

A Case Report: Benzene Contamination in Shampoo

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A Case Report: Benzene Contamination in Shampoo

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Abstract

The availability of safe personal care products is a right that must be obtained by global consumers. There have been several reports of cases of chemical contamination in personal care products, for example, benzene contamination. Recently on 18 October 2022, the U.S. The Food and Drug Administration withdrew shampoo with several brands because benzene contamination with concentrations exceeding the established quality standards had been detected. This study aims to disseminate information on shampoo products contaminated with benzene and how the mitigation is carried out by the Indonesian authorities. This research is descriptive research with a case report study design approach. The data used in this study is in the secondary data obtained from the websites of the United States state authorities (Food and Drug Administration) and the National Agency of Drug and Food Control (BPOM) Indonesia and journals. Data collection was carried out on 18-21 October 2022. From the results of the data search, there were 19 dry shampoo products from the Unilever company that were contaminated with benzene. Two of these products are notified in Indonesia. Benzene contamination in shampoo is thought to originate from the propellant. The propellant/propellant is the material needed by the product in the form of an aerosol dosage form which functions to push the contents of the product out of the package with a certain pressure. BPOM also continues to monitor this issue nationally and internationally.

Keywords: benzene, case report, dry shampoo, personal care, unilever

Abstrak

Ketersediaan produk perawatan pribadi yang aman merupakan hak yang harus didapatkan oleh konsumen global. Ada beberapa laporan kasus kontaminasi bahan kimia pada produk perawatan pribadi, misalnya kontaminasi benzena. Baru-baru ini pada tanggal 18 Oktober 2022, Badan Pengawas Obat dan Makanan Amerika Serikat menarik sampo dengan beberapa merek karena terdeteksi adanya cemaran benzena dengan konsentrasi yang melebihi baku mutu yang ditetapkan. Penelitian ini bertujuan untuk menyebarkan informasi mengenai produk sampo yang terkontaminasi benzena dan bagaimana mitigasi yang dilakukan oleh pihak berwenang di Indonesia. Penelitian ini merupakan penelitian deskriptif dengan pendekatan desain studi laporan kasus. Data yang digunakan dalam penelitian ini berupa data sekunder yang diperoleh dari situs web otoritas negara bagian Amerika Serikat (Food and Drug Administration) dan Badan Pengawas Obat dan Makanan (BPOM) Indonesia serta jurnal. Pengumpulan data dilakukan pada tanggal 18-21 Oktober 2022. Dari hasil penelusuran data tersebut, terdapat 19 produk sampo kering dari perusahaan Unilever yang terkontaminasi benzena. Dua dari produk tersebut dinotifikasi di Indonesia. Kontaminasi benzena pada sampo diduga berasal dari propelan. Propelan/propelan adalah bahan yang dibutuhkan oleh produk dalam bentuk sediaan aerosol yang berfungsi mendorong isi produk keluar dari kemasan dengan tekanan tertentu. BPOM juga terus melakukan pemantauan terhadap isu ini secara nasional dan internasional.

Kata Kunci: benzene, laporan kasus, sampo kering, perawatan personal, unilever

1. Introduction

The availability of safe personal care products is a right that must be obtained by global consumers. Personal care products distributed globally must be safe from physical, chemical, and biological contamination. It seems that this has not been properly monitored, there have been several reports of cases of chemical contamination in personal care products, for example, benzene contamination in personal care sun care products [1]. As reported by the Therapeutic Goods Administration Australia, in 28 April 2022,

2XP SPF50+ Bronze Protect Sunscreen Lotion was contaminated with benzene which exceeded the quality standard so it was withdrawn from the market [2]. Meanwhile, in the United States, Food and Drug Administration (FDA) through a citizen petition on May 21, 2022, benzene has detected in many personal care sunscreen products[3]. Recently on October 18, 2022, United State authorities through the U.S. The Food and Drug Administration withdrew shampoo with several brands because benzene contamination with concentrations exceeding the established quality standards had been detected[4].

Benzene is known as a carcinogenic substance and the molecular arrangement of benzene is presented in **Figure 1** [5-9]. The presence of Benzene should not be found in personal care products. Exposure to the pathways for Benzene in personal care can be through inhalation and dermal, inhalation when the liquid shampoo is removed from the package will experience evaporation, and through the dermal when the liquid shampoo is used. Apart from being a carcinogenic substance, exposure to benzene in children can cause leukemia[10]. Eyes that are splashed with benzene cause pain and burning, and can also injure the cornea[11]. Exposure to Benzene in a long duration can reduce the quality of the skin, the skin can peel and crack[11]. Skin percutaneous knitting experiences a slowdown, so the process of returning the skin to an intact condition requires a long duration [11]. Benzene absorbed by the skin can cause systemic toxicity. Children are the most vulnerable group, because they have a wide skin surface area and weight ratio [11].

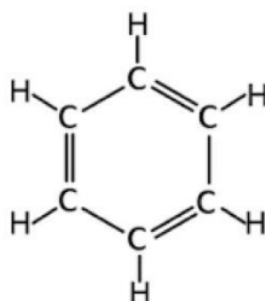


Figure 1. Benzene Molecular Structure[12]

Benzene is commonly found in crude oil and as a by-product of oil refining. However, the utilization of benzene has expanded to be used in various industries. The existence of benzene in the industry is utilized as a solvent, chemical intermediary, and as chemical synthesis[12]. The presence of benzene should not be found and used in industries that have close contact with humans, for example in personal care shampoo products. Presence of benzene in shampoo

The presence of Benzene in personal care shampoos poses a high level of danger to the health of the world's people. Even though reports of benzene contamination in shampoo occurred in the United States, Indonesian authorities must take preventive measures to minimize the expansion of contamination in Indonesia. This study aims to disseminate information on shampoo products contaminated with benzene and how the mitigation is carried out by the Indonesian authorities.

2. Material and Methods

This research is descriptive research with a case report study design approach. The data used in this study is in the secondary data obtained from the websites of the United States state authorities (Food and Drug Administration) and the National Agency of Drug and Food Control (BPOM) Indonesia and journals. This study uses qualitative data in the form of shampoo brand names and product descriptions, while the quantitative data used is shampoo size. Data collection was carried out on 18-21 October 2022.

3. Results and Discussion

Data were obtained from the websites of the United States state authorities (Food and Drug Administration) as many as 19 shampoo products were withdrawn from the market in the United States. The shampoo product being recalled is from the Unilever company. The products recalled by aerosol dry shampoo include the brand's Dove, Nexxus, and Suave, the complete data is presented in **Table 1 dan Figure 2.**

Table 1. List of Shampoo Products Contaminated with Benzene and Withdrawn from The Market 18-21 October 2022

No.	Product Description	Size
1.	Dove Dry Shampoo Volume and Fullness	1.15; 5; 7.3 oz
2.	Dove Dry Shampoo Fresh Coconut	1.15; 5; 7.3 oz

No.	Product Description	Size
3.	Dove Dry Shampoo Fresh and Floral	5 oz
4.	Dove Dry Shampoo Ultra Clean	5 oz
5.	Dove Dry Shampoo Invisible	5 oz
6.	Dove Dry Shampoo Detox and Purify	5 oz
7.	Dove Dry Shampoo Clarifying Charcoal	5 oz
8.	Dove Dry Shampoo Go Active	5 oz
9.	Nexxus Dry Shampoo Refreshing Mist	5 oz
10.	Nexxus Inergy Foam Shampoo	6.7 oz
11.	Suave Dry Shampoo Hair Refresher	5 oz
12.	Suave Professionals Dry Shampoo Refresh and Revive	4.3 oz
13.	Tresemme Dry Shampoo Volumizing	1.15; 5; 7.3 oz
14.	Tresemme Dry Shampoo Fresh and Clean	5 and 7.3 oz
15.	Tresemme Pro Pure Dry Shampoo	5 oz
16.	Bed Head Oh Bee Hive Dry Shampoo	5 oz
17.	Bed Head Oh Bee Hive Volumizing Dry Shampoo	5 oz
18.	Bed Head Dirty Secret Dry Shampoo	2.1 and 6.3 oz
19.	Bed Head Rockaholic Dirty Secret Dry Shampoo	2.5 oz



Figure 2. List of Shampoo Products Contaminated with Benzene and Withdrawn from The Market 18-21 October 2022
Source: [13]

Table 1 and Figure 2 shows a list of shampoo products that are potentially contaminated with Benzene. Based on the results of an independent health hazard evaluation, Benzene concentrations were obtained that exceeded the established quality standards. On the U.S. website, The Food and Drug Administration does not specify the concentration of Benzene. Of the 19 shampoo products in **Table 1**, 2 shampoo products have been notified in the National Agency of Drug and Food Control (BPOM) Indonesia database. The two products are TRESEMME Volumizing Dry Shampoo, certified at BPOM under the name TRESEMME Volume Clean Dry Shampoo (notification number NE51221000008), and TRESEMME Dry Shampoo Fresh and Clean, certified at BPOM under the name TRESEMME Fresh Clean Dry Shampoo (notification number NE51221000007).

The Food and Drugs Administration (FDA) is the United States authority for drug and food control, including dry shampoo products. The U.S. Food and Drugs Administration (FDA) website regarding "Unilever Issues Voluntary U.S. Recall of Select Dry Shampoos Due to Potential Presence of Benzene" does not mention the amount of benzene contamination in dry shampoo products. Meanwhile, cited from

The Valisure has tested several shampoo products contaminated with benzene, and the results obtained are benzene concentrations exceeding 2 ppm set by the FDA for the category of drugs [14]. The dry shampoo tested was not intended for medical or contained active pharmaceutical ingredients for therapeutic purposes. Therefore, the presence of benzene in dry shampoo products cannot be accepted considering the potential public health hazard. The Valisure also measures the concentration of benzene in the air by spraying dry shampoo, it is possible to exposure to benzene through short-term or long-term inhalation. Benzene has the properties of a solvent and precursor for manufacturing chemicals with a more complex structure [14].

Benzene contamination in shampoo is thought to originate from the propellant. The propellant/propellant is the material needed by the product in the form of an aerosol dosage form which functions to push the contents of the product out of the package with a certain pressure. Materials commonly used as propellants include liquefied gases such as fluorochloromethane derivatives, ethane, propane, butane, and pentane, or compressed gases such as carbon dioxide (CO₂), nitrogen (N₂), and nitrogen.

Although benzene has good solvent and precursor properties, the use of benzene in personal care should not be avoided. Benzene is a chemical that is classified as group 1 according to The World Health Organization (WHO) and the International Agency for Research on Cancer (IARC)[5]. Meanwhile The U.S. The Food and Drug Administration (FDA) categorizes Benzene into group 1 solvents with a status that cannot be used in manufacture of medicinal substances, excipients, and drug products, because they have a high toxicity effect[3], [15], [16]. Recently, the Unilever company has not clarified the cause related to benzene contamination in their shampoo products. On other hand, The U.S. The Food and Drug Administration (FDA) has withdrawn 19 of these shampoo products from the market.

On 27 October 2022, Indonesian authorities through the National Agency of Drug and Food Control (BPOM) Indonesia clarified the issue of benzene contamination in shampoo that occurred in the United States. Two of the products that have been notified by BPOM are TRESEMME Volumizing Dry Shampoo, certified by BPOM under the name TRESEMME Volume Clean Dry Shampoo (notification number NE51221000008). TRESEMME Dry Shampoo Fresh and Clean, certified by BPOM under the name TRESEMME Fresh Clean Dry Shampoo (notification number NE51221000007). Based on import data, until now the two products that already have BPOM notification numbers (circulation permits) have never been imported into Indonesian territory. BPOM states that all cosmetics withdrawn from distribution in the United States, are not officially distributed in Indonesia [17].

BPOM is taking several mitigation steps, first BPOM will continue to monitor the Benzene issue in cosmetics and coordinate with ministries/agencies, experts, academics, associations, and relevant cross-sectors both at the national and international levels. Second, BPOM always carries out pre- and post-market supervision on the safety and quality of cosmetic products in accordance with applicable standards and intensifies cosmetic supervision in all regions of Indonesia. Third, BPOM also continuously carries out cyber patrols on website platforms, social media, and e-commerce. BPOM coordinates with the Ministry of Communication and Informatics (Kemenkominfo) and the Indonesian E-Commerce Association (IdEA) to take down content on links identified as selling cosmetics that are declared unsafe or contain hazardous materials. Fourth, BPOM urges the public to be smart consumers by always checking "CLICK" (packaging, label, distribution permit, and expiration) before buying or using cosmetics. Make sure the packaging is intact, read the information on the label, make sure it has a distribution permit/notification number from BPOM, and has not passed its expiration date [17].

4. Conclusion

The results of data collection found that there were 19 dry shampoo products contaminated with benzene. Two of these products have been notified by the BPOM of the Republic of Indonesia. Although notified, the two products have never been imported to Indonesia. Benzene contamination in shampoo is thought to originate from the propellant. The propellant/propellant is the material needed by the product in the form of an aerosol dosage form which functions to push the contents of the product out of the package with a certain pressure. BPOM also continues to monitor this issue nationally and internationally. BPOM always carries out pre- and post-market supervision on the safety and quality of cosmetic products in accordance with applicable standards and intensifies cosmetic supervision in all regions of Indonesia.

5. Acknowledgment

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6. Abbreviations

<i>BPOM</i>	Food and drug regulatory agency
<i>FDA</i>	Food and drug administration
<i>IARC</i>	International agency for research on cancer
ppm	parts per million

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- 2. Tampilkan gambar struktur molekul Benzen dan beri penjelasannya.**
- 3. Tampilkan contoh-contoh gambar shampoo yang terkontaminasi Benzen**

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