



LEGAL CONTROL MEASURE FOR THE MANUFACTURE AND  
DISTRIBUTION OF PRODUCTS CONTAINING MICROBEADS  
COMPONENTS IN THAILAND

BY  
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AN INDEPENDENT STUDY PAPER SUBMITTED IN  
PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF MASTER OF LAWS  
(BUSINESS LAWS)

GRADUATE SCHOOL OF LAW  
ASSUMPTION UNIVERSITY

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## ABSTRACT

This Independent Study Paper has been prepared with the purpose of identifying the problems of the legislation that related to control on the manufacture and distribution of products containing microbeads in Thailand namely Hazardous Substance Act B.E.2535(1992) (HSA1992) It focuses on both legal and practical problems by comparing to microbeads control law in the United Kingdom namely The Environmental Protection (Microbeads) (England) Regulations 2017(EPR2017) in order to point out the difference on the matter alike, as well as to provide solutions to problems that might occur.

This Independent Study Paper found out that it is likely to have microbeads contamination in the marine environment of Thailand and nowadays there is still no any legal for controlling on the manufacture and distribution of products containing microbeads in Thailand. Even though there is the HSA1992 that related to microbeads control and have the same purpose with the EPR2017, the HSA1992 still have the practical problem because there is no the notification of the ministry identified microbeads as hazardous substance according to section 18 paragraph 2 of the HSA1992. So non-notification of the ministry due to microbeads identification into the HSA1992 leads to the lack of microbeads control law in Thailand. If Thailand still have no attention to this problem, there will be many marine environmental problems from microbeads contamination that may threat not only marine animals but also the human in the future. In case of there are damage from microbeads contamination in the marine environment, nobody have responsible for this damage because there are no any microbeads control law. From the study of microbeads control law in the



United Kingdom, it is found that there is specific law (The EPR2017) for controlling on the manufacture and distribution of products containing microbeads. The EPR2017 defined the meaning of microbeads clearly and specified controlled products comprehensively. Accordingly, the researcher suggests the guidelines to solve the loophole on the enforcement of the HSA1992 for controlling on the manufacture and distribution of products containing microbeads by issuing the notification of the ministry specified microbeads as hazardous substance according to section 18 paragraph 2 of the HSA1992 and applying the definition of microbeads, as well as controlled products according to the EPR2017.



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# Chapter 1

## Introduction

### 1.1 Background of the problems

The deterioration of natural resources due to microplastics contamination is likely to produce severe consequences, especially regarding the marine environment. Several research studies indicate evidence of such on microplastics in the marine ecosystem. Microplastics are plastic particles that are smaller than 5 mm. in diameter. Before 1970, a major cause of microplastics contamination had been due to the degradation of plastics. However, at the present the major cause is the microbeads used in rinse-off products and other cosmetics and skin care products.<sup>1</sup> Microbeads from cosmetics and skin care products are estimated to make up 0.01% to 4.1% of the total microplastics entering the marine environment.<sup>2</sup> The fact that this accounts for only a small percentage of the total microplastics pollution within the sea does not stop it from becoming a significant environmental problem that can be prevented. A report by Francois G, an ecologist estimated that between 4,594 and 94,500 microbeads could be released during a single use.<sup>3</sup> In addition, microbeads are also the most-known source of microplastics contamination. Every time people use products that contain microbeads, the plastic microbeads travel down into the drain along with

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<sup>1</sup> Thompson RC, Olsen Y, Mitchell RP et al. Lost at sea: where is all the plastic? Science2004: 304, 838., at <http://science.sciencemag.org/content/304/5672/838>, (last visited 27 December 2017).

<sup>2</sup> Study to support the development of measures to combat a range of marine litter sources, Eunomia, 29 January 2016., Report for European Commission DG Environment, at <http://ec.europa.eu/environment/marine/good-environmental-status/descriptor-10/pdf/MSFD%20Measures%20to%20Combat%20Marine%20Litter.pdf>, (last visited 27 December 2017).

<sup>3</sup> Francois G. et al., *Marine pollution Bulletin*, at <http://www.sciencedirect.com/science/article/pii/S0025326X1500449X>, (last visited 3 November 2017).

water, as they are too small to be filtered. The increased effectiveness of wastewater sewage treatment could potentially eliminate many microbeads. However, each liter of sewage contains approximately 1-7 microbeads which can travel through waste water sewage treatments and finally end up in our rivers, lakes and ocean.<sup>4</sup> Although the numbers of microbeads that are able to travel through waste water sewage treatments appear quite low, it is crucial to note that every day large amounts of water are used by the global population. This means that even treated water will act as a conductor transporting large amounts of microbeads into the lakes, rivers and ocean, ultimately causing severe microplastics contamination in the planet's waters.

The accumulation of microplastics in the ocean can lead to several adverse effects. Small-sized microplastics can be ingested by marine life. This can cause contamination of microplastics within the food chain of marine organisms starting from organisms at lower trophic levels such as plankton, invertebrates up to organisms of higher trophic levels.

In addition, microplastics themselves are comprised of toxic ingredients and have the ability to transfer chemicals such as PAHs, PCBs and PBDEs during plastic degradation to the marine environment.<sup>5</sup> Studies indicate that a quarter of all fish sold in Californian markets contain microplastics and fibers in their guts.<sup>6</sup> In addition, studies regarding the effects of microplastics on human health or marine ecology indicate that if a person eats six oysters contaminated microplastics, it is likely they would have ate 50 particles of microplastics.

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<sup>4</sup> Martin A and Smith M, Quantitative analysis of microplastics in WWTP Effluent in the Niagara Region (2014), at <http://www.static1.squarespace.com/static/53b0c13fe4b0825a4fd22f09/t/546b8e08e4b07e88a24a2c47/1416334856566/FinalReportMicroplasticsChrisMartin+and+OlgaEizhvert+ina.pdf>, (last visited 3 November 2017).

<sup>5</sup> Suleeporn S. et al., The effects of plastics on health and environment, Journal of Toxicology and Environmental (2013) pp.39-52., at <http://www.thaitox.org/media/upload/file/Journal/2013-1/04article.pdf>, (last visited 27 December 2017).

<sup>6</sup> Dianne Depra, A Quarter Of Fish Sold At Markets Contain Plastic And Fiber: Study, at <http://www.techtimes.com/articles/88731/20150926/a-quarter-of-fish-sold-at-markets-contain-plastic-and-fiber-study.htm>, (last visited 3 November 2017).

Many countries in Europe as well as the United Kingdom have now increased their awareness of the problem of microplastics contamination in marine ecologies. Such countries have begun educating people on the effects and dangers of using products composed of microbeads. For example, the United States and Canada have already enacted laws banning the use of microbeads.

In early January 2018, United Kingdom banned plastic microbeads by enacting The Environmental Protection (Microbeads) (England) Regulations 2017(EPR2017). The EPR2017 prohibit the manufacture and sale of rinse-off personal care products containing microbeads. The prohibition on the manufacture of products containing microbeads took effect on 1 January 2018 and the prohibition on the sale of such products will enter into force on 30 June 2018. Many other countries, including Australia, Austria, Bangladesh, Belgium, China, India, Indonesia, Ireland, France, Luxembourg, Malaysia, the Netherlands, New Zealand, Norway, Sweden, the United Kingdom and Taiwan are considering passing similar laws.

In Thailand, although no research studies have been reported regarding the route and effects of diffused microplastics in the environment, research studies have indicated evidence of microplastics contamination at the Chaolao and Koongviman beaches in Chanthaburi. The report indicated that microplastics debris were found at Jaolao beach of approximately 76.8 to 130.8 pieces per square meter during the rainy season and 106.7 to 200.3 pieces per square meter during the dry season. At Koongviman beach, 143.5 to 205.9 pieces per square meter of microplastics debris were found during the rainy season and 37.6 to 508.2 pieces per square meter of microplastics debris were found during the dry season. In addition, a study report further indicated that the contamination of microplastics in bivalve at Chaolao and Koongwiman beaches in Chanthaburi. From both research studies, the most common form of microplastics found was fiber, and the second most common form was a spherical structure which corresponded with the appearance of microbeads.<sup>7</sup> Increased awareness and attention must be given to resolving this problem of microplastics

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<sup>7</sup> Marine and Coastal Resources Research and Development Institute and Burapha University Faculty of Marine Technology. The survey and classification of microplastics debris in marine, at [http://www.dmcr.go.th/mcrdi/book\\_detail.php?id=304](http://www.dmcr.go.th/mcrdi/book_detail.php?id=304), (last visited 27 October 2017).

contamination, otherwise, there will be severe consequences on marine ecologies that may eventually impact and threaten human life.

Currently, Thailand has enacted alternative laws to control the manufacturing and distribution of products containing microbeads, namely the Hazardous Substance Act B.E. 2535 (1992) (HSA1992). “Hazardous Substances” under the HSA1992 are specified under the notification of the Ministry of Industry of Thailand. However, at the present the Ministry of Industry has not issued a notification specifying microbeads as a Hazardous Substance. As a result, the manufacturing and distribution of products containing microbeads are not currently controlled or regulated by any laws in Thailand, while other countries have already enacted specific laws to ban the manufacturing and distribution of products containing plastic microbeads.

Hence, the researcher would like to examine legal measures regulating the manufacture and distribution of products containing microbeads in the United Kingdom through a comparative legal study in order to show the problem of microbeads contamination in Thailand with its solution.

## **1.2 Hypothesis**

Thailand should pass laws and regulations controlling the manufacture and distribution of products containing microbeads in Thailand to prevent harm caused by microbeads contamination towards public health and the environment, especially the marine environment.

## **1.3 Research Objectives**

The purpose of this independent study is to conduct research on the legal control of manufacturing and distribution of products containing microbeads by examining the relative laws of Thailand and that of the United Kingdom. The objectives of this research shall be as follows:

1.3.1 To address the problem of microbeads contamination in the environment, particularly the marine ecology, and to study environmental principles relating to laws controlling microbeads production and distribution;



1.3.2 To study the relative laws of Thailand and the United Kingdom on the control of the manufacture and use of microbeads;

1.3.3 To address the problem on laws to control manufacturing and distribution of products containing microbeads in Thailand;

1.3.4 To analyze the problem on laws to control manufacturing and distribution of products containing microbeads in Thailand; and

1.3.5 To propose a guideline for the amendment of microbeads control law and the application other non-legal measures to support microbeads control law in Thailand.

## **1.4 Scope of Research**

Due to the limitations of time and my experiences, this independent study is focused only on the laws to control manufacturing and distribution of products containing microbeads by conducting a comparative study between Thailand's Hazardous Substance Act B.E. 2535 (1992) and the United Kingdom's Environmental Protection (Microbeads) (England) Regulations 2017 to answer the question that Thailand should pass laws and regulations controlling the manufacture and distribution of products containing microbeads in Thailand or not.

## **1.5 Research Methodology**

This independent study adopts a qualitative method through an analysis of primary sources and secondary sources in addressing the problem of microbeads contamination in the environment and examining the laws controlling the manufacture and distribution of products containing microbeads in Thailand by comparing with those of the United Kingdom from the following sources:

1.5.1 The primary sources of fact are: (1) an interview of an expert and (2) a survey of a sample product containing microbeads sold in supermarkets in Thailand including internet information. The primary sources of the law are: (1) the Hazardous Substance Act B.E. 2535 of Thailand and (2) the Environmental Protection (Microbeads) (England) Regulations 2017.

1.5.2 The secondary sources of fact come from both Thai and foreign study reports, theses, news, articles and journals about microplastics contamination in the environment. Another secondary sources of the law are Our Common Future (1987) published by the World Commission on Environment and Development and the Earth Summit's Rio Declaration (1992), books and journals including internet information.

## 1.6 Research Expectations

1.6.1 To study environmental principles on the control of manufacture and distribution of products containing microbeads;

1.6.2 To address the gaps of alternative laws of Thailand on the control of manufacture and distribution of products containing microbeads; and

1.6.3 To provide possible means for amending the relative microbeads control law in Thailand.



## Chapter 2

### Facts and Principles of Law on Microbeads Control

#### 2.1 Introduction

This chapter sets out general facts on microbeads such as the definition and use of microbeads, the pathway of microbeads contamination and the adverse effects of microbeads contamination on the environment, particularly on marine ecology. In addition, the chapter also explains the general principles of environmental law relating to microbeads control law, namely the sustainable development principle and the precautionary principle, and that microbeads control laws in the United Kingdom are consistent with such principles.

#### 2.2 Definition and Use of Microbeads

##### 2.2.1 Definition of Microbeads

In considering the definition of microbeads, it is useful to know what microplastics are as microbeads are a type of microplastics.

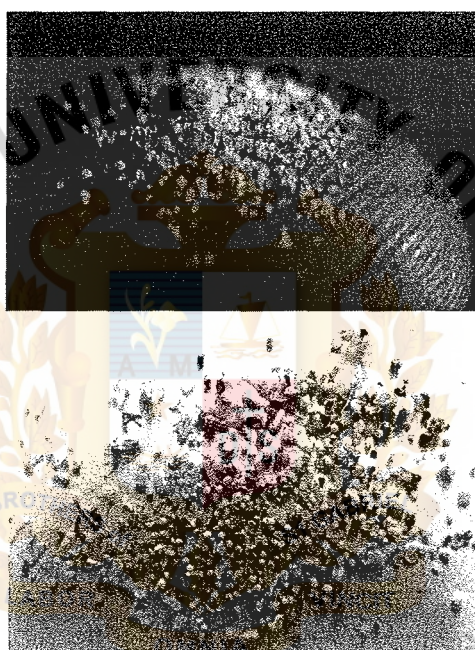
There are many scholars point out the definition of microplastics and microbeads. Greenpeace, the international environmental organization define “Microplastics” as tiny pieces of plastic which are smaller than 5 millimeters.<sup>8</sup> They are used in some cosmetic and personal care products such as exfoliating products. Microplastics can be generated as a by-product, for example, from fibers from clothes, particles from tires, and abrasive sandblasting and microbeads from facial cleansers.<sup>9</sup> Other microplastics come from the degradation of larger plastics (macroplastics) in the

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<sup>8</sup> Greenpeace UK, “Environmental impact of microplastics”, Journal of environment (April 2016), at <https://publications.parliament.uk/pa/cm201617/cmselect/cmenvaud/179/17904.htm>, (last visited 2 November 2017).

<sup>9</sup> Ibid.

out due to their minuscular sizes.<sup>19</sup> Increasing evidence of this issue continue to appear. At the present, many companies have increased their awareness and have already banned the inclusion of microbeads in their products. However, some companies continue to include microbeads in their exfoliating products as the costs of manufacturing microbeads are cheaper than the manufacturing of other alternative materials.<sup>20</sup>



**Picture 1** Examples of microbeads contained in rinse-off products<sup>22</sup>

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<sup>19</sup> Olivia Solon, “New York calls for ban on face scrub microbeads”, *Journal of Environment Law* (May 2014), at <https://arstechnica.com/tech-policy/2014/05/new-york-calls-for-ban-on-face-scrub-microbeads/>, (last visited 10 December 2017).

<sup>20</sup> Siddika Sultana, “Microbeads! Unfold Health Risk and Environmental Pollutant,” *Ibid.*, p. 3.

<sup>22</sup> Sophie Bushwick, “What Are Microbeads And Why Are They Illegal?,” *Journal of Environment* (December 2015), at <https://www.popsoci.com/what-are-microbeads-and-why-are-they-illegal>, (last visited 23 November 2017).



## 1. Reason for the Use of Microbeads

Currently, Microbeads are being used in many cosmetics products. The main reasons for the use of microbeads in such products are not only that microbeads are better for exfoliation than natural materials such as groundnut, seashells or crushed apricot seeds, but owing to the fact that they are also significantly cheaper when it comes to mass production.<sup>23</sup> Moreover, Microbeads can provide a gritty texture to cleansers so that they can create traction on the top layer of the skin to eliminate dirt and grease. “I think everybody loves a little bit of abrasiveness to their facial cleansers,” said Dr. Buka, a dermatologist. “It helps take off makeup; it helps take off impurities from the toxins of a city day.” However, both Dr. Buka and Dr. Jaliman, whom are dermatologists, agree that many of us who exfoliate regularly have no idea that microbeads are contained in exfoliating products.<sup>24</sup> Most people are not aware of the adverse effects of microbeads on the environment since most people rarely ever read product labels to find out the ingredients of the products which they have purchased.<sup>25</sup>

## 2. Products Containing Microbeads

Microbeads are primarily used for exfoliating in face washes and body scrubs, adding color and texture to toothpastes, lip balms, moisturizing creams and cosmetics.<sup>26</sup> They may also be added to over-the-counter drugs.<sup>27</sup> There is biomedical and health science research indicating that microbeads are also used in microscopy techniques,

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<sup>23</sup> Siddika Sultana, “Microbeads! Unfold Health Risk and Environmental Pollutant,” Ibid., p. 9.

<sup>24</sup> Siddika Sultana, “Microbeads! Unfold Health Risk and Environmental Pollutant,” Ibid., p. 9.

<sup>25</sup> Rebecca Adams, “Microbeads! Unfold Health Risk and Environmental Pollutant,” Ibid., p.9.

<sup>26</sup> Julia Lurie, “Your Toothpaste May Be Loaded With Tiny Plastic Beads That Never Go Away”, *Journal of Environment* (May 2015), at <https://www.motherjones.com/environment/2015/05/microbeads-exfoliators-plastic-face-scrub-toothpaste/>, (last visited 15 December 2017).

<sup>27</sup> Ibid.

fluid visualization, fluid flow analysis and process troubleshooting.<sup>28</sup> In addition, they may also be used in other consumer goods including cleaning products and printer toners as well as in industrial products such as abrasive media (e.g., plastic blasting), industry (e.g., oil and gas exploration, textile printing, and automotive molding), other plastic products (anti-slip and anti-blocking applications) and for medical applications.<sup>29</sup>



**Picture 2** Example of microbeads in facial cleanser<sup>31</sup>



**Picture 3** Example of microbeads in toothpaste<sup>33</sup>

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<sup>28</sup> Siddika Sultana, “Microbeads! Unfold Health Risk and Environmental Pollutant,” *Ibid.*, p. 9.

<sup>29</sup> Norwegian Environment Agency, “Sources of microplastic-pollution to the marine environment” *Journal of Environment* (2014) at, <http://www.miljodirektoratet.no/Documents/publikasjoner/M321/M321.pdf>, (last visited 15 December 2017).

<sup>31</sup> Sophie Bushwick, “What Are Microbeads And Why Are They Illegal?,” *Ibid.*, p.10.

<sup>33</sup> *Ibid.*

### 3. People Awareness on Product Containing Microbeads

Most people did not know that the little beads in products used by them are actually bits of plastic. In the United States, the Food and Drug Administration (FDA) requires that if a product contains microbeads, the manufacturing company is required to list the ingredients. Currently, this requirement is not made mandatory by all countries yet, but many manufacturers list their ingredients on the label anyway. If any of the following ingredients appear on a product label: polyethylene, polypropylene, polyethylene terephthalate or polymethyl methacrylate, this means that the product contains plastic, and as a result the user is being duped into contributing to plastic pollution in the environment.<sup>34</sup>

Once people use such personal care products containing microbeads to the skin, significant amounts of microbeads are released and enter the drain to wastewater treatment plants. As mentioned, the small size of microbeads means they are not equipped to be filtered out by wastewater treatment. Microbeads are discharged directly into surface waters and then will accumulate in the marine environment. This is a brief background on the pathway of microbeads contamination to marine ecology which will be explored further below in 2.3.

### 2.3 Pathway of Microbeads Contamination to Marine Ecologies and the Evidence on Microbeads Contamination in Marine Ecologies in Thailand and Foreign Countries

Nowadays there are many reports on the pathway of microbeads contamination to marine ecology in foreign countries such as the report study of the environmental audit committee appointed by the House of Commons, the research study of 5 Gyres Institute on the accumulation of microbeads in the ocean. In Thailand, although no research studies have been reported on the route and effects of diffused microplastics in the environment, there is a study on the evidence of microplastics contamination.

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<sup>34</sup> Eunha Hoh, "Plastic Microbeads: Ban The Bead!," *Journal of Science*, at <https://storyofstuff.org/plastic-microbeads-ban-the-bead/>, (last visited 16 December 2017).

This research study was conducted by the Marine and Coastal Resources Research and Development Institute in cooperation with the Faculty of Marine Technology, Burapha University. The study has indicated that there are microplastics contamination at Chaolao and Koongviman beaches in Chanthaburi.

### **2.3.1 Pathway of Microbeads Contamination to Marine Ecology**

Most of the debris in the planet's oceans are large pieces of plastic debris such as fishing equipment, bottles and plastic bags. However, nowadays, microplastics are the dominant type of plastic debris found in the planet's oceans.<sup>35</sup> From the report study of the Environmental Audit Committee appointed by the House of Commons, it was found that microplastics contamination occur at water surfaces including shorelines around the world. In addition, microplastics contamination is also present in remote locations and deep-sea sediments including arctic sea ice.<sup>36</sup> It was estimated by the 5 Gyres Institute that a total of 15 to 51 trillion microplastic particles have accumulated in the ocean, weighing between 93 to 236 thousand metric tons.<sup>37</sup> Nevertheless, there are large variations in such estimates due to insufficient data, differences in models and fundamental knowledge gaps.<sup>38</sup>

Before the 1970s, the major source of microplastics contamination had been the degradation of larger plastics due to catalyzing factors such as emissions of ultraviolet light.<sup>39</sup> However, at the present, the major sources of such contamination

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<sup>35</sup> Chelsea M. Rochman, "ONE TUBE OF FACIAL SCRUB CAN CONTAIN MORE THAN 330,000 PLASTIC MICROBEADS!," *Journal of Science*, at <https://www.5gyres.org/microbeads/>, (last visited 16 December 2017).

<sup>36</sup> Marcus Eriksen, "Environmental impact of microplastics," *Journal of Environment* (July 2016), at <http://data.parliament.uk/WrittenEvidence/CommitteeEvidence.svc/EvidenceDocument/Environmental%20Audit/Environmental%20impact%20of%20Microplastics/written/31804.html>, (last visited 16 December 2017).

<sup>37</sup> Chelsea M. Rochman, "ONE TUBE OF FACIAL SCRUB CAN CONTAIN MORE THAN 330,000 PLASTIC MICROBEADS!," *Ibid.*, p. 7.

<sup>38</sup> Marcus Eriksen, "Environmental impact of microplastics," *Ibid.*, p.8.

<sup>39</sup> Chelsea M. Rochman, "ONE TUBE OF FACIAL SCRUB CAN CONTAIN MORE THAN 330,000 PLASTIC MICROBEADS!," *Ibid.*, p. 7.



are the microbeads used in rinse-off products and other cosmetics products.<sup>40</sup> When people use such personal care products containing microbeads to the skin, significant amounts of microbeads are always released and enter the drain to wastewater treatment plants. As mentioned, the small size of microbeads means they are not equipped to be filtered out by wastewater treatment and are discharged directly into the water surface.<sup>41</sup> In 2014, the report of the New York State Attorney General's Office found that 25 out of 34 wastewater treatment plants discharged microbeads in their effluents.<sup>42</sup>

There are currently numerous reports on the evidence of microbeads contamination in marine ecology both in Thailand and foreign countries.

### **2.3.2 Evidence of Microbeads Contamination in Marine Ecologies in Thailand and Foreign Countries**

#### **1. Thailand**

##### **1) Study Report**

In Thailand, although no research studies have been reported on the route and effects of diffused microplastics in the environment, a research study has indicated evidence of microplastics contamination at Chaolao and Koongviman beach in Chanthaburi. This research study was conducted by the Marine and Coastal Resources Research and Development Institute in cooperation with the Faculty of Marine Technology, Burapha University. The report indicated that microplastics debris were found at Chaolao beach of approximately 76.8 to 130.8 pieces per square

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<sup>40</sup> Ylva Olsen, "Lost at Sea: Where Is All the Plastic?", *Journal of Science* (June 2004), at [https://www.researchgate.net/publication/8575062\\_Lost\\_at\\_Sea\\_Where\\_Is\\_All\\_the\\_Plastic](https://www.researchgate.net/publication/8575062_Lost_at_Sea_Where_Is_All_the_Plastic), (last visited 17 December 2017).

<sup>41</sup> Marcus Eriksen, "MICROPLASTIC POLLUTION IN THE SURFACE WATERS OF THE LAURENTIAN GREAT LAKES", *Journal of Environment* (January 2014), at <http://oneearth-oneocean.com/microplastic-pollution-in-the-surface-waters-of-the-laurentian-great-lakes-2/>, (last visited 17 December 2017).

<sup>42</sup> Siddika Sultana, "Microbeads! Unfold Health Risk and Environmental Pollutant," *Ibid.*, p. 9.

meter during the rainy season and 106.7 to 200.3 pieces per square meter during the dry season. At Koongviman beach, 143.5 to 205.9 pieces per square meter of microplastics debris were found during the rainy season and 37.6 to 508.2 pieces per square meter of microplastics debris were found during the dry season. When considering the difference in the amount of microbeads between the rainy season and dry season, it was found that a higher amount of microplastics were found during the rainy season than during the dry season. The most common form of microplastics found was fiber, and the second most common form found were of a spherical shape.<sup>43</sup>

In addition, the report also found microplastics in sediments. Microplastics were found in sediments at Chaolao beach at approximately 34 to 75.5 pieces during the rainy season and 25.86 to 60.96 pieces during the dry season. At Koongviman beach microplastics were found in sediments at approximately 24.8 to 60.5 pieces during the dry season. The amount of microplastics found in sediment at Jaolao beach was similar to the amount for Koongviman beach. The most common form of microplastics found was fiber, and the second most common form was formless.<sup>44</sup>

In addition, a study report further indicated that the contamination of microplastics in bivalve at Jaolao and Koongwiman beaches in Chanthaburi. There are two types of bivalves in this study: *Danax* sp. and *Paphia* sp. The results indicate that the level of microplastic contamination in *Danax* sp. in Jaolao beach was quite similar with that of Koongwiman beach which was 0.38 to 5.88 particle/individual and 0.14 to 6.1 particle/individual. The density of microplastic in *Paphia* sp. Jaolao beach was 9.28 to 13.34 particle/individual. The most prevalent type of microplastic was fiber for both Jaolao beach (82.3%) and Kungwiman beach (78.9%). The most common microplastic color in this study was black (23.12%) in Chaolao beach and blue (25.29%) in Koongwiman beach. The average size of

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<sup>43</sup> Department of Marine and Coastal Resource and Burapha University Faculty of Marine Technology, The survey and characteristic of Microplastics debris in marine at <http://www.dmcg.go.th/attachment/download/download.php?WP=oKE3MrkCoMOahKGtnJg4WaN1oGy3ZRjmoH9axUF5nrO4MNo7o3Qo7o3Q>, (last visited 17 December 2017).

<sup>44</sup> Ibid., p.9.

microplastic in Chaolao beach was 51.4 to 140  $\mu\text{m}$  in width and 536 to 3,082.2  $\mu\text{m}$  in length. Meanwhile, the average size of microplastic in Koongwiman beach was 41.1 to 167.7  $\mu\text{m}$  in width and 465 to 2,555  $\mu\text{m}$  in length.<sup>45</sup>

From both study reports, it can be inferred that microplastics contamination largely exists within Thailand's marine environments, such as on the seashore and in sediments which includes the habitats of marine animals.

## 2) Interview of Experts

In supporting the fact that microbeads contamination is now occurring in Thailand's marine environments, the researcher has proceeded to gather further information by interviewing two Thai experts such as (1) Dr. Suchana Chavanit (Associate Professor of Marine Ecology/Deputy Director of Chula Unisearch) and (2) Dr. Varongsiri Kemsawasd (Ph.D. (Food Microbiology) of Mahidol University).

(1) Dr. Suchana Chavanit (Associate Professor of marine ecology / Deputy Director of Chula Unisearch) interviewed on 8 December 2017.

**Question 1:** What's your opinion on the usage of microbeads in products (e.g. Facial cleanser, scrub, peelings, and toothpaste)? Should we use natural substances (e.g. coconut residue)?

**Answer:** Well-known cosmetics brands have already banned microbeads because of concerns regarding their effects on the environment, leading to the reduction of microbeads in quantity. Some countries have already seen them banned. Only some cosmetics brands still use microbeads in their products. However, in my opinion Thailand shouldn't use microbeads anymore, although that would depend on the law of each countries.

**Question 2:** What is your opinion on the awareness of microbeads contamination in academic groups and general people in Thailand?

**Answer:** That's a good question. The people who work in the plastic industry or researchers may be aware, but in general most people aren't. Some

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<sup>45</sup> Pitipong Tharamon, "Contamination of microplastic in bivalve at Chaolao and Kungwiman beach Chanthaburi province," *Journal of Environment* (2016), at [http://marine.chanthaburi.buu.ac.th/file\\_research/2016-02.pdf](http://marine.chanthaburi.buu.ac.th/file_research/2016-02.pdf), (last visited 18 December 2017).

don't even know what microbeads are and how they affect the environment. There isn't much concern regarding this topic..

**Question 3:** From the Microplastics Contamination study report which found microplastics on Jaolao and Koongviman beach as well as microplastics in shell at Chanthaburi, do you think microplastics that were found are likely to be microbeads used in products?

**Answer:** It's probable. However, it's essential to identify what kind of microplastics to specify their sources, because you could be mistaken by looking at them with your naked eye. Sometimes they look like microplastics, but they're not. Special equipment is required to identify whether they are microplastics.

If it's microplastics, is it likely to be microbeads?

**Answer:** It's possible but it's needed to check carefully because sometimes just looking at the shape isn't enough.

**Question 4:** What is your opinion on the contamination of microbeads in marine ecology and how do they affect marine animals and humans?

**Answer:** We still do not know how microbead contamination affects humans. However, the research found that microbead contamination may affect marine animals such as shrimp and other nearby species. Even though we don't know how microbead contamination directly affects ourselves, we could be affected by the shrimp we eat.

**Question 5:** Nowadays, many countries such as the United State enact a law to control the manufacturing and distribution of products containing microbeads, but there is yet to be any legal measures in Thailand. What is your opinion on this?

**Answer:** If other countries already have legal measures to control the issue, then Thailand should as well in order to prevent the problem before having to find a solution. Thailand always enact the law to solve a problem, not to protect. We should be following the good examples showcased by other countries. However, this could depend on the government's awareness of the issue.

**Question 6:** In your opinion, what should the legal measure be? Should microbeads be banned or not?



**Answer:** Yes, that's correct because other countries have already banned microbeads. Microbeads should be banned. It just depends on whether Thailand can do it or not.

(2) Dr. Varongsiri Kemsawasd Ph.D. (Food Microbiology)  
interview on 25 December 2017 at Mahidol University:

**Question 1:** What's your opinion on the usage of microbeads in products (e.g. Facial cleanser, scrub, peelings, and toothpaste)? Should Thailand use natural substances (e.g. coconut residue)?

**Answer:** Foreign countries have campaigns on using peach seeds as scrubs or peelings, which are replaceable microbeads because of their naturally degradable materials. However, we must be concerned of material's acrimony. Therefore, they need to be downsized so that when used as facial scrub, you will not be irritated.

**Question 2:** What is your opinion on the awareness of microbeads contamination in academic groups and general people in Thailand?

**Answer:** Mostly there is a focus only plastic rather than microbeads. As far as I know, there are no data collections on products containing microbeads sold in Thailand. Moreover, the public don't know that microbeads are used in products (such as facial cleansers) as a kind of plastic.

**Question 3:** From the Microplastics Contamination study report which found microplastics on Jaolao and Koongviman beach as well as microplastics in shell at Chanthaburi, do you think microplastics that were found are likely to be microbeads used in products?

**Answer:** It's possible but such microplastics may also be other degradable plastics. Natural plastics contaminated in marine life are degradable but could take a long time. We need to use special equipment to identify that they are microbeads used in products or just microplastics from the degradation of macroplastics. We cannot separate them by the naked eye. However, it is possible that microplastics found in the research are microbeads. The more people use products containing microbeads, the more microbead contamination will occur. Because microbeads are very small in size, they will be filtered out from waste water treatment systems.



**Question 4:** What is your opinion on the contamination of microbeads in marine ecology and how do they affect marine animals and humans?

**Answer:** Plastic contamination will negatively affect marine life and its environment because the degradation of plastics creates harmful toxins. In addition, microplastics or microbeads may be eaten by marine animals such as fishes or shells before then being consumed by humans.

**Question 5:** Nowadays, many countries such as the United State enact a law to control the manufacturing and distribution of products containing microbeads, but there is yet to be any legal measures in Thailand. What is your opinion on this?

**Answer:** The United States and many countries in Europe have already banned microbeads because many studies report that there is microbeads contamination in treated water as well as shells. Because there was sufficient scientific evidence identifying microbeads contamination in the environment and food chain, laws were enacted to provide control. In Thailand, there aren't enough studies on microbeads contamination. Accordingly, our first step should be conducting more research on the results of microbeads contamination and Waste Water Treatment to know the quantity of microbeads contamination in the environment. If Thailand can make the public concerned about these problems, it may be reflected and then enacted by the law.

**Question 6:** In your opinion what should the legal measure be? Should microbeads be banned or not?

**Answer:** The first step should be a voluntary measure by starting a campaign to educate people about the effects of microbeads contamination to the environment. And then when people are concerned, Thailand consider enacting the law for control.

From interviewing experts, it can be concluded that microplastics found at Jaolao and Koongviman beach and microplastics in shell at Chanthaburi from the study reports are likely to be microbeads used in cosmetic products. However, they also agree that to identify whether the microplastics found were in fact microbeads, special equipment is required. Microbeads can't be seen only by the physical eye. Microbeads contamination in the environment has an adverse effect on marine animals, such as shrimps and shells. Because of the small size of

microbeads, they may be eaten by marine animals unintentionally and then consumed by humans, thus causing contamination on ourselves. Both Dr. Suchana and Dr. Varongsiri agree that nowadays, in general, Thai people in general are not concerned about microbeads. Some people don't even know what microbeads are and how they affect the environment. "The first step to control the manufacturing and distribution of products containing microbeads in Thailand is to start with doing more research on the results of microbeads contamination and educating people on its effects on the environment. Then when Thailand have sufficient evidence and general people concerned, Thailand consider enacting the law to control," Dr. Varongsiri said. However, Dr. Suchana has the opinion that if other developed countries already have legal measures to control this microbeads issue, Thailand should as well because Thailand should enact laws to protect rather than waiting for problems and then solving it. Thailand should change the concept to enact laws for protection like other countries. However, it all depends on government's awareness of the effects of microbeads contamination on the environment.

### 3) The survey of sampling products containing microbeads sold in Thai supermarkets

While other developed countries have already enacted the law to ban microbeads, there still are a lot of products containing microbeads sold in Thailand without any legal control. So, the researcher conducts a survey by sampling rinse-off products such as facial cleanser, scrubs and toothpaste that specifically contain microbeads and are sold in Thai supermarkets (Max Value and Tops). This survey was created on November 3, 2017.

The survey found that there are a lot of products specifically containing microbeads, with the ingredients commonly considered to be Polyethylene (PE), Polypropylene (PP), Polyethylene-Glycol (PEG) Polymethyl methacrylate (PMMA) and Nylon (PA) sold in Thai supermarkets.<sup>46</sup> The following table shows the categories of products containing microbeads sold in Thailand.

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<sup>46</sup> International Campaign Against Microbeads in Cosmetics, [This product contains microplastics!](http://www.beatthemicrobead.org/ProductTable.php?colour=2&country=AU&language=EN), at <http://www.beatthemicrobead.org/ProductTable.php?colour=2&country=AU&language=EN>, (last visited 3 November 2017).

**Table 1: Products containing microbeads sold in the Thai supermarkets**

Category	Product Name	Chemicals considered to be microbeads contained in products				
		PE	PP	PMMA	PA	PEG
Facial Cleanser	Neutrogena Deep Clean Foaming Cleanser					<input type="checkbox"/>
Facial Cleanser	Neutrogena Deep Action Daily Pore Cleanser			<input type="checkbox"/>		
Facial Cleanser	Neutrogena Clear Fairness Cleanser	<input type="checkbox"/>				
Facial Cleanser	Dove Radiant Skin Cleanser	<input type="checkbox"/>				
Scrubs/Peelings	Neutrogena Deep Clean Blackhead Eliminating Daily Scrub	<input type="checkbox"/>				
Toothpaste	Colgate Optic White Enamel White					<input type="checkbox"/>
Toothpaste	Sensodyne Whitening Repair and Protect					<input type="checkbox"/>
Toothpaste	Sensodyne Repair and Protect					<input type="checkbox"/>

From Table 1, The first category is facial cleansers. These are Neutrogena Deep Clean foaming cleanser, Neutrogena Deep Action daily pore cleanser, Neutrogena Clear Fairness cleanser and Dove Radiant skin face cleanser, all sold in the supermarkets in Thailand. Those products were identified containing Polyethylene-glycol (PEG), Polyethylene (PE) and Polymethyl methacrylate (PMMA).

The second category is scrubs or peelings, such as Neutrogena Deep Clean blackhead eliminating daily scrub identified as containing Polyethylene (PE).

The third category is toothpastes. These are Colgate Optic White Enamel white, Sensodyne Whitening repair and protect, and Sensodyne Repair and protect, all containing Polyethylene-glycol (PEG) and sold in Thai supermarkets.

Interestingly, there are no labels stating that these products contain microbeads. This shows that the consumer has no chance of knowing whether these products contain microbeads. This also reflects that Thailand is not concerned about the harmful effects of microbeads on humans, animals, plants and the environment, while foreign countries such as United State, United Kingdom and Canada have already enacted laws to control products containing microbeads.

## **2. Foreign Countries**

### **1) Study Report**

There are many reports on the evidence of microbeads contamination in environment and the deterioration of natural resources from microbeads contamination. In 2015, a UK scientific study on the quantity of microbeads in facial scrubs reported that the tested products could contain between 137,000 to 2,800,000 microbeads per bottle 250ml.<sup>47</sup>, while a study by an American non-governmental organization (NGO) 5 Gyres estimated that one single care product (Neutrogena's Deep Clean) contains 360,000 microbeads.<sup>48</sup> In addition, Dr. Sherri Mason, Professor of Chemistry at SUNY Fredonia, while working with 5 Gyres Institute, found plastic particles in all five of the Great Lakes, adding that “The counts obtained, especially those within Lakes Erie and Ontario, rival those within the world's ocean. Even

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<sup>47</sup> Adil Bakir, “Characterisation, Quantity and Sorptive Properties of Microplastics Extracted from Cosmetics,” *Journal of Environment*, at [https://researchportal.port.ac.uk/portal/files/3082039/Characterisation\\_Quantity\\_and\\_Sorptive\\_Properties.pdf](https://researchportal.port.ac.uk/portal/files/3082039/Characterisation_Quantity_and_Sorptive_Properties.pdf), (last visited 17 December 2017).

<sup>48</sup> Amy DuFault, “Ditching microbeads: the search for sustainable skincare,” *Journal of Cosmetics* (May 2014), at <https://www.theguardian.com/sustainable-business/microbeads-cosmetics-gyres-plastics-pollution-makeup>, (last visited 7 December 2017).



further, what surprised us the most is the size of the particles we found. To date, approximately 70% of the plastic we skim off the surface of the Great Lakes is between one third and one millimeter in diameter”.<sup>49</sup> Furthermore, there are random samples initiated by Plastic Soup Foundation and North Sea Foundation in February 2016 that identified over 100 personal care products containing microbeads are available in Australia and that these products were mainly facial and body scrubs<sup>50</sup>. In terms of the relative contributions to microplastics pollution, a range of studies have looked at the number and concentration of microbeads in individual products.<sup>51</sup>

Nowadays Microbeads have become so pervasive, it was estimated that around 808 trillion pieces of microbeads go down American drains every day. When these microbeads go through Waste Water treatment, about 99 percent of the beads settle into sludge, which is frequently used as fertilizer. Due to rain, these microbeads can still enter into the water supply. At the same time the other one percent that fled the sludge—approximately 8 trillion microbeads are released directly into our waterways. It’s enough plastic to cover 300 tennis courts.<sup>52</sup>

From the abovementioned details it could be inferred that when people use products containing microbeads, these plastic microbeads go down the drain. Although the Waste Water Sewage Treatment is more efficient, and many microbeads may be eliminated, there are still 1-7 microbeads per liter of sewage that can travel through waste water sewage treatments because they’re too small to be filtered. And then they end up in our rivers, lakes and oceans. Even though the number of microbeads that can travel through waste water sewage treatments are quite low, there is a lot of water that people use per day. It means that the treated water are

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<sup>49</sup> Cody Primmer, “Emerging Pollutants: Microbeads,” *Journal of Environment* (2015), at <http://www.cayugalake.org/microbeads-emerging-issue.html>, (last visited 17 December 2017).

<sup>50</sup> Ibid.

<sup>51</sup> Siddika Sultana, “Microbeads! Unfold Health Risk and Environmental Pollutant,” Ibid., p. 9.

<sup>52</sup> Sophie Bushwick, “What Are Microbeads And Why Are They Illegal?,” Ibid., p. 4.



the conductors that took a lot of microbeads into the ocean. In summary, there will be plenty of microplastics contamination in the ocean.

Today's Greenpeace report says that "around 36.5 per cent of fish that were caught by trawlers in the English Channel contained synthetic polymers." Moreover, the report also found that "there are synthetic polymers in cod, haddock and mackerel too". Around 83 per cent of Norwegian lobsters had microplastics contamination. Polyethylene used in microbeads are most commonly plastics found in North Sea and Baltic fish. There is Portuguese study stating that microplastics were found in 20 per cent of 263 commercially-caught fish. In addition there is an analysis of 121 fish caught in the Mediterranean, including tuna and swordfish, concluding that there are plastic debris in 18 per cent, and a field study collecting fish in the North Pacific found 35 per cent contained plastic fragments.<sup>53</sup> In addition, this report also showed a list of many products containing microbeads sold in supermarkets and drug stores in the United Kingdom which the researcher would like to discuss in the next topic.

2) Report of products containing microbeads sold in the United Kingdom.

From today's Greenpeace report there are many products containing microbeads sold in supermarkets and drug stores in United Kingdom. The researcher will categorize the products using the following table.

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<sup>53</sup> Sean Poulter Consumer Affairs Editor for The Daily Mail, "Revealed: Plastic is found in a THIRD of fish caught in Britain because of toxic microbeads used in shower gels, toothpastes and beauty products", *Journal of Cosmetics*, at <http://www.dailymail.co.uk/news/article-3759269/Plastic-fish-caught-Britain-toxic-microbeads-used-shower-gels-toothpastes-beauty-products.html>, (last visited 17 December 2017).

**Table 2: Products identified containing microbeads sold in supermarkets and drug stores in the United Kingdom from today's Greenpeace report**

Category	Product Name	Ingredient
1. Facial Cleanser	<ul style="list-style-type: none"> <li>- Neutrogena blackhead eliminating sos cleanser</li> <li>- Biore warming anti-blackhead cleanser</li> <li>- Sisley, Phyto-blanc buff and facial wash gel</li> </ul>	<ul style="list-style-type: none"> <li>- Polyethylene</li> <li>- Polytetrafluoroethylene</li> <li>- Nylon-12</li> <li>- Polymethyl methacrylate</li> <li>- Nylon-6</li> <li>- Polyethylene terephthalate</li> <li>- Nylon-66</li> </ul>
2. Scrub/Peelings	<ul style="list-style-type: none"> <li>- Neutrogena Deep clean invigorating Daily scrub</li> <li>- Clean and Clear Exfoliating Daily wash</li> <li>- Nivea essential gentle exfoliating daily scrub</li> <li>- Men Energizing face scrub</li> </ul>	<ul style="list-style-type: none"> <li>- Polyethylene</li> <li>- Polytetrafluoroethylene</li> <li>- Nylon-12</li> <li>- Polymethyl methacrylate</li> <li>- Nylon-6</li> <li>- Polyethylene terephthalate</li> <li>- Nylon-66</li> </ul>
3. Shaving Cream	<ul style="list-style-type: none"> <li>- Gillette Fusion ProGlide Gel, cooling</li> <li>- Gillette series protection shave gel</li> <li>- The Real shaving company multi-task super 8 balm</li> </ul>	<ul style="list-style-type: none"> <li>- Polyethylene</li> <li>- Polytetrafluoroethylene</li> <li>- Nylon-12</li> <li>- Polymethyl methacrylate</li> <li>- Nylon-6</li> <li>- Polyethylene terephthalate</li> <li>- Nylon-66</li> </ul>

From Table2, The first category is facial cleansers. These are Neutrogena Blackhead Eliminating SOS cleanser sold in Boots, Neutrogena Deep Clean Invigorating

Daily scrub sold in Tesco supermarket, Biore warming anti-blackhead cleanser sold in Ocado, and Sisley phyto-blanc buff and facial wash gel sold in John Lewis.

The second category is Scrubs or Peelings. These are Neutrogena Deep Clean Invigorating Daily scrub sold in Tesco supermarket, Clean and Clear exfoliating Daily wash sold in Superdrug, Nivea Essentials gentle exfoliating scrub, and other products containing microbeads (e.g. Men Energizing face scrub) sold in Boots. The third category is shaving products. These are Gillette Fusion ProGlide GelCooling sold in Superdrug, Gillette series protection shave gel sold in Lotus, and The Real Shaving Company Multi-task Super 8 balm sold in Ocado.

These products all contain at least one of the following plastics: polyethylene, polytetrafluoroethylene, nylon-12, polymethyl methacrylate, nylon-6, polyethylene terephthalate and nylon-66.<sup>54</sup>

From Table2, it can be inferred that nowadays there is a microbeads contamination in the environment, especially in marine ecology in foreign countries such as the United Kingdom. In Thailand, although there is only one report study about microplastics contamination, there is also the opinion of Thai experts following a survey of products containing microbeads that implies there is likely to be microbeads contamination in the Thai environment. This microbeads contamination can cause many adverse effects to environment, especially in marine ecology as well as to the human.

## **2.4 Adverse effects of microbeads on the marine ecology and humans**

### **2.4.1 Adverse effects of microbeads on the marine ecology**

#### **1. Adverse effects on water**

When people use products containing plastic microbeads, these beads go down the drain and then end up in wastewater treatment systems. Depending on the efficiency of wastewater treatment, some of them will enter as sewage sludge, but some go through the wastewater treatment systems and enter our rivers. In the U.S.

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<sup>54</sup> Richard Thompson, "Beat the microbeads," *Journal of Cosmetics*, at <http://www.beatthemicrobead.org/science/>, (last visited 4 January 2018).

and Europe, waste water treatment plants (WWTPs) can remove microbeads with an efficiency of greater than 98 percent, but this isn't the case in most other countries.<sup>55</sup> In 2009, there are published observations from Fendall and Sewell University in Auckland which report that microbeads pass into household waste water streams directly and are too small to be retained by the standard treatment plants and therefore enter the marine environment. Not only do they enter the sea, but they can also enter the food chain.<sup>56</sup>

Considering the relative contribution of microplastics pollution, the studies have looked at the quantity or concentration of microbeads in each product.

When microbeads enter the marine environment, it is impossible to identify the source of origin. German researchers Liebezeit and Dubaish (University of Oldenburg) hypothesize that products containing microbeads, especially peelings, make up most of the microplastics found in the Wadden Sea. In addition, waste water doesn't get purified at all. Thanks to heavy rain, some waste water may overflow directly in to the marine environment. This occurs especially in countries that lack waste water treatment efficiency, so there will be a lot of microbeads entering directly into surface waters.<sup>57</sup>

## **2. The adverse effects on marine life**

Studies have identified that marine animals are not capable of discriminating between their usual food source and microplastics. These particles are absorbed by marine animals either via ingestion or refinement, with microplastics having potentially brought toxins to the basis of the food chain. Moreover, they have the

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<sup>55</sup> Siddika Sultana, "Microbeads! Unfold Health Risk and Environmental Pollutant," *Ibid.*, p. 9.

<sup>56</sup> Chelsea Rochman, "Sources, Fate And Effects Of Microplastic in the Marine Environment: Part 2 of a Global Assessment," (London: INTERNATIONAL MARITIME ORGANIZATION, 2016), p.17., at <http://unesdoc.unesco.org/images/0024/002475/247517e.pdf>, (last visited 19 December 2017).

<sup>57</sup> Richard Thompson, "Beat the microbeads," *Ibid.*, p.27.

potential to transfer themselves to the food chain, which may lead to consumption by humans.<sup>58</sup>

#### **2.4.2 The adverse effects of microbeads on humans**

Nowadays, although there is still no officially researched study on the effects of microbeads on humans, there are many researches on the evidence of microbeads polluting the food chain. Moreover, dermatologists and dental hygienists also have the opinion that people may have irritated skin or teeth from using the facial cleanser or toothpaste containing microbeads.

##### **1. Food Chain Pollution**

Although microbeads are small, they're the cause of big problems to our health. Billions of tiny particle plastics used in personal care products can go down the drain and into our water supply such as lakes, rivers, and oceans every day. They have the potential to absorb toxins in the water. Microbeads are eaten by marine life and can make their way up the food chain. Fish species consumed by humans are not able to distinguish between their usual food source and microbeads, so these tiny beads were eaten by such fishes at a frightening rate. Moreover, the toxins absorbed in these microbeads can transfer to the tissue of fish.<sup>59</sup> However, humans usually consume fish and seafood which have been noted to contain plastic fragments inside their guts and body tissues.

Scientists hypothesize that over time, Persistent Organic Pollutants (POPs) will start to accumulate in the food chain, transfer from species to species, with consequences to humans. For example, the research study conducted by RMIT University separated microbeads from face cleansers and spiked them with the pollutant polybrominated diphenyl ethers (PBDEs) and then fed them to Murray River rainbow fish. The research found that up to 12.5 per cent of PBDEs on the microbeads were absorbed by the tissue of the fish. This result was published in the journal

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<sup>58</sup> Alla Katsnelson, "News Feature: Microplastics present pollution puzzle," *Journal of Science* (June 2015), at <http://cleanship.org/reports/microplastic-presents-pollution-puzzle.pdf>, (last visited 19 December 2017).

<sup>59</sup> Eunha Hoh, "Plastic Microbeads: Ban The Bead!," *Ibid.* p. 13.



Environmental Science & Technology. PBDEs have potentially biomagnified up themselves in marine animals. PBDEs which were eaten by fish and shellfish is linked to a rise of concentration in humans. Bradley Clarke, lead investigator and environmental scientist at RMIT University said that “In general, we know that if someone eats a fish, they have the risk to eat any toxins that may be in the fish”.<sup>60</sup>

## 2. Affecting skin

Microbeads contained in facial cleansers, especially peelings scrubs, come off the dead skin and gunk out of pores. Scrubbing these little beads on skin can be harmful. Although exfoliation is an important skin care routine, it needs to remember that skin on the face is delicate and can be easily ruined. The skin on your face should be treated carefully. Microbeads were used in most of peelings because they are cheaper to produce than other exfoliators. However, they can create small rents on skin and leave it fragile to bacteria.<sup>61</sup>

## 3. Affecting teeth

Generally, people use toothpaste to clean their teeth and make their mouth smell fresh, but those who use toothpaste containing microbeads may be getting more than clean and sparkling white teeth. Microbeads contained in toothpaste are normally made of polyethylene, which is a non-biodegradable object, so it will not dissolve in the mouth. In addition, a report from the Washington post said that

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<sup>60</sup> Esther Han, “Microbeads are leaching toxic chemicals into fish, sparking public health fears”, Journal of Environment (August 2016), at <https://www.smh.com.au/business/consumer-affairs/microbeads-are-leaching-toxic-chemicals-into-fish-sparking-public-health-fears-20160816-gqtlpk.html>, (last visited 21 December 2017).

<sup>61</sup> Clare Milliken, “Your Favorite Body Wash Might Be a Serious Danger to the Environment and Your Health”, Journal of Environment (August 2014), at <https://greatist.com/connect/microbeads-harmful-to-environment-human-health>, (last visited 19 December 2017).

microbeads contained in toothpaste are not only damaging to the environments and marine life, but also causes severe dental hygiene issues.<sup>62</sup>

Dental hygienist Trish Walraven observed little blue spots in the gum lines of her patients. She firstly thought these spots were caused by cleaning products or something that her patients chew. However, she discovered that these blue spots turned out to be polyethylene which is the common plastic generally used in toothpaste, facial cleansers, packaging materials such as grocery bags, garbage bags and plastic bottles. Michael Apa, DDS agrees with dental hygienist Trish Walraven, explaining that "Microbeads can cause the problem of lacerations in their mouth when used with a sonic toothbrush against enamel and has heard of patients getting microbeads in their gums. These lead to gum irritation and site-specific bone loss, especially if these microbeads were not properly removed".<sup>63</sup>

In addition, Brian Moore, a dentist from Kentucky also said that "the microbeads containing toothpaste can appeal more to bacteria when these beads get stuck in the gum line and this could be the cause of serious problems such as the development of periodontal disease and gingivitis."<sup>64</sup>

From the abovementioned facts, it can be inferred that microbeads contamination causes many adverse effects not only to the environment but also to the human body. Although there is still no official research study about the effects on humans, many countries in Europe (such as the United Kingdom), Canada and the United State have already enacted laws to control the manufacturing and distribution of products containing microbeads. They are concerned not only of the short-term effects but also the long-term effects of microbeads contamination on the environment, especially on marine life. The accumulation of microbeads in the environment will cause the deterioration of the environment and a lack of natural resources that will

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<sup>62</sup> Carmen Drahl, "What You Need To Know About Microbeads, The Banned Bath Product Ingredients," Ibid., p.8.

<sup>63</sup> Siddika Sultana, "Microbeads! Unfold Health Risk and Environmental Pollutant," Ibid., p. 9.

<sup>64</sup> Tarlor Bryant, "How the Microbead Ban Affects You", Journal of Environment (January 2016), at <http://www.refinery29.com/2016/01/100202/microbeads-beauty-products-environmental-effects?bucketed=true>, (last visited 22 December 2017).

affect the next generation. So, they try to prevent the problem rather than waiting until it became critical before finding a solution. This measure is consistent with the general principles of environmental law, namely the precautionary principle and the sustainable development principle.

## **2.5 Principles of environmental law that are related to the microbeads control law and the microbeads control law in the United Kingdom that is consistent with those principles**

The design and application of modern environmental law have been shaped by a set of principles and concepts outlined in publications such as “Our Common Future (1987)”, published by the World Commission on Environment and Development, and the Earth Summit’s Rio Declaration (1992). There are six principles of environmental law, these being the precautionary principle, the sustainable principle, the prevention principle, the polluter pays principle, the integration principle and the public participation principle.<sup>65</sup>

However, due to the scope of research, the researcher will only focus on the principles that are related to the law on the control of manufacturing and distribution of products containing microbeads namely (1) the sustainable development principle and (2) the precautionary principle.

### **2.5.1 The Concept of the Sustainable Development principle**

The Sustainable Development principle was defined by the World Commission on Environment and Development (WCED) in 1987 as humanity’s ability to make development sustainable and to ensure that it meets the needs of the

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<sup>65</sup> Federico Cheever, “Principles of Environmental Law,” Journal of Environmental Law, at <https://www.britannica.com/topic/environmental-law#ref224605>, (last visited 22 December 2017).

present without compromising the ability of future generations to meet their own needs from “Our Common Future”, WCED (1987).<sup>66</sup>

The United Nations Conference on Environment and Development (UNCED) or Earth Summit in 1992 issued the Rio Declaration on Environment and Development to affirm sustainable development. According to the Stockholm Declaration on Human Environment, the definition of sustainable principles is defined as:

Principle 1 “Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.”

Principle 3 “the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.”

Principle 4 “in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.”

Principle 25 “Peace, development and environmental protection are interdependent and indivisible.”<sup>67</sup>

From the mentioned definitions, it can be inferred that sustainable development principles have 3 main concepts.

The first concept is using natural resources depending on the basic human needs to live, such as food, clothes, accommodation, medicine and being employed, requirements to make life better. These demands need to use natural resources and the environment. Even though both the rich and the poor have basic human needs, the rich are inclined to need a higher standard of life and facilities besides the essential things needed by the poor. For the poor when they get basic human needs, they also have the right to improve their life to be better than the standard.

The second concept is the limitation of the environment and development because basically the environment has two main duties, namely to be essential

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<sup>66</sup> The committee of the World Commission on Environment and Development, *Our Common Future, From One Earth to One World*, at <http://www.un-documents.net/our-common-future.pdf>, (last visited 22 December 2017).

<sup>67</sup> The Rio Declaration on Environment and Development 1992.



resources to development but also the source of pollution from the development. However, the environment has a limitation, the sustainable development must be concerned about justice principles between the same generation and the next generation. The justice principle between the same generations solves the poverty problem and responds to the demands of disadvantaged people. The justice principle between the present generation and the next generation is used economically and is noticed by the next generation.

The third concept is the concept of development. The Sustainable Development principle is to use and conserves natural resources simultaneously. This principle needs to consider the policy related to the social factor and the culture, such as the opportunity to access and use natural resources equally, public participation including to the role of non-government organization and business organizations to make sustainable development, development focused on the benefit of most people and development that promotes people to know the rights and duties including to respect others to use natural resources and environment. Development focused only on economic growth will be unsuccessful towards sustainable development. Accordingly, to create sustainable development, there needs to be a development in the culture and the morals to balance between the progress of economic growth and the progress of mental health

### **2.5.2 The Concept of the Precautionary principle**

The definition of the precautionary principle in the Rio declaration (United Nations 1992) is “In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”.<sup>68</sup>

An addition to the definition in the EU communication on Precautionary principle: “The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on

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<sup>68</sup> The Rio Declaration on Environment and Development 1992.



the environment, human, animal or plant health may be inconsistent with the high level of protection chosen by the EU”.<sup>69</sup>

There are various definitions of the precautionary principle in literature, declarations and international treaties. Despite the divergence of wording in each definition, most of the definitions have some key words in common.<sup>70</sup> To summarize, the precautionary principle is when human activities may cause unacceptable damage but currently with uncertain scientific evidence. Actions shall be conducted to avoid or decrease that damage. Unacceptable danger refers to harm to humans or the environment, which is menacing to human life or health that is severe and efficiently irrevocable, unequal to present or future generations, or enforced without sufficient deliberation of the human rights of those affected. Action should be chosen by considering the proportion of the potential harm, comparing their positive and negative results and assessing the moral implications of both actions and inactions. The choice of action should be the result of a participated method.<sup>71</sup>

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<sup>69</sup> Brussels, Commission adopts Communication on Precautionary Principle, (February 2000), at [http://europa.eu/rapid/press-release\\_IP-00-96\\_en.htm](http://europa.eu/rapid/press-release_IP-00-96_en.htm), (last visited 25 December 2017).

<sup>70</sup> The Forest of Broceliande, The Precautionary Principle, at <https://proxy.eplanete.net/galleries/broceliande7/precautionary-principle-further-discussion>, (last visited 22 December 2017).

<sup>71</sup> World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), “The Precautionary Principle” (France: the United Nations Educational, Scientific and Cultural Organization, 2005), p. 17, at <http://unesdoc.unesco.org/images/0013/001395/139578e.pdf>, (last visited 24 December 2017).

## **2.6 Background of The Environmental Protection ((Microbeads) (England) Regulations 2017) that is consistent with the general principle of environmental law (Sustainable Principle and Precautionary Principle)**

### **2.6.1 Background of The Environmental Protection (Microbeads) (England) Regulations 2017) that is consistent with the Sustainable principle**

The main reason why the United Kingdom enacted the EPR2017 was when microbeads entered the environment and it was impossible to recover them or mediate the adverse effects that could consequently come out.<sup>72</sup> The accumulation of microbeads in environment causes the deterioration of the natural resources and the environment, especially marine life. This will be not be good for the next generation. Microbeads in personal care and cosmetic products are no better at scrubbing the skin with natural materials such as ground nut shells or crushed apricot seeds, but they're much cheaper to mass-produce and there are concerns regarding the adverse effects of microbeads on natural resources and the environment.<sup>73</sup> When comparing the advantages of using microbeads in personal care and cosmetics with the disadvantages of microbeads in the environment, there are more disadvantages than advantage.

From the reasons why microbeads have already been banned in the United Kingdom, the abovementioned statements are consistent with the concept of the Sustainable principle, which is using the natural resources economically and conserving them to maintain natural resources for the next generation.

### **2.6.2 Background of the Environmental Protection (Microbeads) (England) Regulations 2017) that is consistent with the Precautionary Principle**

In 2016, the results of a five-year Defra funded study on the impact of microplastics in the marine environment conducted by the University of Plymouth showed that microplastics ingested by marine creatures can be the causation of harm

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<sup>72</sup> Toiletry & Perfumery Association, "Plastic Microbeads FAQs," *Journal of Cosmetics*, at <http://www.thefactsabout.co.uk/plastic-microbeads---in-depth/content/251>, (last visited 4 January 2018).

<sup>73</sup> Ibid.

both directly and indirectly by transporting other chemical substances into their systems. These findings supported the growing body of evidence of damage caused to marine creatures by ingestion of microplastics. Microbeads are a type of microplastics, so we can use evidence concerning microplastics to provide information regarding the adverse effects of microbeads on the environment.

There is still no clear scientific evidence to specify how microbeads affects us humans. The United Kingdom and many other countries in Europe have been concerned about microbeads contamination, thus prompting laws to be enacted to control manufacture and distribution of products containing microbeads. In the United Kingdom, they issued the EPR2017 in order to ensure consistency in understanding the meaning of microbeads and to ensure that all relevant products will be free from them. The law is consistent with the concept of the Precautionary principle mentioned above, which lacks full scientific certainty and shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

## 2.7 Conclusion

From this chapter, it can be inferred that nowadays many countries worldwide have faced microbeads contamination in the environment. In Thailand, there are only studies about microplastics contamination such as the report study about microplastics contamination in the sediment and seashore at Chaolao and Koongviman beach in Chanthaburi. However, opinions of two Thai experts state in 2.3.2 (b) that microbeads are a kind of microplastics that, from their research, are likely to be microbeads. In addition, there are many reports about the adverse effects of microbeads on the environment, especially on marine life. These are the evidence shown that nowadays, Thailand still doesn't have any science technology to filter out microbeads so they can travel down into the drain along with water and then end up in the ocean. The deterioration of natural resources, especially in the marine environment, from microbeads contamination is likely to be severe. Many countries in Europe have concerns about this problem and have started campaigns to warn people about the adverse effects of microbeads contamination on the environment. The United Kingdom have already enacted a law to ban microbeads. The EPR2017 is consistent

with the Precautionary principle and the Sustainable Development principle, which are the general principles of environmental law. However, Thailand still don't have any specific laws to control the manufacturing and distribution of products containing microbeads.



## **Chapter 3**

# **Legal measures to control manufacturing and distribution of products containing microbeads in the United Kingdom and alternative laws to control the manufacturing and distribution of products containing microbeads in Thailand**

### **3.1 Introduction**

This chapter will focus on the background and the enforcement of the EPR2017, including the definition of microbeads under the EPR2017. In addition, this chapter will also analyze the purpose of Thai legislations that may relate to the control of microbeads and explain the background and the enforcement of the HSA1992 of Thailand, including the definition of hazardous substances under the HSA1992. Then there will be a comparison between the EPR2017 and the HSA1992.

### **3.2 Legal Measures to control manufacturing and distribution of Products containing microbeads in the United Kingdom (The Environmental Protection (Microbeads) (England) Regulations 2017)**

The researcher has chosen the EPR2017 to be a model law because the purpose of the EPR2017 is consistent with the general principles of environmental law such the precautionary principle and the sustainable development principle. In addition, the definition of microbeads and the products that were controlled according to the EPR2017 are clear and comprehensive. Moreover, the United Kingdom was among the first countries to enact a microbeads control law.

The EPR2017 can be separated into two main portions. The first portion is involved with the Environmental Protection Act 1990. This section is also divided into five parts. The first part is the introduction, which includes the citation, commencement, extent, application and the interpretation. The second part is the offence and defense of due diligence for suppliers and the time limits for the



prosecution of those offences. The third discusses enforcement and civil sanctions. The fourth part is the guidance and the last part is about the review. Another portion deals with the Regulatory Enforcement and Sanctions Act 2008. This portion is also separated to five main parts. The first part is about Variable Monetary Penalties and Compliance Notices. The second refers to stop notices, the third is enforcement undertaking, the fourth is about Non-compliance penalties and the finally the fifth part is about administration and appeals.

However, due to the scope of this research, the researcher will only focus on the first portion that is related to the definition of microbeads, the products and the controlled actions discussed in section 2 (interpretation) of part 1 and the offences in section 3 of part 2.

### **3.2.1 Background and Significance of the Environmental Protection (Microbeads) (England) Regulations 2017**

Microplastics are tiny pieces of plastic that are smaller than 5 millimeters. When released into the environment, they will accumulate in bodies of water because microplastics are not biodegradable.<sup>74</sup> In 2016, a five year Defra funded study on the impact of microplastics in the marine environment was conducted by the University of Plymouth showed that microplastics ingested by marine creatures can be the causation of harm both directly and indirectly by transporting other chemical substances into their systems. These findings supported the growing body of evidence of damage caused to marine creatures by ingestion of microplastics.<sup>75</sup>

Microbeads are a water-insoluble solid plastic particle that have less than or equal to 5mm in any dimension. These microbeads are intentionally added to various products such as beauty products or health products.<sup>76</sup> They have been used for a long time. Approximately 680 tons of plastic microbeads are used in personal care products in the United Kingdom every year, there are billions of microbeads which are being washed into drainage systems and entering our oceans. When

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<sup>74</sup> The House of Commons, “Environmental impact of microplastics,” Ibid., p.8.

<sup>75</sup> Richard C. Thompson, “The physical impacts of microplastics on marine organisms: A review,” *Journal of Environmental pollution* (October 2012), at <http://resodema.org/publications/publication9.pdf>, (last visited 5 January 2018).

<sup>76</sup> Toiletry & Perfumery Association, “Plastic Microbeads FAQs,” Ibid., p.30.

microbeads enter the environment, it is impossible to recover them or remediate the adverse effects that could consequently come from it. The increasing tensions from microbeads extend the overall risk. Accordingly, it is sensible to minimize the disposal of microbeads to the marine environment when it's possible to use less hurtful alternatives.<sup>77</sup> Microbeads are an avoidable source of marine pollution.

Microbeads are a type of microplastics, so we can use evidence concerning microplastics to provide information about the adverse effects of microbeads on the environment. Nowadays, there is growing evidence on microplastics from many studies that support activities to enhance the marine environment. The United Kingdom has been working with neighboring countries through the OSPAR Regional Action Plan (RAP) to solve Marine Litter problems since 2014. Part of this work has looked at the engagement of the cosmetics industry to promote a voluntary phase-out of using microplastics in cosmetics and personal care products. In October 2015 this work led to a recommendation from the European Trade Association for the cosmetics industry. Cosmetics in Europe created voluntarily phased out the use of microbeads in cleansing and exfoliating products, with many cosmetics companies, both large and small, agreeing to issue public commitments to do so.<sup>78</sup>

In January 2016, a petition calling for the UK Government to ban microbeads from cosmetics was launched by Greenpeace. There were over 385,000 signatures received in this petition. The Environmental Audit Committee's investigation into the environmental impact of microplastics was published in August 2016. It comprised a recommendation to enact the law to ban the use of microbeads in cosmetic and personal care products. The harmony with international legislation was advocated by the EAC.<sup>79</sup>

There is an increased understanding and awareness of microbeads and their harm. Because of the cosmetic industry's voluntary action and the increasing pressure from consumers, more than 70% of manufacturers have already removed microbeads from their products. However, to ensure the consistency in understanding microbeads and ensuring that all relevant products will be free from them, Ministers made the decision to enact the EPR2017 to ban the manufacturing and sale of rinse-

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<sup>77</sup> The House of Commons, "Environmental impact of microplastics," *Ibid.*, p.8.

<sup>78</sup> *Ibid.*

<sup>79</sup> *Ibid.*

off personal care products containing microbeads while continuing to engage other countries to support the development of similar bans internationally.<sup>80</sup>

### 3.2.2 Definition of Microbeads

“Part 1, Section 2, of the EPME2017 provide that:

“Microbeads” means any water-insoluble solid plastic particle of less than or equal to 5mm in any dimension.<sup>81</sup>

“Plastic” means a synthetic polymeric substance that can be molded, extruded or physically manipulated into various solid forms and that retains its final manufactured shape during use in its intended applications.”<sup>82</sup>

From the definition of microbeads and the products which are controlled under Part 1, Section 2, of the EPR2017, it can be inferred that according to the EPR2017, microbeads are plastic particles which are insoluble in water. They have less than or equal to a size of 5mm in any measurement, and they are intentionally added to various products such as beauty products or health products.

### 3.2.3 Enforcement (products and actions which were controlled)

“Part 1, Section 2, of the EPR2017 provide that:

“Rinse-off personal care product” means any substance, or mixture of substances, manufactured for the purpose of being applied to any relevant human body part in the course of any personal care treatment, by an application which entails at its completion the prompt and specific removal of the product (or any residue of the product) by washing or rinsing with water, rather than leaving it to wear off or wash off, or be absorbed or shed, in the course of time; and for this purpose.”<sup>83</sup>

(a) “Personal care treatment” means any process of cleaning, protecting or perfuming a relevant human body part, maintaining or restoring its condition or changing its appearance; and

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<sup>80</sup> The House of Commons, “Environmental impact of microplastics,” Ibid.

<sup>81</sup> Section 2 of Environmental Protection (Microbeads) (England) Regulations 2017.

<sup>82</sup> Ibid.

<sup>83</sup> Ibid.

(b) “Relevant human body part” is:

(i) any external part of the human body (including any part of the epidermis, hair system, nails or lips);

(ii) the teeth; or

(iii) mucous membranes of the oral cavity

Part 2, Section 3, of these provide that:<sup>84</sup>

(1) A person who, in the manufacture of any rinse-off personal care product, uses microbeads as an ingredient of that product is guilty of an offence.

(2) A person who supplies, or offers to supply, any rinse-off personal care product containing microbeads is guilty of an offence.

(3) A person guilty of an offence under paragraph (1) or (2) is liable on summary conviction to a fine.”

The EPR2017 prohibits the manufacture and sale of rinse-off personal care products containing microbeads which are specified in the regulations. Rinse-off personal care products means products which are designed for use on the body, skin, face, hands, feet, hair, nails, mouth and teeth, including deodorant, perfume, peelings, cleanser, skin or hair softener, bath products as well as personal care and dental products.

### **3.3 Thai laws relating to the control on the manufacturing and distribution of products containing microbeads in Thailand**

Nowadays, Thailand does not have any specific law for controlling the manufacture and distribution of products containing microbeads. Accordingly, Thailand need to look for other laws that may apply to microbeads control. In Thailand, there are many laws that could relate to microbeads control such as the Industrial Products Standards Act B.E. 2511 (1968) (IPSA1968), Cosmetics Act B.E. 2535(1992) (CA1992) and the Hazardous Substance Act B.E. 2535(1992) (HSA1992). However, from considering the purpose of the abovementioned Act, the researcher found that in the case of the IPSA1968 the main purpose of this legislation is to set out

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<sup>84</sup> Section 2 of Environmental Protection (Microbeads) (England) Regulations 2017.



the standard of industrial products in order to protect consumers and improve the quality of industrial products in Thailand for international trading.<sup>85</sup> This purpose is inconsistent with the main purpose of the law on controlling the manufacture and distribution of products containing microbeads which is to protect the environment, animals and human life.

In case of the CA1992 the purpose of the CA1992 is to set out the standard of cosmetics products in order to protect consumers and the rights of the business operators.<sup>86</sup> The purpose of the CA1992 is therefore not in accordance with the purpose of the laws to control the manufacturing and distribution of products containing microbeads. In the case of the HSA1992 the purpose of the HSA1992 to control the manufacture and distribution of the substances that may be harmful to human, animals and the environment. This purpose is consistent with the purpose of the EPA2017 that is the microbeads control law in the United Kingdom that the researcher has mentioned above. Consequently, the HSA1992 can be applicable as microbeads control law in Thailand.

The HSA1992 can be separated into four main chapters. The first chapter (section 6 to section 14) is about the committee on Hazardous Substances. The second chapter (section 15 to section 56) is about the control of Hazardous Substances. The third chapter (section 57 to section 69) is about duties and civil liabilities and the fourth chapter (section 70 to section 89) is about penalties.

However, due to the scope of the research, only the definition of hazardous substance in section 4 will be focused upon, as well as the categories of hazardous substances under the HSA1992 in Section 18, paragraph 1, and the enforcement in Section 5, paragraph 2, and Section 18, paragraph 2.

### **3.3.1 Background and Significance of the Hazardous Substance Act B.E. 2535**

Due to economic growth, many hazardous substances are imported to use in business operations. Some hazardous substances may cause severe effects to

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<sup>85</sup> Industrial Products Standards Act B.E.2511 (1968).

<sup>86</sup> Sunantha Aekpaisarnkul, the conclusion of Cosmetic Act B.E. 2535 (October 2004), at [http://web.krisdika.go.th/data/lawabout/lawdetail/lawdetail\\_112.htm](http://web.krisdika.go.th/data/lawabout/lawdetail/lawdetail_112.htm), (last visited 9 January 2018).



humans, animals, plants and the environment. Although the government has enacted laws to control, such laws are not sufficient. Accordingly, the HSA1992 was enacted to specify measures to control the manufacture, import and distribution of hazardous substances.

### 3.3.2 Definition and Categories of Hazardous Substance

#### 1. Definition of Hazardous substance

“Under Section 4 of the HSA1992, a "Hazardous Substance" means the following substances:<sup>87</sup>

- (1) Explosives;
- (2) Flammable Substance;
- (3) Oxidizing agent and peroxide;
- (4) Toxic substance;
- (5) Substance causing diseases;
- (6) Radioactive substance;
- (7) Mutant causing substance;
- (8) Corrosive substance;
- (9) Irritating substance;
- (10) Other substance either chemicals or otherwise which may cause injury to persons, animals, plants, property, or environments.”

The definition of hazardous substances in this section does not specify only chemical substances but includes anything that may be harmful to human, animals, plants, properties or the environment. Hazardous substances may be considered as a form of instant products having single chemical or mixed chemicals. Hazardous substances may be in solid, liquid or gas form. In addition to microorganism or components of microorganism that may cause infection or harmful to environment, such shall be deemed hazardous substances. Some materials are not detrimental on their own but in some circumstances, they may be harmful to humans or the environment such as inert gas tanks in high pressure which may explode and

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<sup>87</sup> Section 4 of the Hazardous Substance Act B.E.2535.

cause damaging effects to humans and properties. The leak of nitrogen from the container may cause a person to suffer from a lack of oxygen and then death.<sup>88</sup>

## 2. Categories of Hazardous Substances

“Section 18, paragraph 1, of the HSA1992 provides that:

Hazardous Substances are classified according to the needs for control as follows:<sup>89</sup>

(1) Type 1 Hazardous Substance is that of which the production, import, export, or having in possession must comply with the specified criteria and procedures.

(2) Type 2 Hazardous Substance is that of which the production, import, export, or having in possession must first be notified to the authority and must also comply with the specified criteria and procedures.

(3) Type 3 Hazardous Substance is that of which the production, import, export, or having in possession must obtain a permit.

(4) Type 4 Hazardous Substance is that of which the production, import, export, or having in possession is prohibited.”

Under Section 18, paragraph 1, of the HSA1992, hazardous substances shall be classified under the following categories by considering the level of harm caused by each substance to specify the level for measures of control.

The first category are hazardous substances which its production, import or export or having in possession shall be in accordance with the determined rules and procedure. A hazardous substance in this category is controlled by legislation at the minimum.<sup>90</sup>

The second category are hazardous substances which its production, import or export or having in possession shall be notified in advance to the competent official and shall be in accordance with the determined rules and procedure such as

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<sup>88</sup> Orpan Prangkaew, “The problem of Business Law relating to Hazardous substance,” (Master’s Degree, Faculty of Law, Sripatum University, 2013), p.52.

<sup>89</sup> Section 18 of Hazardous Substance Act B.E.2535.

<sup>90</sup> Ibid.

Formaldehyde (Methanol) in household products or public health (e.g. correction pen, liquid and detergent).<sup>91</sup>

The third category are hazardous substances which its production, import or export or to have it in possession shall be licensed such as Borax, Cadmium, Chlorine Lead and Sulfuric Acid including with Chemical Waste (e.g. the used lube oil, the electronic of electricity part).<sup>92</sup>

The fourth category are hazardous substances which its production, import or export or to have it in possession is strictly prohibited such as DDT Skunk Oil Arsenic Trioxide, Asbestos (Crocidolite) Aldrin and Dioxin (e.g. pesticide).<sup>93</sup>

### 3.3.3 Enforcement

“Section 18, paragraph 2, states that “For the purpose of prevention and stopping of danger that may be inflicted upon the persons, animals, plants, property, or environments, the Minister of Industry with the opinions of the Committee, shall have the power to publish in the Government Gazette designating the names or qualifications of hazardous substance, types of hazardous substance, period of application and responsible agencies for the control of the said hazardous substance.”<sup>94</sup>

Section 18, paragraph 2 of the HSA1992 gives power to the Minister of Industry with the opinions of the Committee to control the substances that may be inflicted upon the persons, animals, plants, property or environment. Accordingly, to be considered as a hazardous substance under the HSA1992, the Minister of Industry, with the recommendation of the Committee need to enact a notification specifying microbeads as a hazardous substance by virtue of Section 5, Paragraph 2, and Section 18, Paragraph 2, of the HSA1992.

However, at the present, no notification has been issued to specify microbeads as a hazardous substance. As a result, there is still the loophole on the enforcement of the HSA1992 for controlling the manufacture and distribution of products containing microbeads in Thailand.

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<sup>91</sup> Section 18 of Hazardous Substance Act B.E.2535.

<sup>92</sup> Ibid.

<sup>93</sup> Ibid.

<sup>94</sup> Section 18 of Hazardous Substance Act B.E.2535.

### 3.4 Conclusion

From the study of United Kingdom law related to control of the manufacture and distribution of products containing microbeads, it appears that the EPR2017 has clearly defined the definition of microbeads and plastics. In addition, the EPR2017 also specifies and defines the products containing microbeads which are controlled by the EPR2017.

Currently, the manufacture and distribution of products containing microbeads is controlled by the EPR2017. Producers in the United Kingdom have shown concerns about problems of microbeads contamination in the environment and choose to use natural substances as substitutes for microbeads. In the part of consumers, they now know what microbeads are and how they affect the environment, so consumers try to avoid using products containing microbeads. However, the person who violates the EPR2017 by manufacturing or distributing products containing microbeads which were controlled by the EPR2017 will be fined and punished according to the EPR2017.

From the study of Thai law that relates to the control of the manufacture and distribution of products containing microbeads, it appears that there is no specific law for controlling microbeads in Thailand. Accordingly, Thailand need to apply other related laws by using an analogy method. From considering the purpose of laws that may relate to microbeads control, it was found that the purpose of the HSA1992 is related to microbeads control and also consistent with the purpose of the EPR2017. However, there is still a loophole in the enforcement of the HSA1992 which cannot respond to the regulation of microbeads.

Accordingly, at the present, the manufacture and distribution of products containing microbeads in Thailand are still not controlled by any legislation. In Chapter 4, the researcher will explain regarding the problems of the lack of microbeads control law and analyze such loophole of the HSA1992.

## **Chapter 4**

### **Problems of the Lack of Microbeads Control Laws in Thailand**

#### **4.1 Introduction**

This chapter will describe the problems regarding the lack of microbeads control laws in Thailand in two parts. The first part concerns the problem regarding the lack of specific laws for regulating the use of microbeads. If there are no specific applicable laws, other laws relating to microbeads control may need to be applied by analogy. In considering the purpose of the laws in Chapter 3, it was found that the HSA1992 should serve as an alternative law for the regulation of microbeads in Thailand. However, there are some loopholes in enforcing the HSA1992 with respect to the control of the manufacture and distribution of products containing microbeads. The second part of this chapter will include an analysis and assessment of the loopholes of the HSA1992 which do not respond to the purpose of controlling the manufacture and distribution of products containing microbeads in Thailand.

#### **4.2 Problems regarding the lack of laws regulating microbeads in Thailand**

In Thailand, although there are no research studies reported on the pathways and effects of microplastics which have spread into the environment, there are some studies conducted by the researcher as mentioned in Chapter 2 which indicates evidence of microplastics contamination at Caolao and Koongviman beaches in Chanthaburi.<sup>95</sup> In addition, a study has been conducted on the contamination of

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<sup>95</sup> Department of Marine and Coastal Resource and Burapha University Faculty of Marine Technology, "The survey and characteristic of Microplastics debris in marine," Ibid., p. 16.



microplastics in bivalve at Chaolao and Koongwiman beach in Chanthaburi.<sup>96</sup> From both study reports it can be inferred that microplastics contamination does in fact occur in Thailand. Even though they were not identified as microbeads, as indicated in the opinion of the experts (Dr. Suchana and Sr. Varongsiri) in the abovementioned interview in Chapter 2, the experts viewed that the microplastics discovered were likely to be microbeads because microbeads are a type of microplastics. However, to identify exactly whether or not the microplastics found were microbeads, the use of specialty equipment will be required. From these facts, it can be concluded that nowadays, microplastics contamination occurs in the marine environment in Thailand, and those microplastics are likely to be microbeads which forms a component of many rinse-off products.

From Chapter 3, it was shown that Thailand still does not has not enacted any legislations for microbeads control, whereas many developed countries have already enacted such laws to ban or regulate microbeads. The United Kingdom has already enacted the EPR2017 to control the manufacture and distribution of products containing microbeads. The EPR2017 defines the meaning of microbeads clearly and thoroughly specify which products are being controlled under the EPR2017. Nowadays, the manufacture and distribution of products containing microbeads are being regulated by the EPR2017. Manufacturers in the United Kingdom have shown concerns about microbeads contamination in the environment and proceed to use natural substances as substitutes for microbeads. On the part of consumers, they have begun to know what microbeads are and how they negatively impact the environment, and therefore consumers try to avoid using products containing microbeads. As deterrence, any person who violates the provisions of the EPR2017 by manufacturing or distributing products containing microbeads in a manner contrary to these laws will be fined and punished.

Based on the problems regarding laws regulating microbeads in Thailand as mentioned in Chapter 3, the researcher will now describe and analyze these problems by categorizing them into two main problems as follows:

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<sup>96</sup> Pitipong Tharamon, "Contamination of microplastic in bivalve at Chaolao and Kungwiman beach Chanthaburi province," *Ibid.*, p.16.

#### **4.2.1 Problem on the lack of specific laws for microbeads control in Thailand**

Currently, Thailand does not have any specific law to control the manufacture and distribution of products containing microbeads. Manufacturers therefore continue to manufacture and distribute products containing microbeads. From the survey of sampling products containing microbeads in Chapter 2, the researcher found that many products containing microbeads are sold in supermarkets in Thailand such as the Neutrogena Deep Clean foaming cleanser, Neutrogena Deep Action daily pore cleanser, Dove Radiant skin face cleanser, Colgate Optic White Enamel white and Sensodyne Whitening Repair and Protect. However, such products do not have labels specifying that they are composed of microbeads. As a result, consumers have no way of knowing whether or not products contain microbeads. In addition, from the interview of two Thai experts in Chapter 2, the experts are of the same opinion that most people in Thailand are not concerned about the adverse effects of microbeads to the environment. In summary, microbeads are not controlled by any legislation in Thailand. In the case that any problem arises as a result of microbeads contamination, no specific laws will be available in solving these problems.

For example, assume that many shrimps have died in marine waters. From an inspection to find the cause of the deaths, it was found that the shrimps have many microbeads, which are components of rinse-off products, inside their guts, and that this contamination is the cause of their deaths. In this case, since Thailand does not have any specific law which could apply to this issue, other Thai laws that somewhat relate to the control of microbeads would need to be considered. From analyzing the purpose of Thai laws which may relate to microbeads control in Chapter 3, it was found that the purpose of the HSA1992 can be related to microbeads control and also consistent with the purpose of the EPR2017. Therefore, the HSA1992 can serve as an alternative law to solve this problem by an analogy. However, in practice, the HSA1992 has failed to apply. There are certain loopholes regarding the enforcement of the HSA1992 in controlling the manufacture and distribution of products containing microbeads which will be analyzed by the researcher in 4.2.2 below.

#### **4.2.2 Analysis of the loophole in the enforcement of the Hazardous Substance Act B.E. 2535 to regulate microbeads**

Microbeads are synthetic polymer particles made in a size range which is bigger than 0.1  $\mu\text{m}$  smaller than or equal to 5 mm.<sup>97</sup> They are manufactured for a specific purpose and utilization. Microbeads are comprised of a variety of synthetic polymers depending on the required functionality.<sup>98</sup> When microbeads enter the marine environment, they can leach plasticizers (chemicals that are added). Those plasticizers become toxic when they come into contact with UV and mechanical degradation. The chemicals emitted from the degradation of microbeads are harmful to the environment, especially marine environment. Moreover, they can be transporting potentially harmful microbes and algal species to new locations.<sup>99</sup>

“Under Part 1, Section 2, of the EPR2017, microbeads are solid plastic particles that are insoluble in water and they have less than or equal to 5mm in any dimension.”<sup>100</sup>

From both details abovementioned regarding microbeads, it can be inferred that microbeads have specific qualifications. They are solid plastic substances made to be within a size range that is bigger than 0.1  $\mu\text{m}$  and smaller than or equal to 5 mm. Microbeads are comprised of a variety of synthetic polymers depending on the required functionality. However, when microbeads enter the environment, they become harmful to animals and natural resources especially the marine ecosystem. This is consistent with the definition of a hazardous substance under Section 4(10) of the HSA1992 which state “a hazardous substance means the other substance, either chemicals or otherwise, which may cause injury to persons, animals, plants, properties

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<sup>97</sup> Carmen Drahl, “What You Need To Know About Microbeads, The Banned Bath Product Ingredients,” Ibid., p.8.

<sup>98</sup> Creative Mechanisms Blog, “Everything You Need To Know About Polyethylene (PE),” Ibid., p.2.

<sup>99</sup> Environment Protection Authority, “Plastic microbeads products and the environment” (Sydney: Environment Protection Authority, 2016), p. 3.

<sup>100</sup> Section 2 of Environmental Protection (Microbeads) (England) Regulations 2017.

or the environment.” Consequently, Thailand may interpret microbeads as a hazardous substance under the HSA1992.<sup>101</sup>

However, in order to fall under the scope of the HSA1992, the Minister of Industry, with the opinion of the Committee, will need to issue a notification specifying microbeads as a hazardous substance by virtue of Section 18, Paragraph 2, of the HSA1992, which states that “for the purpose of preventing danger that may be inflicted upon persons, animals, plants, properties or the environment, the Minister of Industry with the opinions of the Committee, shall have the power to publish in the Royal Gazette designating the names or qualifications of hazardous substance, types of hazardous substance, period of application and responsible agencies in control of such hazardous substances.” Nevertheless, no such notification has ever been issued.

From the details abovementioned, it can be concluded that two loopholes exist in the enforcement of the HSA1992 for controlling the manufacture and distribution of products containing microbeads as follows:

#### **1. The specific qualification of microbeads**

From the definitions of microbeads abovementioned in this chapter, it is shown that microbeads have a qualification that is different from other substances. Accordingly, Thailand cannot interpret microbeads as any hazardous substances that have already been specified by the notification of the Ministry.

#### **2. The lack of a notification of the Ministry of Industry specifying microbeads as a hazardous substance**

Even though Thailand may interpret microbeads as a hazardous substance under Section 4(10) of the HSA1992, to be a hazardous substance under the HSA1992, the Minister of Industry, with the opinion of the Committee, need to issue a notification specifying microbeads as a hazardous substance by virtue of Section 5, Paragraph 2, and Section 18, Paragraph 2, of the HSA1992. However, currently, there has not been any notification issued specifying microbeads as a hazardous substance.

In summary, Thailand still does not have any legislations to control and regulate the manufacture and distribution of products containing microbeads. The

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<sup>101</sup> Section 4 of Hazardous Substance Act B.E.2535.



## **Chapter 5**

### **Conclusion and Recommendations**

#### **5.1 Introduction**

This Chapter concludes the study process and answers the hypothesis set out in Chapter 1. The researcher will summarize each of the five chapters as follows:

Chapter 1 discussed the research background of the problems on the lack of microbeads control law in Thailand. This discussion was guided by the hypothesis that “there should be legal control on the manufacturing and distribution of rinse-off products containing microbeads in Thailand in order to protect the harm from microbeads contamination to the environment, especially the marine environment, including to the human.” Five research objectives were set out to answer the said hypothesis as follows: The first objective was to address the problem of microbeads contamination in the environment, especially in marine ecologies, and study the concept of environmental principles relating to microbeads control laws. These objectives were fulfilled by the study in the Chapter 2. The second objective was to conduct a comparison of the laws of Thailand and the United Kingdom regarding the control of the manufacture, distribution and use of microbeads. This objective was completed in the study in Chapter 3. The third objective was to address the problem of the laws to control the manufacturing and distribution of products containing microbeads in Thailand. This objective was completed in the study in Chapter 4. Finally, the last objective was to analyze the problems in the law to control manufacturing and distribution of products containing microbeads in Thailand. This objective was completed by the study in Chapter 4.

In Chapter 2, a literature review was provided regarding the general facts of microbeads such as the meaning and use of microbeads, the pathway of microbeads contamination and the adverse effects of microbeads contamination to the environment, especially in marine ecologies. A literature review was also provided regarding general principles of environmental law which related to microbeads control laws, namely the sustainable development principle and the precautionary principle.



products containing microbeads have a risk of irritation to their teeth or skin from using such products, such as some toothpastes, facial cleansers and peelings.<sup>104</sup> Nowadays, many countries in Europe have already enacted laws to ban microbeads. The United Kingdom was among the first country to enact microbeads control law (the EPR 2017). Furthermore, the background of the EPR2017 is consistent with the environmental principles, namely the precautionary principle and the sustainable development principle as mentioned in Chapter 2.

In Thailand, there is a report study conducted by the Marine and Coastal Resources Research and Development Institute in cooperation with Burapha University, Faculty of Marine Technology, about microplastics contamination on seashores and bivalves at the Chalao and Koongviman beaches in Chanthaburi.<sup>105</sup> From the interview of two Thai experts such as Dr. Suchana and Dr. Varongsiri in Chapter 2, such experts view that the microplastics found in this research are likely to be microbeads because microbeads are a kind of microplastics. Moreover, from the survey of product samples sold in supermarkets such as Tops and Max Value in Thailand in Chapter 2, it was found that many products were specified as containing microbeads. From this information, it can be inferred that microbeads contamination occurs in the marine environments of Thailand.

Nowadays, Thailand does not have any specific microbeads control laws. Although Thailand can apply the HSA1992 to solve this problem through an analogy method, the enforcement of the HSA1992 for the purpose of controlling the manufacture and distribution of products containing microbeads have failed in solving such problem as there has not been any notification of the Ministry issued to specify microbeads as a hazardous substance under the HSA1992. Accordingly, the manufacture and distribution of rinse-off products containing microbeads remain unregulated in Thailand. Producers continue to manufacture and distribute products containing microbeads. From the survey of product samples containing microbeads in Chapter 2, the researcher found that many products contain microbeads sold in supermarkets in Thailand, such as Neutrogena Deep Clean foaming cleanser,

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<sup>104</sup> Carmen Drahl, "Emerging Pollutants: Microbeads," *Ibid.*, p.8.

<sup>105</sup> Pitipong Tharamon, "Contamination of microplastic in bivalve at Chaolao and Kungwiman beach Chanthaburi province," *Ibid.*, p.16.

Neutrogena Deep Action Daily pore cleanser, Dove Radiant skin face cleanser, Colgate Optic White Enamel White and Sensodyne Whitening Repair and Protect toothpastes. However, such products do not contain a label specifying that they contain microbeads. Accordingly, the consumer has no way of knowing whether or not a product contains microbeads. In addition, from the interview of two Thai experts in Chapter 2, they have the same opinion that most people in Thailand are not concerned about the adverse effects of microbeads to environment. Moreover, some people do not even know what microbeads are. Where any problems arise due to microbeads contamination in the environment, there will be not be any available legislation to solve these problems.

From the facts presented, it can be inferred that Thailand is faced with a problem due to the lack of microbeads control laws. In order to explore the means to solve this problem, the researcher has made a comparison between the HSA1992 and the EPR2017 in Chapter 3 and then assesses the loophole of the HSA1992 in regulating products containing microbeads in Chapter 4. From the comparison and analysis, we are able to see that the EPR2017 has clearly provided a definition of microbeads and also comprehensively specified the products being controlled. Accordingly, in practical terms, such regulations would not be ineffective in controlling the distribution of products containing microbeads like the HSA1992 of Thailand. Therefore, the researcher would like to propose to the Ministry of Industry to issue a notification specifying microbeads as a hazardous substance by applying the definition of microbeads and the controlled products under the EPR2017. This issue will be clarified in 5.3.

### **5.3 Guidelines for the amendment of the Hazardous Substances Act B.E. 2535 (Recommendations)**

In order to solve the lack of specific law for controlling manufacture and distribution of products containing microbeads in Thailand and the loopholes in the enforcement of the HSA1992, the researcher would like to propose the amendment of the HSA1992 as follows;

In Thailand there are laws relating to the control of the manufacturing and distribution of products containing microbeads, namely the HSA1992. In addition, the purpose of the HSA1992 is also consistent with the purpose of the EPR2017, that is, to protect the environment from harm.

Under Section 18, paragraph 1, of the Hazardous Substance Act B.E. 2551, a hazardous substance shall be classified by considering the level of harm caused by each substance under the following categories:

The first category are hazardous substances of which their production, import or export or having in possession shall be in accordance with the determined rules and procedure. Hazardous substances in this category are controlled by legislation at the minimum.<sup>106</sup>

The second category are hazardous substances of which their production, import or export or having in possession shall be notified in advance to the competent official and shall be in accordance with the determined rules and procedure, such as Formaldehyde (Methanol) used in household products or public health (e.g. correction pen, liquid detergent).<sup>107</sup>

The third category are hazardous substances of which their production, import or export or having in possession shall be licensed, such as Borax, Cadmium, Chlorine Lead and Sulfuric Acid including with Chemical Waste (e.g. used lube oil, the electronic of electricity part).<sup>108</sup>

The fourth category are hazardous substances of which their production, import or export or having in possession is strictly prohibited, such as DDT Skunk Oil Arsenic Trioxide, Asbestos (Crocidolite) Aldrin and Dioxin (e.g. pesticide).<sup>109</sup>

Under Section 18, paragraph 1, in order to be considered as a hazardous substance in the fourth category under the Hazardous Substance Act B.E. 2535, such substance shall be or be comprised of the following chemicals.<sup>110</sup>

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<sup>106</sup> Orpan Prangkaew, "The problem of Business Law relating to Hazardous substance," Ibid., p. 45.

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> Ibid.

1. Chemicals which are highly poisonous and can cause severe effects to humans and animals even in few quantities, such as Aldicarb, Crimidine, Cycloheximide, Dicrotophos, Dinitrocresol, Dinoseb and dinoseb salts, Endrin, Fluoroacetamide, Fluoracetate sodium, Fluoroacetic acid and its salts, Heptachlor, Mevinphos, Monocrotophos, Omethoate and Phophamidon;<sup>111</sup> or
2. Chemicals under the Stockholm Convention on Persistent Organic Pollutants (POPs) such as Aldrin, Chlordane, DDT, Diedrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex and Toxaphene;<sup>112</sup> or
3. Chemicals which are carcinogens under the International Agency for Research on Cancer (IARC) which are categorized as carcinogens in group A1, chemicals that are reliable to be carcinogens in group 2A, and chemicals that can potentially cause cancer in group 3A;<sup>113</sup> or
4. Chemicals banned in foreign countries because such chemicals are harmful to the human, plants, animals or environment;<sup>114</sup> or
5. Chemicals banned due to other reasons such as chemicals which are harmful to the environment with replaceable substances such as chlorofluorocarbons.<sup>115</sup>

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<sup>110</sup> The Food and Drug Administration (FDA), Hazardous substance in the fourth category at [http://www.fda.moph.go.th/sites/Hazardous/KM\\_Factsheet/11.%20%20%E0%B8%A7%E0%B8%B1%E0%B8%95%E0%B8%96%E0%B8%B8%E0%B8%AD%E0%B8%B1%E0%B8%99%E0%B8%95%E0%B8%A3%E0%B8%B2%E0%B8%A2%E0%B8%8A%E0%B8%99%E0%B8%B4%E0%B8%94%E0%B8%97%E0%B8%B5%E0%B9%88%204.pdf](http://www.fda.moph.go.th/sites/Hazardous/KM_Factsheet/11.%20%20%E0%B8%A7%E0%B8%B1%E0%B8%95%E0%B8%96%E0%B8%B8%E0%B8%AD%E0%B8%B1%E0%B8%99%E0%B8%95%E0%B8%A3%E0%B8%B2%E0%B8%A2%E0%B8%8A%E0%B8%99%E0%B8%B4%E0%B8%94%E0%B8%97%E0%B8%B5%E0%B9%88%204.pdf), (last visited 10 January 2018).

<sup>111</sup> World Health Organization, IARC Monographs on the Evaluation of carcinogenic Risks to Humans (June 2012), at <http://apps.who.int/bookorders/anglais/detart1.jsp?sesslan=1&codlan=1&codcol=72&codcch=100>, (last visited 11 January 2018).

<sup>112</sup> The Food and Drug Administration (FDA), “The problem of Business Law relating to Hazardous substance,” *Ibid.*, p.58.

<sup>113</sup> *Ibid.*

<sup>114</sup> *Ibid.*

<sup>115</sup> *Ibid.*



Currently, many countries have already enacted laws to control manufacturing and distribution of products containing microbeads. The United Kingdom enacted the law to control such by passing the EPA 2017. The prohibition on the manufacturing of such products became effective since 1 January 2018 and the prohibition on the sale of such products will come into force on 30 June 2018.<sup>116</sup> The United States passed the Microbead-Free Waters Act of 2015 which required companies to stop using microbeads in producing beauty and health products which took effect on July 2017,<sup>117</sup> and Canada has also banned the manufacturing of products containing microbeads which took effect during the beginning of 2018. Several countries in the European Union have also campaigned for the banning of microbeads. Many studies regarding the adverse effects of microbeads to the environment and marine life were carried out, such as the study concerning ingested Microscopic Plastic Translocate to the Circulatory System of the Mussel.<sup>118</sup> The main reason why microbeads were banned is that they are avoidable sources of pollutant because there are other substances that can serve as an alternative to microbeads, such as shell nuts and such substances which are not harmful to the environment and marine life like microbeads.<sup>119</sup>

From the facts mentioned in Chapter 3 about microbeads, they may be considered as a hazardous substance in the fourth category of Section 18 of the Hazardous Substance Act B.E. 2551 as they are harmful to the environment and human life, and that they can be replaced by natural substances that are harmless to the environment and human life. In addition, many developed countries have already enacted laws to ban them.

Under Section 18, paragraph 2, of the HSA1992, it is stated that “For the purpose of prevention and stopping of danger that may be inflicted upon the persons, animals, plants, property, or environments, the Minister of Industry with the opinions

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<sup>116</sup> The Environmental Protection (Microbeads) (England) Regulations 2017.

<sup>117</sup> Microbead-Free Waters Act of 2015.

<sup>118</sup> Alla Katsnelson, “News Feature: Microplastics present pollution puzzle,” Ibid., p.29.

<sup>119</sup> The House of Commons, “Environmental impact of microplastics,” Ibid., p.2.



of the Committee, shall have the power to publish in the Government Gazette designating the names or qualifications of hazardous substance, types of hazardous substance, period of application and responsible agencies for the control of the said hazardous substance.”<sup>120</sup>

Section 18, paragraph 2 of the HSA1992 grants power to the Minister of Industry, with the opinions of the Committee, to control substances that may be inflicted upon persons, animals, plants, properties or the environment. Accordingly, to be considered as a hazardous substance under the HSA1992, the Minister of Industry, with the opinions of the Committee, can specify substances which are inflicted upon persons, animals, plants, properties or the environment, under a notification of the Ministry, as hazardous substances. Section 8 Paragraph 2 of the HSA1992 uses the word “may”. Thus, even though scientific evidence is insufficient to show that such substances are inflicted upon to persons, animals, plants, properties, or the environment, just the fact that they are likely to be harmful to the environment or humans or plants is sufficient to enact a notification specifying microbeads as hazardous substances under the HSA1992. This is consistent with the precautionary principle mentioned in Chapter 2.

From the abovementioned details, the researcher would like to propose to the Ministry of Industry with the opinions of the Committee to issue a notification of the Ministry specifying microbeads as a hazardous substance in the fourth category under Section 18 of the HSA1992 by applying the definition of microbeads and products controlled under the EPR2017 which the researcher mentioned in Chapter 3.

## 5.4 Conclusion

From the discussions of the findings, it can be concluded there is a high likelihood that microbeads contamination occurs in the environment in Thailand. The HSA1992 is the law that mostly relates to microbeads control, and the purpose of the HSA1992 is consistent with the purpose of the EPR2017. However, the enforcement of The HSA1992 in controlling the manufacture and distribution of microbeads have

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<sup>120</sup> Section 18 of the Hazardous Substance Act B.E.2535.

failed because there has been no specification of microbeads as a hazardous substance under any notification.

In conclusion, to solve such loophole, the researcher would like to propose to the Ministry of Industry with the opinions of the Committee to issue a notification specifying microbeads as a hazardous substance in the fourth category under Section 18 of the HSA1992 by applying the definition of microbeads and the products controlled under the EPR2017 to such notification.



## **Bibliography**

### **Periodical Materials and Journal**

Kofi Renne. London: Institute of Environment, Health and Societies Department of Life Sciences, Brunel University, 2016.

The House of Commons. Environmental impact of microplastics. London: The Environmental Audit Committee, House of Commons, 2017.

Siddika Sultana. Microbeads! Unfold Health Risk and Environmental Pollutant. Bangladesh: Environment and Social Development Organization (ESDO), 2016.

Environment Protection Authority. Plastic microbeads products and the environment. Sydney: Environment Protection Authority, 2016.

### **Thesis**

Orpan Prangkaew. "The problem of Business Law that related to Hazardous substance". Master of law, Faculty of Law, Sripatum University, 2013.

### **Law**

Section 2 of Environmental Protection (Microbeads) (England) Regulations 2017

Industrial Products Standards Act B.E.2511 (1968)

Microbead-Free Waters Act of 2015 Section 4 Hazardous Substance Act B.E.2535

Section 18 of Hazardous Substance Act B.E.2535

### **Internet**

Greenpeace UK. Environmental impact of microplastics. Journal of environment (April 2016). At <https://publications.parliament.uk/pa/cm201617/cmselect/cmenvaud/179/17904.htm>. (last visited 2 November 2017).

Carmen Drahl. What You Need To Know About Microbeads, The Banned Bath Product Ingredients. Journal of Science (January 2016). At <https://www.forbes.com/sites/carmendrahl/2016/01/09/what-you-need-to-know-about-microbeads-thebanned-bath-product-ingredients/#390c511e7a33>. (last visited 10 October 2017).

- Creative Mechanisms Blog. Everything You Need To Know About Polyethylene (PE). Journal of Science (November 2016). At <https://www.creativemechanisms.com/blog/polyethylene-pe-for-prototypes-3d-printing-and-cnc>. (last visited 11 December 2017) .
- Plastic Soup Foundation. Beat the Microbead. Journal of Science. At [http://www.beatthemicrobead.org/faq/#ac\\_347\\_collapse2](http://www.beatthemicrobead.org/faq/#ac_347_collapse2). (last visited 5 December 2017).
- Rebecca Adams. Why Use Microbeads When The Alternatives Are Better?. Journal of Science (February 2014). At [https://www.huffingtonpost.com/2014/02/20/Microbeads-exfoliation\\_n\\_4815133.html](https://www.huffingtonpost.com/2014/02/20/Microbeads-exfoliation_n_4815133.html). (last visited 1 September 2017) .
- Olivia Solon. New York calls for ban on face scrub microbeads. Journal of Environment Law (May 2014). At <https://arstechnica.com/tech-policy/2014/05/new-york-calls-for-ban-on-face-scrub-microbeads/>. (last visited 10 December 2017) .
- Sophie Bushwick. What Are Microbeads And Why Are They Illegal?. Journal of Environment (December 2015). At <https://www.popsoci.com/what-are-microbeads-and-why-are-they-illegal>. (last visited 23 November 2017).
- Norwegian Environment Agency. Sources of microplastic-pollution to the marine environment. Journal of Environment (2014). At <http://www.miljodirektoraet.no/Documents/publikasjoner/M321/M321.pdf>. (last visited 15 December 2017) .
- Julia Lurie. Your Toothpaste May Be Loaded With Tiny Plastic Beads That Never Go Away. Journal of Environment (May 2015). At <https://www.motherjones.com/environment/2015/05/microbeads-exfoliators-plastic-face-scrub-toothpaste/>. (last visited 15 December 2017) .
- Eunha Hoh. Plastic Microbeads:Ban The Bead!. Journal of Science. At <https://storyofstuff.org/plastic-microbeads-ban-the-bead>. (last visited 16 December 2017).
- Chelsea M. Rochman. ONE TUBE OF FACIAL SCRUB CAN CONTAIN MORE THAN 330,000 PLASTIC MICROBEADS!. Journal of Science. At <https://www.5gyres.org/microbeads/>. (last visited 16 December 2017).
- Marcus Eriksen. Environmental impact of microplastics. Journal of Environment (July 2016). At <http://data.parliament.uk/WrittenEvidence/CommitteeEvidence.svc/EvidenceDocument/Environmental%20Audit/Environmental%20impact%20of%20Microplastics/written/31804.html>. (last visited 16 December 2017).

- Ylva Olsen. Lost at Sea: Where Is All the Plastic?. Journal of Science (June 2004). At [https://www.researchgate.net/publication/8575062\\_Lost\\_at\\_Sea\\_Where\\_Is\\_All\\_the\\_Plastic](https://www.researchgate.net/publication/8575062_Lost_at_Sea_Where_Is_All_the_Plastic). (last visited 17 December 2017).
- Marcus Eriksen. MICROPLASTIC POLLUTION IN THE SURFACE WATERS OF THE LAURENTIAN GREAT LAKES. Journal of Environment (January 2014). At <http://oneearth-oneocean.com/microplastic-pollution-in-the-surface-waters-of-the-laurentian-great-lakes-2/>. (last visited 17 December 2017)
- Department of Marine and Coastal Resource and Burapha University Faculty of Marine Technology. The survey and characteristic of Microplastics debris in marine. At <http://www.dmcg.go.th/attachment/download/download.php?WP=oKE3MRkCoMOahKGtnJg4WaN1oGy3ZRjmoH9axUF5nrO4MNo7o3Qo7o3Q>. (last visited 17 December 2017).
- Pitipong Tharamon. Contamination of microplastic in bivalve at Chaolao and Kungwiman beach Chanthaburi province. Journal of Environment (2016). At [http://marine.chanthaburi.buu.ac.th/file\\_research/2016-02.pdf](http://marine.chanthaburi.buu.ac.th/file_research/2016-02.pdf). (last visited 18 December 2017)
- International Campaign Against Microbeads in Cosmetics. This product contains microplastics!. At <http://www.beatthemicrobead.org/ProductTable.php?colour=2&country=AU&language=EN>. (last visited 3 November 2017).
- Adil Bakir. Characterisation, Quantity and Sorptive Properties of Microplastics Extracted from Cosmetics. Journal of Environment. At [https://researchportal.port.ac.uk/portal/files/3082039/Characterisation\\_Quantity\\_and\\_Sorptive\\_Properties.pdf](https://researchportal.port.ac.uk/portal/files/3082039/Characterisation_Quantity_and_Sorptive_Properties.pdf). (last visited 17 December 2017).
- Amy DuFault. Ditching microbeads: the search for sustainable skincare. Journal of Cosmetics (May 2014). At <https://www.theguardian.com/sustainable-business/microbeads-cosmetics-gyres-plastics-pollution-makeup>. (last visited 7 December 2017).
- Cody Primmer. Emerging Pollutants: Microbeads. Journal of Environment (2015). At <http://www.cayugalake.org/microbeads-emerging-issue.html>. (last visited 17 December 2017).
- Sean Poulter Consumer Affairs Editor for The Daily Mail. Revealed: Plastic is found in a THIRD of fish caught in Britain because of toxic microbeads used in shower gels, toothpastes and beauty products. Journal of Cosmetics. At



- <http://www.dailymail.co.uk/news/article-3759269/Plastic-fish-caught-Britain-toxic-microbeads-used-shower-gels-toothpastes-beauty-products.html>. (last visited 17 December 2017)
- Richard Thompson. Beat the microbeads. *Journal of Cosmetics*. At <http://www.beatthemicrobead.org/science/>. (last visited 4 January 2018)
- Chelsea Rochman. Sources, Fate And Effects Of Microplastic in the Marine Environment: Part 2 of a Global Assessment. London: INTERNATIONAL MARITIME ORGANIZATION, 2016. At <http://unesdoc.unesco.org/images/0024/002475/247517e.pdf>. (last visited 19 December 2017) .
- Alla Katsnelson. News Feature: Microplastics present pollution puzzle. *Journal of Science* (June 2015). At <http://cleanship.org/reports/microplastic-presents-pollution-puzzle.pdf>. (last visited 19 December 2017).
- Esther Han. Microbeads are leaching toxic chemicals into fish, sparking public health fears. *Journal of Environment* (August 2016). At <https://www.smh.com.au/business/consumer-affairs/microbeads-are-leaching-toxic-chemicals-into-fish-sparking-public-health-fears-20160816-gqt1pk.html>. (last visited 21 December 2017).
- Clare Milliken. Your Favorite Body Wash Might Be a Serious Danger to the Environment and Your Health. *Journal of Environment* (August 2014). At <https://greatist.com/connect/microbeads-harmful-to-environment-humanhealth>. (last visited 19 December 2017).
- Tarlor Bryant. How the Microbead Ban Affects You. *Journal of Environment* (January 2016). At <http://www.refinery29.com/2016/01/100202/microbeads-beauty-products-environmental-effects?bucketed=true>. (last visited 22 December 2017).
- Federico Cheever. Principles of Environmental Law. *Journal of Environmental Law*. At <https://www.britannica.com/topic/environmental-law#ref224605>. (last visited 22 December 2017).
- The committee of the World Commission on Environment and Development. Our Common Future, From One Earth to One World. At <http://www.un-documents.net/our-common-future.pdf>. (last visited 22 December 2017).
- Brussels. Commission adopts Communication on Precautionary Principle (February 2000). At [http://europa.eu/rapid/press-release\\_IP-00-96\\_en.htm](http://europa.eu/rapid/press-release_IP-00-96_en.htm). (last visited 25 December 2017).

- The Forest of Broceliande. The Precautionary Principle. At <https://proxy.planete.net/galleries/broceliande7/precautionary-principle-further-discussion>, (last visited 22 December 2017).
- World Commission on the Ethics of Scientific Knowledge and Technology (COMEST). The Precautionary Principle. France: the United Nations Educational, Scientific and Cultural Organization, 2005. At <http://unesdoc.unesco.org/images/0013/001395/139578e.pdf>. (last visited 24 December 2017).
- Toiletry & Perfumery Association. Plastic Microbeads FAQs. Journal of Cosmetics. At <http://www.thefactsabout.co.uk/plastic-microbeads---in-depth/content/251>. (last visited 4 January 2018)
- Richard C. Thompson. The physical impacts of microplastics on marine organisms: A review. Journal of Environmental pollution (October 2012). At <http://resodem.a.org/publications/publication9.pdf>. (last visited 5 January 2018).
- Sunantha Aekpaisarnkul. The conclusion of Cosmetic Act B.E. 2535 (October 2004). At [http://web.krisdika.go.th/data/lawabout/lawdetail/lawdetail\\_112.htm](http://web.krisdika.go.th/data/lawabout/lawdetail/lawdetail_112.htm). (last visited 9 January 2018)
- The Food and Drug Administration (FDA). Hazardous substance in the fourth category. At [http://www.fda.moph.go.th/sites/Hazardous/KM\\_Factsheet/11.%20%20%E0%B8%A7%E0%B8%B1%E0%B8%95%E0%B8%96%E0%B8%B8%E0%B8%AD%E0%B8%B1%E0%B8%99%E0%B8%95%E0%B8%A3%E0%B8%B2%E0%B8%A2%E0%B8%8A%E0%B8%99%E0%B8%B4%E0%B8%94%E0%B8%97%E0%B8%B5%E0%B9%88%204.pdf](http://www.fda.moph.go.th/sites/Hazardous/KM_Factsheet/11.%20%20%E0%B8%A7%E0%B8%B1%E0%B8%95%E0%B8%96%E0%B8%B8%E0%B8%AD%E0%B8%B1%E0%B8%99%E0%B8%95%E0%B8%A3%E0%B8%B2%E0%B8%A2%E0%B8%8A%E0%B8%99%E0%B8%B4%E0%B8%94%E0%B8%97%E0%B8%B5%E0%B9%88%204.pdf). (last visited 10 January 2018)
- World Health Organization. IARC Monographs on the Evaluation of carcinogenic Risks to Humans (June 2012). At <http://apps.who.int/bookorders/anglais/detart1.jsp?sesslan=1&codlan=1&codcol=72&codcch=100>. (last visited 11 January 2018).

