder to get that data. It is not impossible, but in terms of routine monitoring it tends to be done by count. Microplastics can be very numerous. On some shorelines, we know that they far outnumber the larger items, but if you looked at it by weight, you could get a slightly different picture.

Q269 Peter Heaton-Jones: Understood. Of microplastics, what proportion of those are microbeads found in cosmetic products?

Professor Thompson: We can only hope to try to estimate that. If we look at data from the industry, that suggests that 680 tonnes of microbeads are used in cosmetics every year. I obtained permission to bring some microbeads in, if you wish to look at them, because I was not sure if you had actually seen them. With your permission, Chair, I will circulate these. Each of these jars matches one of the containers it has come from. That is number 3, which matches that one. There was a paper relating to these published in 2015. Some of these manufacturers may have taken steps to remove the particles since then, and I do not think that it is a case for trying to name and shame particular manufacturers because, as you have heard already, they are widespread. These pairs match up. These are widely used in the industry. The container that you have over there, Carolyn, contains about 3 million particles of plastic. It is not about naming and shaming necessarily individuals, but their use is quite considerable—

Q270 Peter Heaton-Jones: Professor Thompson, sorry, I do not want to pin you down necessarily, but what proportion of microplastics would be microbeads from cosmetic products?

Professor Thompson: If we say that 680 tonnes a year, which is an industry figure, is used as microbeads in cosmetics, some of that is going to pass through sewage treatment and into the marine environment. Some of it is going to be captured in sewage treatment. There are uncertainties about how much might be captured by sewage treatment. However, there is a residual question there of what happens to the material that you do capture in sewage treatment, and I have been trying to obtain reliable data from the water authorities as to what proportion is incinerated and what is returned to the land. If it is returned to the land, then the total emission to the environment is going to be equivalent to the total production. A worst-case scenario: let us assume that all of the tonnage of microbeads that are produced each year for the UK use, the 680 tonnes in the UK, is potentially going back to the environment. That puts it in the region of 1% or so of the total marine litter to the environment based on estimates of marine litter entering the marine environment from the UK. Those estimates of the total marine litter to the environment in the UK are quite noisy. They are ranging from 10 tonnes to 250,000 tonnes. We have no clear figure on what the total emission is of all litter in the UK to the environment. The figure of the relative proportion of microplastics is dependent on two things: first, the data on the microbeads, which I think is quite reliable because we know the production statistics, the 680 tonnes. If you want to look at it as a percentage, it is more dependent on our uncertainty over the other.

Having said all of that, 680 tonnes I do not think is a trivial amount. If you want to compare that to the mass of litter that is removed by the Marine Conservation Society in

their annual beach cleans, we could be talking up to 70 times the amount of litter that is removed from beaches by volunteers in beach cleans. It might be small in percentages, but to me what that illustrates is the scale of the wider problem, rather than trivialising the issue relating to microbeads as a source.

Q271 Peter Heaton-Jones: It is perfectly legitimate, in your expert opinion, to be focusing on microbeads in cosmetic products as being a problem that is—if I can put it like this—worth tackling? It is not so trivial that we should be looking elsewhere?

Professor Thompson: I think it is worth tackling, and I think particularly in my view it is worth tackling because I see it as an unnecessary and an avoidable emission to the environment. What we need to be clear on is that any action on microbeads on its own is not going to solve the problem. While I was delighted to see a number of nations introducing legislation, and I see that as a positive move, I have a concern in the back of my mind that I would not want that to be seen as a tick in the box that marine litter issues are now solved because 1% or 2% of the problem has been solved by eliminating microbeads from cosmetics. I have a concern there that we must recognise that this is only part of the problem, but it is an important part and it is something that action could be taken on, yes.

Q272 Geraint Davies: If I can take you forward then, what do you think can be done to deal with the existing plastics in the ocean? We are talking at the moment about not making the problem worse, but there is all this plastic, as you said. What can we do about that?

Professor Thompson: My view is that the appropriate place to take action is stemming the flow. If I had an amount of money to invest as a philanthropist, I would be spending at the moment 99% of it on stemming the flow and 1% on clean-up. As I started to move towards stemming the flow, I would increase my expenditure on clean-up, but we need to recognise at the moment that it is going in far faster than we can attempt to clean it up. It is present in the deep sea, thousands of metres beneath the sea surface. It is present in coral reefs. It is present in a wide range of marine organisms. The idea that we would want to invest money in clean-up in perpetuity seems to be the wrong way to go. We need to think about stopping the input. I could expand that more as to what you might do, if you want me to, in terms of action to stop inputs, but that is where I would place my emphasis.

Q273 Geraint Davies: On stopping the flow. If we do not have a ban and there is an ongoing flow, albeit diminished, is it the case that water and sewage plants are able to trap these particles before they go into the sea, so they do end up going down the sink? What is the situation there?

Professor Thompson: It would depend on the efficiency of the sewage treatment plant, and there is evidence that some sewage treatment plants will potentially trap more of these particles than others. If you use a sound filter, there is a need for some kind of back-flushing, which may then result in an emission. There is also the question of whatever solids you separate from the sewage, what do you do with those solids? If they are incinerated, then I suppose everything that is there is removed from the equation. If they are spread back on to land, then they are spread back on to land with the plastic

contaminants. It is quite hard to separate the plastic from all of the other solids that you have in a sewage treatment plant.

Q274 Geraint Davies: Really you are saying we should put a full stop to the flow of more of this stuff into the environment. I think you are saying that. You did not have any particular solution for the current stock of contaminants. Are there ways to clean up our oceans, or not really?

Professor Thompson: To be clear, I think it is far simpler to eliminate the microbeads at source, rather than try to develop an expenditure on more sophisticated sewage treatment. Elimination at source is the way forward.

In terms of litter that is already in the ocean, it is completely worthwhile to try to remove it. Voluntary beach cleans are very important. However, it is not a long-term answer. We will be cleaning up in perpetuity unless we take action to stem the flow, and that relies on taking action across a range of different inputs. We need to recognise there that there is not a single solution. With microbeads, it may be a question of introducing a ban. If you look at the types of litter, larger litter that are fragmenting into smaller items, about 40% of it is single-use items of plastic. We have already—and I think very responsibly—taken action on single-use plastic carrier bags because they were seen as being largely unnecessary. We could take a plastic bag with us.

Some of the things that we do with plastic—plastic is not the enemy here. Let us be clear on that. It brings many societal benefits. It has the potential to reduce our footprint on the environment, but there are a lot of things that we do with plastic that cannot be solved by a ban. What we need to achieve is a much more systemic thinking. I caught the end of the session from the cosmetics manufacturers earlier on, and some of your questioning drove towards that when you were asking, "What happened 20 years ago when these materials were being phased in? Was there no precautionary principle?" Maybe there was, maybe there was not, but that is what is absolutely needed, in my view: a recognition at the beginning, at the design stage of a product, of what is its fate at the end of its lifetime. If we are thinking of introducing legislation—and I heard you grappling with whether or not there should be a ban, and what that would do to small industry or not, and what the message would be from a ban or not—it is about trying to give a message to industry that what is needed is to take that precautionary principle right at the outset when you are starting to think about a change.

In my view, we did know about marine litter 20 years ago. We knew quite a lot about it. The first scientific paper on microbeads in cosmetics was back in 1996. It is not a new thing. It may be new in the wider public interest, but this is not a new problem, the likelihood that they would pass to the environment.

Q275 Geraint Davies: You are talking about microplastics, but you also said 40% of plastic is single-use packaging.

Professor Thompson: Yes. Single-use items of packaging, yes.

Q276 Geraint Davies: Yes, so what do you think should happen about that?

Professor Thompson: What should happen?

Q277 Geraint Davies: Yes. Do you have any particular idea on policy? Should it stop altogether?

Professor Thompson: I will give you an example here.

Q278 Geraint Davies: I know what you are talking about, but what should we do about it?

Professor Thompson: Let me give you a simple example relating to policy. These are PET bottles. If I talk to a recycler, these are the low-hanging fruit. These are the most widely recyclable polymer that we have, PET. They are both delivering a soft drink. They both weigh the same amount. The introduction of colouring in this one means that from a recycler's point of view there is almost no economic incentive to recycle it because it limits the applications that they can use the recyclate for. This one is potentially worth five times more to them. What is the colouring doing? It is not to do with getting the goods safe to the consumer or extending the shelf life. It is to do with marketing. If I look at these bottles in Japan, I will find that the same brand that is green here is clear, because the association have got together to move towards clear PET, which has a higher value. Where we need to go is to make sure that at the design stage we incorporate value for recovery at the end of the life, because it is that value that will make sure that the material gets collected, rather than wasted into landfill or into the environment.

Q279 Zac Goldsmith: I am going to be very quick. I just want to go back to the ecological impacts briefly. We heard at the last session from the Marine Conservation Society that they believe that the microplastics have had the effect of reducing reproduction in oysters by 36%. I am interested in very briefly knowing whether you accept that figure, if that is something you are familiar with, and what you believe the impact will be more widely on the fishing industry.

Professor Thompson: The figure is true from those experiments. Those experiments, however, are relatively high-dose compared to what an oyster might encounter in the natural environment. I do not think that that is a widespread phenomenon with oysters. I think that the high-dose experiment has yielded those results. There is at the moment a discrepancy between linking some of the lab evidence, where, by necessity, you are maybe using a single polymer of a single size in a particular dose, whereas in the natural environment you are faced with a heterogeneous mixture of different sizes and different types of polymer. That makes that particular lab experiment, in my view, a very high-dose experiment.

Q280 Zac Goldsmith: We also have heard that microplastics can be inhaled by humans. Can you elaborate on that? Can you tell us what you believe the impact of that would be, what the implications are?

Professor Thompson: If you have fine dust particles that are airborne, of course there is the potential for them to be inhaled, as there is with a range of other particulates. We hear about it from exhaust fumes. The potential for small particles of plastic to be inhaled is certainly a real one, but I do not think that that is an issue that relates to marine litter. I do not think we are going to be inhaling dust that has come back from the sea or that has come back from seafood. I think that the environmental exposure to most humans is

probably going to be in and around the home, the office, the workplace, rather than coming back from the environment.

As to what the consequences of that might be, we really do not have any clear understanding. There is some data from high exposure, chronic exposure in factories of effects on workers there, but that is very different to what you might encounter as an average citizen.

Q281 Zac Goldsmith: In a line, we have heard from almost every panel that we do not know everything there is to be known about the harmful impacts of microbeads and microplastics, but surely it is also the case that we know enough already, even though we do not know it all, to apply something more than the precautionary principle, that there is enough evidence there to justify a phase-out or a ban, depending on your politics and where you are coming from. Would you accept that?

Professor Thompson: That would certainly be my opinion.

Q282 Zac Goldsmith: There are no doubts in your mind; we know enough already to justify—

Professor Thompson: We know enough already. When you consider that there is 4% of oil production going into making plastics, if we recovered those plastics at the end of their lifetime, we could use that to recycle. If we consider that we know that there is harm from large items of plastic, and that is very clear, a list of over 700 species that encounter large items of plastic, that large items of plastic are one of the main things that are fragmenting into smaller items, along with the microbeads in cosmetics, and the plastic in the oceans is going to be cumulative. It is not going to biodegrade. At some point, we are certainly going to reach a perspective where your oyster example maybe is more environmentally realistic. In my view, yes, we are at that position where there is enough evidence to take action. Of course, we could always ask for more evidence.

Zac Goldsmith: Thank you.

Q283 Caroline Lucas: We were just touching on the issue of ingestion. Is it your view that that is an area that just needs far more research before we can even begin to decide what the balances are in terms of the need to raise awareness and the need to develop policy responses to it?

Professor Thompson: It is similar to Zac's question. In my view there is already a substantial body of evidence. Of course it would be desirable to collect more evidence, but particularly when we start to think about the quantities of larger items of plastic that are fragmenting into microplastics—and this inquiry is about microplastics in general, and cosmetics are part of that—then we have a lot of evidence already about the harm that those larger items of plastic can do. Microplastics are part of the picture that we are starting to understand, but I would not necessarily consider—put it this way—that an absence of knowledge about the full extent of any problems to do with microplastic is a reason to delay on action relating to larger items of litter that we already know quite a lot about. It is a part of the picture, I would say.

Q284 Caroline Lucas: It was human ingestion in particular. That was the missing word, sorry, in my question.

Professor Thompson: Sorry. We know very little about that. It would need to come from laboratory experiments, not with humans, and that may be an area that requires more work in the future. It depends a little bit on whether or not the emissions of plastic to the environment can be stemmed, because if we can solve the problem in other ways then the human exposure pathway that you are talking about may not actually be realised.

Q285 Carolyn Harris: Last question. Do you believe that the insufficient evidence is allowing manufacturers to get away scot-free, or a get-out-of-jail card?

Professor Thompson: No. I do not think that manufacturers are going out of their way to do harm to the environment, but there is a question about being aware of what the end-of-life fate of a particular product is. In the case of the microbeads in cosmetics, it seems inevitable that they are going to pass, or a proportion of them, into the environment through sewage, and we have a growing body of the evidence that that might cause. I do not think the lack of evidence is a reason not to take action and I do not think it is a reason for manufacturers not to take action.

Q286 Carolyn Harris: What about funding for research? Is that easy to come by, or is it more difficult to get funding?

Professor Thompson: Funding is challenging at the moment, I have to say, but our research has been funded. It has been funded by Defra, it has been funded by the Leverhulme Trust, it has been funded by the European Union. We have an ongoing study that is funded by NERC. There is funding, but of course, depending on the rate at which these questions are to be answered, it is going to be limited by available funding, yes.

Chair: Thank you. Professor Thompson, thank you for taking the time to be with us today. We have had a bit of a gallop through the science, but that has been very interesting and I am sure you will await the conclusions of our report with interest.

Professor Thompson: Thank you very much.