Toxics Link
for a toxics-free world

ISSUES AND CONCERNS OF

TALCUM POWDER IN INDIA

A report by
TOXICS LINK

IPEN
for a toxics-free future

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About IPEN: IPEN is a global network of public interest non-governmental organiza-tions (NGOs) forging a toxics-free future. IPEN is comprised of over 550 NGOs in more than 116 countries. Together we work to ensure that toxic chemicals and metals are no longer produced, used, or disposed of in ways that harm human health and the environment. IPEN and its Participating Organizations have become a leading force in chemicals and waste regulation and are catalyzing an international movement to promote chemicals without harm and an end to the production of the world's most hazardous substances.

About Toxics Link: Toxics Link is an Indian environmental research and advocacy organization set up in 1996, engaged in disseminating information to help strengthen the campaign against toxics pollution, provide cleaner alternatives and bring together groups and people affected by this problem. Toxics Link's Mission Statement - "Working together for environmental justice and freedom from toxics. We have taken upon ourselves to collect and share both information about the sources and the dangers of poisons in our environment and bodies, and information about clean and sustainable alternatives for India and the rest of the world." Toxics Link has unique expertise in areas of hazardous, medical and municipal wastes, international waste trade, and the emerging issues of pesticides, Persistent Organic Pollutants (POPs), hazardous heavy metal contamination etc. from the environment and public health point of view. We have successfully implemented various best practices and have brought in policy changes in the aforementioned areas apart from creating awareness among several stakeholder groups.

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Introduction

Talc, a mineral composed of magnesium, silicon and oxygen, is classified as a naturally occurring hydrous silicate mineral. It is considered to be one of the softest minerals in the world. As a powder, it can absorb oils, moisture and odour, and reduce friction. Therefore, it has been commercially used in personal hygiene and cosmetic products to assist in keeping skin dry and prevent rashes.[1]

Talc gained popularity as a cosmetic product when Johnson & Johnson (J & J) started selling it in the late 1800s. J & J talc baby powder is one brand that is immensely popular in India too. Due to the hot and tropical climate, India and other Southeast Asian countries face the risk of dermal heat disorders.[2] One such disorder is miliaria, a widely recognized, heat-induced dermatitis that leads to skin rash. Majority of the manufacturers market talcum powders (cosmetic-grade talc) to the Indian and greater Southeast Asian populations to combat the risk of sweat-induced dermatitis.[3] A large number of Indian consumers rely on talcum powder for fighting perspiration and odour, to helping lend the user a 'fairer' skin tone. The talcum powder market in India is estimated to be worth about ₹700 crore.[4]

In its natural form, some talc contains asbestos, a substance known to cause cancers in and around the lungs when inhaled. Although Rohl et al. disseminated information on asbestos in talc products over 45 years ago,[5,6] the issues surrounding the use of talc in powder attracted a lot of global attention following the public outcry and series of litigations against J & J in the US and Canada. Several studies conducted over the past 25 years found an association between perineal talc powders and ovarian cancer.[7–12] J & J and other manufacturers faced thousands of lawsuits from people who claim their talc products caused cancer.[13] Moreover, after J & J withdrew their talc baby powder from the shelf only in these countries, there is more suspicion amongst the public regarding the possible health impacts of talc.

Talc–Properties, uses and market trends

Talc is a naturally occurring mineral, mined from the earth, composed of magnesium, silicon, oxygen, and hydrogen. Chemically, talc is a hydrous magnesium silicate having a chemical formula of $Mg_3Si_4O_{10}(OH)_2$. Talc is usually green, white, gray, brown, or colorless. It is a translucent mineral with a pearly luster. It is the softest known mineral and is assigned a hardness of 1 on the Mohs Hardness Scale.[14]

Talc is used in a wide variety of everyday products. It is an important ingredient in rubber, a filler and whitener in paint, a filler and brightening agent in high-quality papers, and a primary ingredient in many types of cosmetics. Talc in pulverized form is mostly used as a filler in paper, textile, rubber, insecticides and fertilizer industries. Pure talc after calcining, known as Lava, is used in the manufacturing of low-loss ceramic materials essential for radio, radar, television, etc. In roofing products, such as tar, paper, asphalt shingles and roll roofing, talc acts as a fire retardant and increases weather resistance. The lightweight plastic parts used in automobiles are made from talc-reinforced polypropylene, which enhances their performance and durability.

The talc market was valued at USD 2.63 billion in 2018 and is projected to reach **USD 3.72 billion by 2026,** growing at a **CAGR of 4.42% from 2019 to 2026.** The top players operative in the talc market are Imerys, Nippon Talc, Liaoning Aihai Talc, Mondo Minerals, Minerals Technologies, Guangxi Guilin Longsheng Huamei Talc Development Company, Sibelco, Xilolite, IMI Fabi and Golcha Minerals.[15] The leading talc-producing countries in 2018 were China, India, Brazil, the United States, South Korea, France, Japan, and Finland. Thus, the Asia Pacific region is a major producer and exporter of talc across the globe. Indian talc is considered to be the second best in the world next to Italian talc. Talc export of India was 259522 tonnes in 2018-19, i.e., 17% share in the total value of Indian mineral exports. Rajasthan is the hub of activities related to talc mining, processing and trade with 57% of all talc reserves in India followed by Uttarakhand (25%). 9% of the talc reserves in India are cosmetic-grade talc.[16]

Use of talc in cosmetics

Talc is reported to function as an abrasive, absorbent, anti-caking agent, bulking agent, opacifying agent, skin protectant and slip modifier in cosmetics. It is used in a large number of cosmetic products such as antiperspirants, powdered foundation, feminine hygiene products or baby care, for its multiple properties and benefits. Products containing talc may be applied to baby skin, used in products that could be incidentally ingested, or used near the eye area or mucous membranes. Additionally, talc is used in cosmetic sprays and powders.[17]

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Where the risk lies

Talc is an ingredient used in many cosmetics, from baby powder to blush. Asbestos*, a mineral that is a known carcinogen, may occur naturally alongside talc in some metamorphic rocks. Research studies have confirmed that asbestos can be found close to talc deposits underground and contaminate it when talc is mined.[18,19] **Asbestos is harmful when it breaks down and lodges in the lung tissue, possibly leading to diseases including lung cancer, asbestosis and mesothelioma**. When talking about the link of talc to cancer, it is important to distinguish between talc that contains asbestos and talc that is not contaminated with asbestos, i.e., asbestos-free talc. Talc that has asbestos is generally accepted as being able to cause cancer if it is inhaled. Although talc without asbestos can itself produce talcosis, the evidence is less clear.[20,21] A study by Akhtar et al. highlighted that the nanotalc collected from two different geographical regions, i.e. Indian-origin and American-origin significantly induced cytotoxicity, oxidative stress, and apoptosis in human lung epithelial cells.[22]

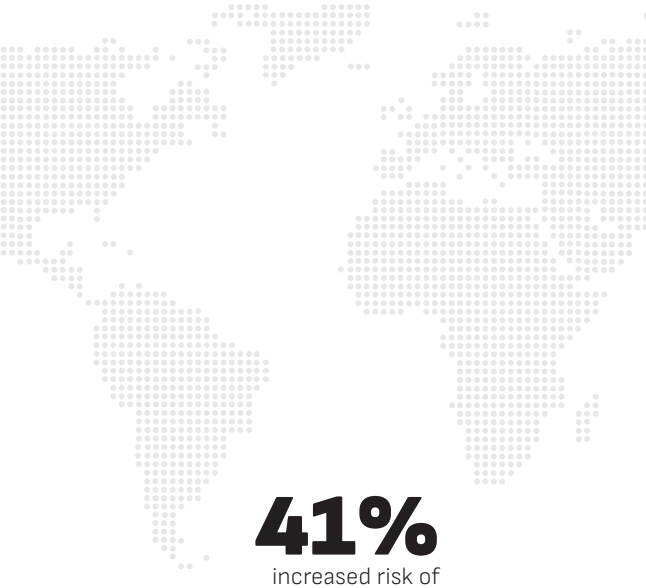
The International Agency for Research on Cancer (IARC), a part of the World Health Organization (WHO) that identifies causes of cancer, classifies the genital use of talc-based body powder as "possibly carcinogenic to humans" based on the limited evidence from human studies of a link to ovarian cancer. Epidemiologic evidence also suggests a possible association between genital use of talcum powder and the risk of ovarian cancer.[23,24] On the other hand, talc containing asbestos is classified as "carcinogenic to humans."[13] More specifically, talcum powder may cause ovarian cancer if powder particles applied to the genital area or on condoms were to find their way through the vagina, uterus, and fallopian tubes to the ovary. Ovarian cancer is a fatal but rare form of cancer that affects millions of women and accounts for 4% of all the female cancers.[25] In India too, the incidence of ovarian cancer amongst reproductive and growing women is on the rise. The possible increase in risk is alarming because it tampers with the usually low risk of being diagnosed with ovarian cancer in an average woman's lifetime. Based on the lack of data from human studies and limited data in lab animal studies, IARC[26] classifies inhaled talc not containing asbestos as "not classifiable as to carcinogenicity in humans."

*Asbestos refers to six unique minerals, namely, chrysotile (white asbestos), amosite (brown asbestos), crocidolite (blue asbestos), anthophyllite, tremolite and actinolite, belonging to the serpentine and amphibole families.[50] All the identified asbestos forms can cause asbestosis, malignant mesothelioma, lung cancer, ovarian cancer, laryngeal cancer and other serious diseases.

Mineral Families of Asbestos

- Serpentine asbestos
  - Curly fibres made up of sheets of crystals
  - Historically, chrysolite from the serpentine family accounted for >95% of all asbestos used around the world
- Amphibole asbestos
  - Needle-shaped fibres
  - Compared to serpentine asbestos, amphibole asbestos can cause cancer with much less exposure
  - Most commercial types: amosite and crocidolite
  - Non-commercial types: anthophyllite, tremolite and actinolite

Chrysotile is often accompanied by trace amounts of amphibole types of asbestos in natural asbestos deposits, which increase its toxicity. Although all forms of asbestos can cause mesothelioma, there is considerable evidence that the potency for the induction of mesothelioma varies by fibre type, and in particular, chrysotile asbestos is less potent than the amphibole forms of asbestos. However, it has been concluded that people should treat chrysotile asbestos with the same level of concern as other forms of asbestos.



41%
increased risk of
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Global studies

A Harvard study reported a 41% increased risk of ovarian cancer amongst women who apply talcum powder regularly in the genital area.[27]The US-based NGO Environmental Working Group found asbestos in a toy make-up kit and 2 eye shadow palettes in laboratory tests commissioned by them on products purchased from a large scale online retailer.[28] In April 2009, the Korea Food and Drug Administration (KFDA) discovered asbestos in 8 out of 12 baby powder brands that used talc as the source material. The investigation included a total of 30 products from 14 baby powder manufacturing companies.[29]

Steffen et al. reported 10 cases of serious ovarian cancer in women who primarily or exclusively used a variety of J & J cosmetic talc products including Johnson's Baby Powder (JBP), Shower to Shower (STS), and STS Shimmer in the US.[12] They found that asbestos was present in the tissue samples of 8 out of 10 affected women. Gordon et al. investigated one historic talcum powder brand in the US and found that this brand contained asbestos and the application of talcum powder released inhalable asbestos fibres.[30]

Indian studies

The Indian Institute of Toxicology Research (IITR), Lucknow conducted a study to investigate the safety of talcum powders being sold in the market by analyzing the asbestos content. Five branded samples of talcum powder were analysed and all were found to be contaminated with asbestos fibres. Asbestos fibre contamination in these powders ranged from 10.3–15.4%. The study indicates the risk of human exposure to asbestos through the use of naturally contaminated talcum powder and has been published in the Annual Report 2005-2006 of IITR.[31]

A recent study on asbestos in commercial Indian talc, believed to be the first report of such findings in India, highlighted the presence of tremolite asbestos in Indian talc products. The study revealed that large quantities of body talc products containing asbestos are used throughout India and Southeast Asia and are likely to pose a huge public health risk for asbestos-related diseases, especially for the cancers related to asbestos exposure. However, the mining source and location of talc used in these products were unknown in this study.[19]

Johnson & Johnson's recall of talcum powder

Talc powder was an essential part of women's cosmetics due to its multiple uses. In 1893, J & J released its popular baby powder after discovering it could prevent diaper rash. Later, companies began marketing it to women stating that talc was good for controlling odour and moisture in the genital area. At that time, no one was aware of the potential risks associated with the long-term use of talcum powder.

Published scientific literature dating back to the 1960s has suggested a possible association between the use of powders containing talc and the incidence of ovarian cancer. Also, questions about the potential contamination of talc with asbestos have been raised since the 1970s. Medical biopsies have shown talc particles embedded in the ovaries of women with this form of cancer; most of whom claim daily use of baby powder.

According to the reports, several litigations were filed against some of the manufacturers of talcum powder, among which J & J was one of the biggest names.[32] J & J has always publicly denied its talcum powder products cause cancer, much like many other companies accused of using asbestos in their products. However, documents unsealed in 2017 revealed J & J company executives were aware of asbestos liabilities as early as the 1970s.[33] Thousands of women who developed ovarian cancer after long-term use of the talc baby powder blamed the negligence of J & J and the failure to warn consumers of possible consequences of their products.

In the wake of huge public outcry and several litigations, the company decided to permanently discontinue about 100 products, including the J & J baby powder. However, this decision was only applicable to the North American Market (i.e., US and Canada). The company stated that there has been a decline in demand for the powder and stores can continue selling its existing inventory until it runs out. The company however, continues to sell its products in other markets, including India.

Regulations and actions at global scale

EU

Currently, no specific requirements for cosmetic powders exist in the EU Cosmetics Regulation 1223/2009, but there are restrictions for individual ingredients. As an example, talc is listed in the EU Cosmetics Regulation Annex III (list of substances which cosmetic products must not contain except subject to the restrictions laid down) with the precautionary warning requirement "Keep powder away from children's nose and mouth". Despite the lack of restrictions, manufacturers are responsible for the safety of their products containing talc placed in the EU market in line with the requirements of the cosmetics regulations.

USA

It is still legal to sell talc-based products contaminated with asbestos due to a U.S. law stating that products may contain up to 1% of asbestos and still be considered asbestos-free. This leads to considerable amounts of asbestos fibers still present in the available products. There is no U.S. law regulating the effective testing of talc-based products for asbestos, despite the government agreeing that exposure is never safe. The FDA just recommends that the companies choose their talc mining sites carefully.[34] J & J discontinued the use of talc-based baby powder in the U.S. and Canada in May 2020, following a significant volume of lawsuits citing it as the cause of millions of cancer cases. After asbestos contamination was found in different talc-based cosmetics, the US FDA is planning to establish an asbestos testing standard for all consumer products. In January 2020, the FDA received recommendations from experts in different federal agencies to standardize the testing process.[35]

Canada

A draft screening and risk management assessment was conducted by Health Canada and Canadian environment and climate change agencies. Both these proposals focused on the potential dangers of talc inhalation and the use of the mineral by women in the genital or perineal area. Proposed recommendations to reduce exposure include:

- Adding talc to Canada's list of toxic substances
- Modifying the current entry on talc in Health Canada's cosmetic ingredient hotlist
- Modifying the natural health products and ingredients database to reflect potential risks
- Encouraging the public to avoid talc inhalation and/or perineal use

The science on the risks posed by talc compelled the Canadian federal government in 2018 to propose to classify talc as a toxic substance under the ***Canadian Environmental Protection Act*** (CEPA) — the first step in regulating or banning the ingredient.[36]

ASEAN

The advisory of the Association of Southeast Asian Nations (ASEAN) on the use of talc aims to provide the public with information on talc safety and ease the public's fear in using cosmetic products containing the ingredient. Cosmetic products that are sold or supplied in the ASEAN countries must comply with the applicable prohibitions or restrictions on cosmetic ingredients as well as the product labelling stipulated under the ASEAN Cosmetic Directive (ACD) which has been adopted by all the ASEAN Member States (AMS). Talc is allowed for use as an ingredient in cosmetic products under the ACD Cosmetic Regulation.[37]

Talc is allowed to be used in cosmetic products in ASEAN with the current requirements on the product labelling. At present, talcum powders used for children must be labelled with a warning that states, "Keep powder away from children's nose and mouth" to avoid inhalation. This is in line with the product labelling requirements in the European Union (EU) and Canada.

The advisory stated that all the ASEAN countries will continue to closely monitor any new safety data related to the use of talc in cosmetic products and will take appropriate action and inform the public if necessary.

Other countries

China is the largest producer of talc. Some 47 companies which used to procure Chinese talc powder had to withdraw their product from the market in South Korea due to high asbestos contamination.

Congo has suspended the import of Johnson baby powder. The Ministry of Commerce has decided to suspend the importation and marketing of this powder in the country.

Regulations and actions in India

The Indian standard for talc in cosmetics is given in IS 1462(1985): SPECIFICATION FOR TALC FOR COSMETIC INDUSTRY. The standard prescribes the requirements and methods of sampling and test for talc used in the cosmetic industry. The Central Drugs Standard Control Organization (CDSCO) under Directorate General of Health Services, Union Ministry of Health and Family Welfare is the organization responsible for regulating talc-containing cosmetics and talc powders. In December 2018, the CDSCO had ordered J & J to stop manufacturing baby powder till it was proven to be asbestos-free. However, in March 2019, after a clean chit from a government laboratory in Chandigarh, the company advertised that the baby powder was of standard quality and free of asbestos. However, it should be noted that the measurement of asbestos in any product can be extremely challenging and requires high-quality and rigorous testing.[38] It is imperative that India follows appropriate monitoring methods to detect asbestos in talc to ensure its suitability as a raw material for use as an ingredient in consumer products.[39] Some public health experts have been raising concerns about the safety of talc-based products in India. They fear the possibility of asbestos contamination, lack of rigorous and high-quality testing by manufacturers and poor monitoring and surveillance by regulatory authorities.

Asbestos Testing

According to the experts, the standard test methods used by the talc industry lack specificity and sensitivity.[40] For example, the transmission electron microscopy (TEM) detected asbestos in nine products out of 52 cosmetic products tested by US FDA during its year-long study, but the polarized light microscopy found asbestos only in two of those nine, thus highlighting the shortcomings of optical microscopy methods. The exact quantification of asbestos minerals has been disputed for many years. However, currently, TEM is regarded as the most reliable technique for detecting asbestos fibres by many experts. Even different laboratories testing the same product using the most sensitive electron microscopy method may conclude differently about the asbestos presence. These differences may be attributed to a lack of a uniform standard for testing which provides unambiguous guidelines for identifying and counting asbestos fibers.[41]

Therefore, the regulatory agencies should take steps to support the development of robust standardized testing methods to improve sensitivity, consistency, and inter-laboratory concurrence of asbestos testing of talc used in cosmetic products and of talc-containing cosmetic products.

Alternatives to talc

Some alternatives to talc are as follows:

1. Cornstarch
2. Baking Soda

   (Blend of baking soda and cornstarch or kaolin clay)
3. Tapioca starch
4. Arrowroot starch

   (Alternative for people who are allergic to corn)
5. Kaolin clay (Cosmetic clay)
6. Rice starch
7. Oat flour

Advantages of alternatives to talc[34]

- **White Kaolin clay:** Used in deodorants, facial masks, scrubs and soaps, it is one of the best bases for many baby powders. It is the mildest of all clays and does not draw oil from the skin. It is suitable for all skin types.
- **Cornstarch powder:** Derived from oat, corn, rice or wheat flour, it has a soothing effect on the skin and helps keep it dry by absorbing oil and wetness. It is used in cosmetic creams and make-up as a thickening agent.
- **Dried herbs & essential oils:** Invest in chamomile, calendula blossoms, lavender buds, rose petals or tea tree oil, which can be added to feel fresh and relaxed. Indulge in a bath or add them to your moisturizing routine using any of these ingredients to get the best of its benefits.
- **Baking soda:** Baking soda reduces body odours by cutting down its acidity and drying it up.
- **DIY deodorant:** Make a smooth paste with four tablespoons of coconut oil, four tablespoons of cornstarch, two tablespoons of baking soda and 12 drops of an essential oil of choice. Mix in all the ingredients evenly and let it rest in a jar until it thickens. Once it reaches a thick consistency, this natural deodorant can be used.

The raw materials for talc replacements are not significantly more costly. For example, J & J has sold an inexpensive corn starch baby powder alternative since 1980.[4]

Examples of brands selling alternatives to baby talc powder in India

Products	Major ingredients	Manufacturer
The Moms Co. Talc-free Natural Baby Powder with Corn Starch	Corn starch	The Moms Co., Quantum, Uttar Pradesh
Mamaearth Talc Free Organic Dusting Powder for Babies	Arrowroot and Oat starch	Honasa Consumer Pvt. Ltd, Lakeshwari, Bhagwanpur, Uttarakhand
BeyBee Talc-free Natural Dusting Baby Powder for newborn babies	Mixture of Arrowroot, Corn starch and Oat starch	Baby & mOm Retail Pvt. Ltd., India
Mother Sparsh Talc-free Natural Dusting Powder for Babies	Arrowroot powder and Corn starch	SRS Industries, Lakeshwari, Roorkee district, Haridwar, Uttarakhand
Forest Essentials Daspushpadi Baby Powder (Ayurvedic)	Corn starch and Arrowroot	Mountain Valley Springs (I) Pvt. Ltd., Bhadrabad district, Hardwar, Uttarakhand

Products	Major ingredients	Manufacturer
Lotus Herbals Baby+ Love Sprinkle no-talc powder	Corn starch and light Kaolin clay	Lotus Herbals Color Cosmetics, Baddi, Solan district, Himachal Pradesh
Mama Bear Natural Baby Powder (Amazon brand)	Corn starch	Mama Bear, India
Burt's Bees Baby Bee Dusting Powder Bottle	Corn starch and bark powder	Burt's Bees, Inc., Durham, NC, USA
Dabur Baby Powder Talc-Free	Arrowroot Powder, oats Starch and ayurvedic herbs	Dabur India Ltd, New Delhi
GAIA Talc-Free Cornstarch Powder	Cornstarch	GAIA Skin Naturals, Australia
Earthy Sapo Baby Dusting Powder (Ayurvedic)	Organic arrowroot powder and vetiver powder	Kalart Creations, Hyderabad, Telangana

Cornstarch as an alternative to talc

Cornstarch soaks the excessive oil from the skin and can be used as a setting powder by people with oily or shiny skin. It can be used as a facial cleanser to remove dead skin because of its mild abrasive property. Its anti-inflammatory properties help to soothe skin rashes, burns and itching.[42] Thus, cornstarch can be used as a safer alternative to talcum powders. Cornstarch is made of large particles located in the corn kernel and is completely free of asbestos. Also, the chances of inhalation are less when compared to talcum powder because of the larger particle size. Many consumer product companies have acknowledged the benefits of using cornstarch and have increasingly used cornstarch in place of talc. J & J; however, continues to market two versions of baby powder: one with corn-starch in US and the classic, more recognizable version with talc in India.[43]

India is one of the top 10 maize producers in the world contributing approximately 2—3% of the total maize produced globally. The maize is cultivated throughout the year in all states of the country. It is also one of the top 5 maize exporters in the world contributing almost 14% of the total maize exported to different countries around the world.[44] Therefore, cornstarch can be a great natural alternative to talcum powder in India.

Way Forward and recommendations

The Johnson & Johnson episode has raised serious public health concerns regarding the use of talc in powder and even in other cosmetics. Further, numerous studies have also highlighted the presence of asbestos in talc. Therefore, emphasizing the prevention approach, following recommendations are proposed to safeguard the health of the women and children.

- **Phase out the use of talc in products:** It is high time that instead of waiting for the companies to withdraw their asbestos-laden talcum powder products, the CDSCO may take appropriate measures in regulating these products in India.
- **Promotion of safer alternatives:** There are safer alternatives available to replace talc and many of these alternatives are plant derivatives. As science continues to strengthen the link between talcum powder and ovarian cancer, it is high time that the alternatives to traditional talc products as listed above are promoted.
- **Industry initiatives:** As there are growing concerns linking talc-based powders to cancer, the companies must shift to safer alternatives to safeguard the health of the women and children, as they are most vulnerable to the harmful impacts of talc-based cosmetics and powder. The companies should provide proper warning labels and give people the choice to opt for their products after fully knowing the risks that they face. Further, the companies should maintain the records of where the talc was mined, along with the specific records of testing. The end-users and manufacturers of those talc or talcum powder products should be held accountable for this information and it should be made available to consumers. It is pertinent to mention that Chanel, Revlon and L'Oréal, three of the biggest brands in cosmetics, are quietly moving away from using talc in some products as U.S. cancer lawsuits and consumer concerns mount.[45]
- **Regulatory actions:** A necessary regulatory measure to protect public health is to mandate quality control standards that guarantee all talc intentionally added to cosmetics is tested before production and repeated testing is applied during production. Analysis must be conducted by the most rigorous and sensitive methods possible to assure the absence of asbestos in talc products. The regulatory agencies should ensure that the manufacturer tests for the absence of asbestos using rigorous testing methods in all batches of talc raw material procured by them and not test them randomly. Moreover, the regulatory agencies should recommend ovarian cancer warning labels on baby powder.
- **Issues of laboratories:** The methodology for testing of asbestos in talc is a key issue for many countries including India. There are controversies regarding the suitable methodology to detect asbestos in talc and therefore it is paramount that the testing protocols are accurate and as per the globally prescribed norms. Considering the scale of use of talc in various products in India, the regulatory agencies should take steps to support the development of robust standardized testing methods to improve sensitivity, consistency and inter-laboratory concurrence of asbestos testing of talc used in various products in India. The laboratories in India also need to upgrade themselves with the global protocol to diffuse any controversies arising out of testing of asbestos.
- **Role of the consumers:** Consumers using cosmetics should actively seek products made without any controversial ingredient. Consumers should check out the labels for details to find out what critical ingredients are in their products, and how they are tested and produced. This will encourage the companies to pay attention to consumer concerns, otherwise, they run the risk of losing market share and possibly hurting their public image.

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Annexure I:

Studies on talc conducted globally

	Study	Country	Year	Findings
			Global Studies	
1	Korea Food and Drug Administration (KFDA)[29]	South Korea	2009	• This investigation included a total of 30 products from 14 baby powder manufacturing companies • **They found asbestos in 8 out of 12 baby powder samples that used talc as the source material**
2	Gordon et al.[30]	USA	2014	• The purpose of this study was to investigate one historic brand of cosmetic talcum powder associated with mesothelioma in women • **This brand was found to contain asbestos and the application of this talcum powder released inhalable asbestos fibers** • Lung and lymph node tissues removed at autopsy revealed pleural mesothelioma. Further, digestions of the tissues were found to contain anthophyllite and tremolite asbestos
3	The Netherlands Food and Consumer Product Safety Authority (NVWA)[46]	Netherlands	2018	• In 2018, the Netherlands Food and Consumer Product Safety Authority (NVWA) and the Human Environment and Transport Inspectorate (ILT) tested a number of talc-containing cosmetic products available in the Dutch market for the presence of asbestos fibres • **2 talc-containing cosmetic products (a blusher and an eyeshadow) were found to contain asbestos fibres**
4	U.S. PIRG Education Fund (PIRG)[47]	USA	2018	• PIRG tested more than a dozen makeup products that contained talc from a variety of stores and brands, including children and teen products as well as adult products • **They found three products containing asbestos currently sold by Claire's retail company**
5	Taiwan FDA[48]	Taiwan	2019	• The Taiwan FDA found asbestos in **two cosmetic products made in China** by a Taiwanese company

	Study	Country	Year	Findings
6	Environmental Working Group NGO[28]	USA	2020	• Analysis of 21 talc- containing cosmetic products, including eye shadow, face and body powder, and children's makeup kits was conducted • **Asbestos was found in two eye-shadow palettes and a toy makeup kit**
7	Steffen et al.[12]	USA	2020	• 10 cases of serious ovarian cancer among users of J&J talc containing cosmetic products • **Out of 10 reported cases, 8 were found to contain tremolite and/or anthophyllite asbestos in their tissue samples**
8	US Food and Drug Administration (FDA)[49]	USA	2020	• **Asbestos was found in 9 out of the 52 talc-based cosmetics tested, out of which one was J&J baby powder** • 8 of the contaminated products were in women's makeup products • The samples were tested in AMA Analytical Services, Inc., the leading laboratory in the US in matters of asbestos-contaminated talc
			Indian Studies	
9	Indian Institute of Toxicology Research (IITR), Lucknow[31]	India	2005-2006	• A study was conducted to investigate the safety of talcum powders being sold in the Indian market by analyzing the asbestos content • 5 branded samples of talcum powder were analysed and **all were found to be contaminated with asbestos fibres** • Asbestos fibre contamination in these powders ranged from 10.3—15.4%
10	Fitzgerald et al.[19]	India	2019	• In an initial group of 5 Indian talc products tested, **one was found to contain tremolite asbestos** • The second group of 8 products was tested and **6 contained tremolite asbestos** • The talc products were procured online as well through an Indian-based retail outlet

Annexure II:

Cost of alternative baby powders available in present Indian market (prices as in Dec 2020)

Alternative baby powders	Quantity (g)	MRP (Rs.)
The Moms Co. Talc-Free Natural Baby Powder with Corn Starch	100	249
Mamaearth Talc-Free Organic Dusting Powder for Babies	100	199
BeyBee Talc-free Natural Dusting Baby Powder for new born babies	100	199
Mother Sparsh Talc-free Natural Dusting Powder for Babies	100	225
Forest Essentials Daspushpadi Baby Powder (Ayurvedic)	100	695
Lotus Herbals Baby+ Love Sprinkle no-talc powder	100	130
Mama Bear Natural Baby Powder (Amazon brand)	200	249
Burt's Bees Baby Bee Dusting Powder Bottle	210	1800
Dabur Baby Powder Talc-Free	300	375
Johnson's Baby Powder with pure cornstarch	113	1669
	425	3185
GAIA Talc Free Cornstarch Powder	100	650
Earthy Sapo Baby Dusting Powder (Ayurvedic)	50	200

Annexure III:

Some baby talc powders available in present Indian market (prices as in Dec 2020)

Baby talc powders	Quantity (g)	MRP (Rs.)
Johnson's baby powder (talc) (US brand)	400	225
	600	320
Mee Mee baby powder (Malaysian brand)	500	229
Pigeon Baby Powder with Fragrance (Japanese brand)	100	149
	500	299
Chicco Baby Moments Talcum Powder (Italian brand)	300	299
Sebamed Baby Powders (German brand)	200	666
Softsens Baby Powder (Indian brand)	200	130
Mothercare all we know baby powder (UK brand)	150	399
Cussons mild and gentle baby powder (UK brand)	200	2215
Wheezal Homoepathy Calendula Baby Powder	100	75
Himalaya Baby Powder (Ayurvedic)	400	215
	700	300
Sofskin Baby Powder (American brand)	675	220

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