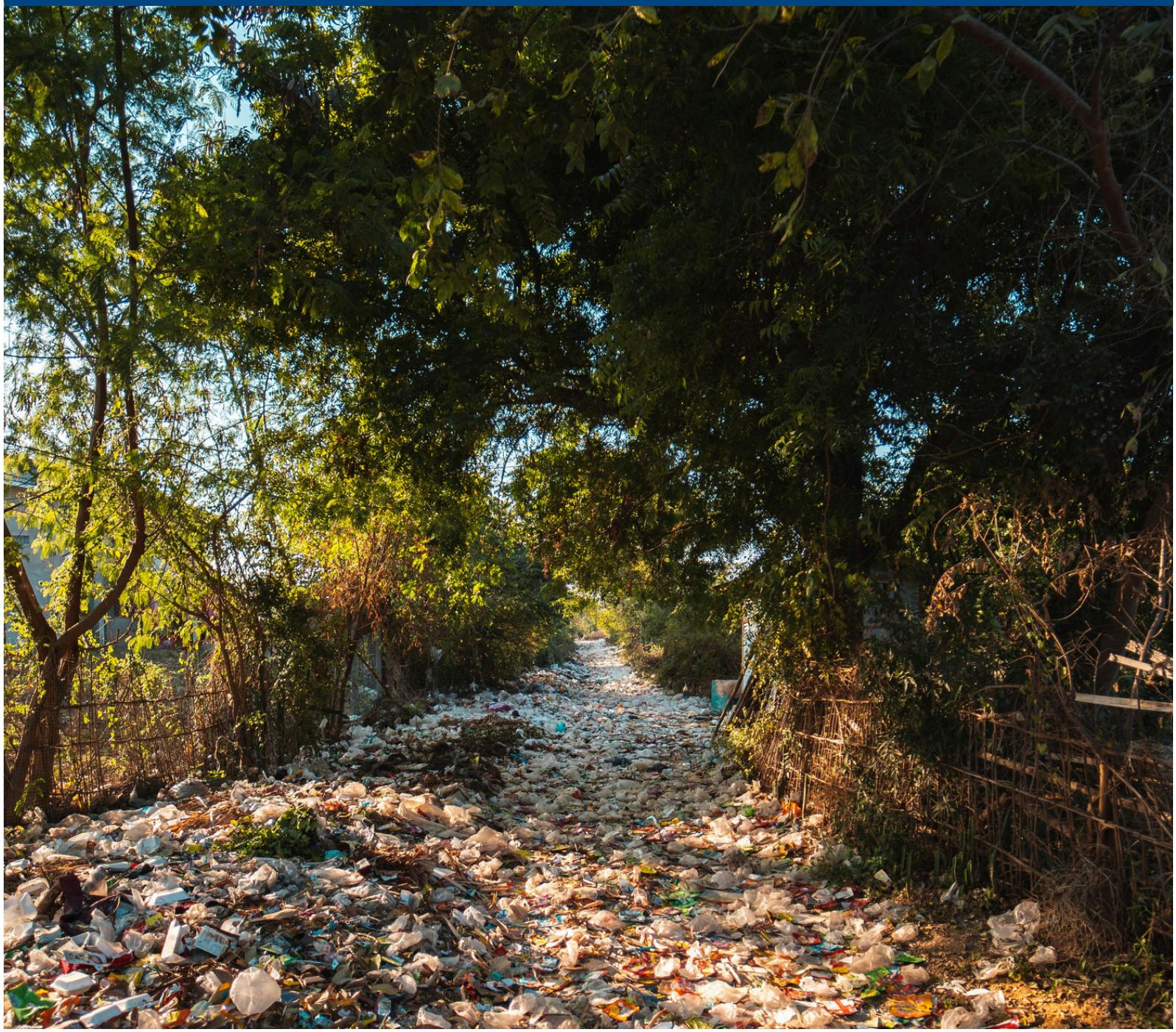
PHTHALATES AND BISPHENOLS IN TUNISIA

2026



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IPEN

for a healthy toxics-free future

Exposure to high-molecular-weight phthalates has been associated with a significant increase in cardiovascular mortality and all-cause mortality over the duration of the study. Exposure to phthalates may also promote the development of cancers. Disorders of glucose and lipid metabolism (such as diabetes and obesity), as well as other pathologies, have also been reported.

The cosmetics sector is the second main field of application in which phthalates are found. As phthalates are not chemically bound to plastics, they are released over time into the environment and can enter the human body through ingestion, inhalation, and skin absorption.

Executive summary: Tunisian situation report on phthalates and biphenols

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Semia Gharbi- Sarra Hechmi

EXECUTIVE SUMMARY

This country situation report provides an assessment of the production, importation, use, regulation, and environmental occurrence of phthalates and bisphenols in Tunisia during the period 2010–2025. These substances, widely used as plasticizers and additives in consumer and industrial products, are recognized for their endocrine-disrupting properties and associated human health and environmental risks.

1. The Plastics Ecosystem in Tunisia: Situation Overview

Tunisia does not produce plastic raw materials and therefore imports all of its needs in these materials. Imports of chemical products in Tunisia have consistently been driven primarily by plastics and plastic articles. Indeed, since 2001, more than one third of imports in this sector have been accounted for by these products. In this regard, it should be noted that plastic raw materials (polymers, polyacetals, etc.) and other primary plastics are imported in large quantities to supply the plastics processing industry, particularly the technical plastics industry, which has emerged as a highly dynamic activity in Tunisia. Moreover, France and Italy remain the leading suppliers of plastic materials to Tunisia, followed by Saudi Arabia, Germany, and China[1].

The Tunisian plastics industry is currently experiencing a period of dynamic growth, establishing itself as a major player in the country's economic landscape. With an estimated production value of 343 million Tunisian dinars (MDT) and an annual growth rate exceeding 9%, the sector now represents 1.5% of the country's total manufacturing output[2]. The plastics industry in Tunisia covers a wide range of activities, from the production of raw materials to the manufacture of finished products used in various industries such as packaging, automotive, electronics, and construction.

Tunisia has only one local manufacturer providing the national and international markets with plasticizers such DOP, DINP, and DIDP. This Tunisian company has successfully manufactured two new products TOTM and DUP at its plant that meet user requirements and has registered them with two international organizations, namely the American Chemical Society and the European Chemicals Agency (ECHA)[3].

The distribution of the Tunisian companies in the plastics processing sector by regime is as follows:

- Fully exporting companies (TE: Totalement Exportatrice): 79
- Non–fully exporting companies (NTE: Non Totalement Exportatrice): 184
- Total number of companies: 263

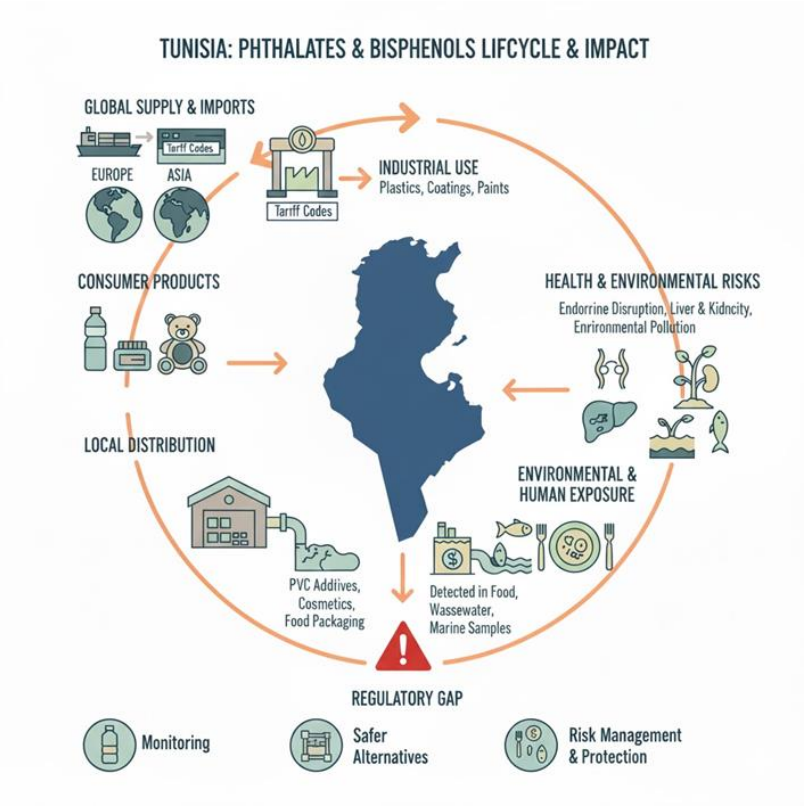
Seventy-eight percent (78%) of these companies have foreign participation. Foreign capital is mainly of French, Italian, and German origin. Other countries represented

[1] https://www.tunisieindustrie.nat.tn/fr/download/CEPI/2018/ich.pdf
[2] https://www.tunisieindustrie.nat.tn/fr/download/fichesPro/ICH/04.pdf
[3] https://www.sgp.com.tn/

include Algeria, Libya, Morocco, the United Kingdom, Monaco, Sweden, Seychelles, Norway, Portugal, Belgium, and the United States[4].

Customs data from the Institut National de la Statistique (INS), analyzed using tariff nomenclatures, indicate sustained imports of polymers, plasticizers, and plastic-containing goods, despite international restrictions and declining trends observed after 2020 and again in 2025.

Environmental and analytical studies conducted in Tunisia between 2020 and 2025 confirm the presence of phthalates (e.g. DEHP, DBP, BBP) and bisphenols (BPA, BPS, BPF) in wastewater, sludge, soils irrigated with treated wastewater, bottled water, food packaging, and recycled plastics. Higher contamination levels are observed near industrial zones and wastewater treatment plants, suggesting continuous emission sources[5].



While Tunisia is party to major international chemicals conventions and has adopted sectoral standards, the country lacks a unified chemical management framework and comprehensive monitoring and enforcement capacity. This executive summary highlights key findings, identifies regulatory and technical gaps, and proposes strategic recommendations to support the progressive phase-out of hazardous plastic additives and the transition toward safer alternatives.

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[4] https://www.tunisieindustrie.nat.tn/fr/download/CEPI/2018/ich.pdf

[5] https://pubmed.ncbi.nlm.nih.gov/36759412/ - https://pmc.ncbi.nlm.nih.gov/articles/PMC8718386/?utm_source=chatgpt.com - https://www.researchgate.net/publication/369880967_Analyse_produits_Plastique_cas_de_la_Tunisie_1_1_2 -

2. Methods

The assessment was conducted using a mixed-methods approach combining data analysis, regulatory review, and synthesis of scientific evidence.

A systematic review of peer-reviewed scientific publications, national technical reports, and international guidance documents was undertaken to identify available data on phthalates and bisphenols, in Tunisia. It was also based on contact with national authorities.

Particular attention was given to studies published between 2020 and 2025 addressing environmental contamination, exposure pathways, and analytical detection of these substances.

Trade-related information was obtained from the Institut National de la Statistique (INS) and analysed for the period of 2010 to 2025. Import and export flows were examined using customs tariff numbers corresponding to polymers, plasticizers, resins, plastic products, and chemical intermediates known to contain or be associated with phthalates and bisphenols. This approach allowed indirect estimation of national dependence on these substances in the absence of direct production data.

A regulatory review was conducted to evaluate Tunisian legislation and standards related to chemicals, plastics, food contact materials, and consumer products. These were compared with relevant European Union regulations (REACH, food contact materials), WHO guidance, and obligations under the Basel, Rotterdam, and Stockholm Conventions.

3. Trade of plasticizers in Tunisia

We can consider that Tunisia does not manufacture phthalates domestically and relies almost entirely on imports even one company is manufacturing specific plasticizers.

3.1 Diisononyl Phthalate (DINP)[6]:

Imports were initially low, sourced from Europe until 2015, then diversified to Asian suppliers, with South Korea, Vietnam, and India dominating from 2017 onwards. Exports remained concentrated on neighboring African markets. Other ortho-phthalates experienced increasing imports from Europe between 2005 and 2018, with Italy being the principal supplier, and stabilized after 2019, while exports focused on North African countries such as Libya and Morocco.

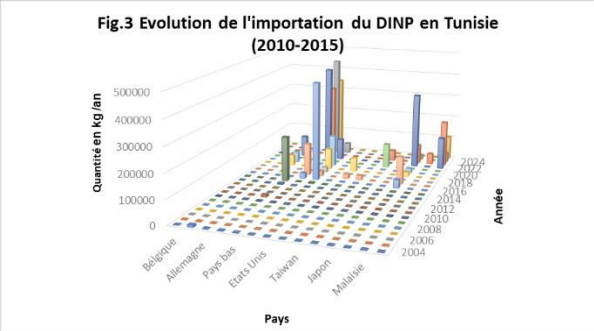


Fig.3 Evolution de l'importation du DINP en Tunisie (2010-2015)

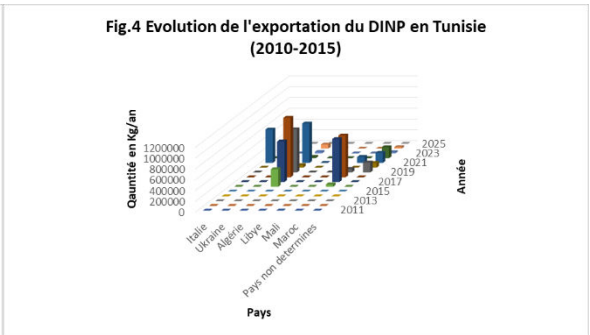
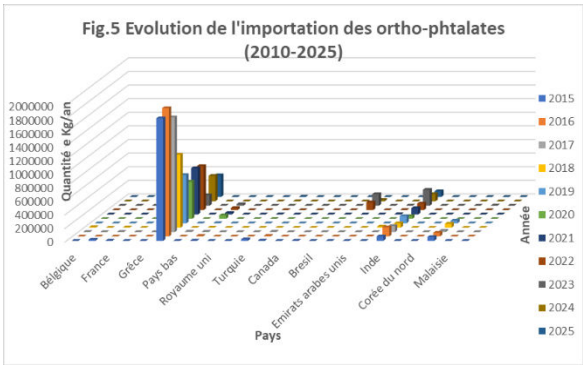


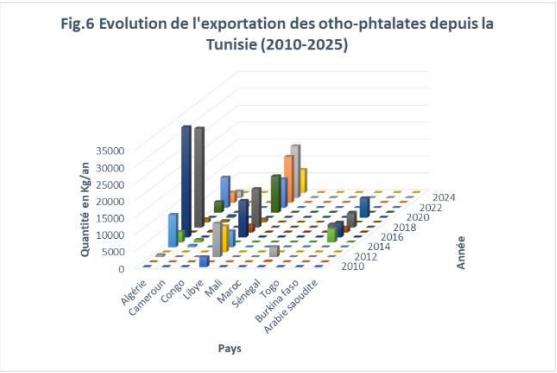
Fig.4 Evolution de l'exportation du DINP en Tunisie (2010-2015)

[6] https://www.ins.tn/

3.2 Ortho-phthalates Diethyl Phthalate (DEP), Butyl Benzyl Phthalate (BBP), Ditridecyl Phthalate (DTDP), Heptyl Undecyl Phthalate (PHUE):

According to the National Institute of Statistics (INS), imports from Europe (Italy, France, Germany) increased sharply between 2010 and 2018.
Italy overwhelmingly dominated import volumes, with very high peaks (exceeding one million units / quantity not specified), indicating a major industrial supply source.
From 2019 onward, import volumes stabilized or slightly declined, suggesting a possible market saturation or regulatory and market adjustments.
India emerged as a regular and growing supplier, with significant volumes, pointing to a potential shift toward more cost-competitive or alternative plasticizers.
Exports are mainly concentrated in North Africa and a limited number of African countries, while flows to the Middle East and Sub-Saharan Africa remain marginal.
Libya is the primary export market, accounting for the largest export volumes.
More modest exports are observed to countries such as Morocco, Cameroon, Burkina Faso, Senegal, Togo, Mali, and Saudi Arabia.

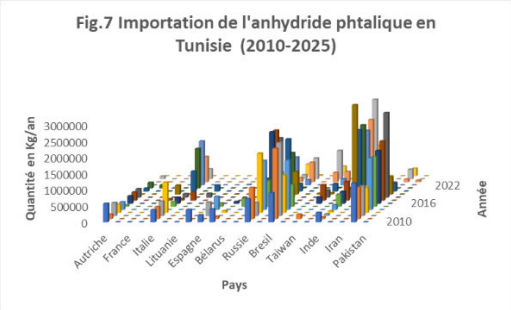




3.3 Anhydride Phthalate (AHP):

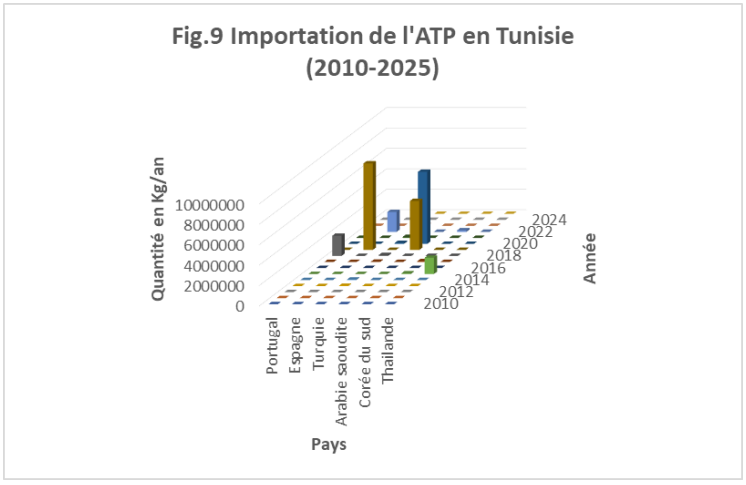
Russia is a regular exporter of phthalic anhydride to Tunisia, with volumes reaching around 2,000 tonnes in some years, notably 2017[7]. In 2025, imports from Russia amounted to 360 tonnes. Among European suppliers, Austria and Italy are key exporters to Tunisia, with volumes of 88 tonnes and 308 tonnes, respectively, in 2025. Asian countries account for significant export volumes, estimated at around 1,500 tonnes in 2025, highlighting their growing role in Tunisia's supply chain. Turkey has emerged as an exporter of phthalic anhydride to Tunisia since 2016, contributing to the diversification of supply sources. For the exports, it is concentrated only on two African countries from North Africa—Algeria and Libya—but stopped since 2021 for Algeria and 2013 for Libya.

[7] http://apps.ins.tn/comex/fr/comex_comex_nsh6.0.php



3.4 Terephthalic acid and its salts (TPA):

According to INS data, only import flows are recorded for this chemical substance, with no exports reported.
The main sources of supply of terephthalic acid and its salts (TPA) are concentrated in Europe, Asia, and occasionally the Middle East and North America. Among European suppliers, Portugal and Spain stand out with very high import volumes, notably Portugal around 2,000 tonnes in 2017 and Spain around 9,000 tonnes in 2019, coinciding with the COVID-19 period.
On the Asian side, South Korea and Thailand appear as occasional suppliers. Saudi Arabia is notable for very large export volumes in 2019 and 2020 (5,000 and 8,000 tonnes, respectively), also coinciding with the COVID-19 period.

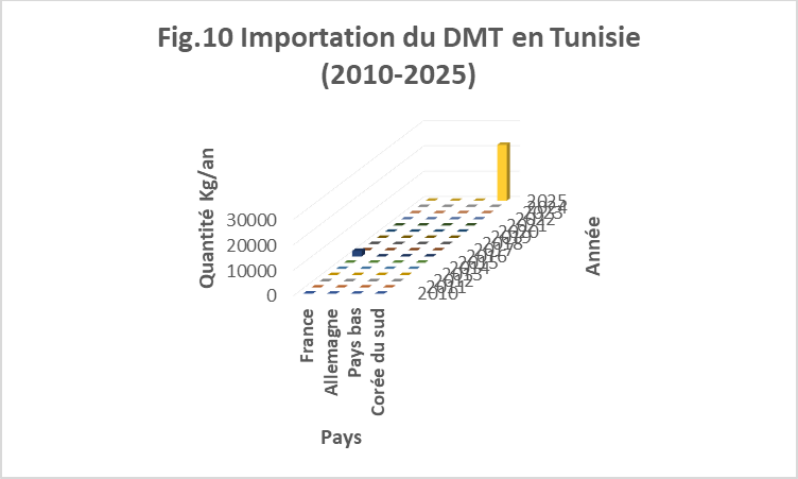


3.5 Dimethyl Terephthalate (DMT)[8]:

DMT is a key raw material for the production of polyethylene terephthalate (PET), used in plastic bottles, films, and polyester fibers for textiles. According to INS data, there are no recorded exports of DMT from Tunisia, and import volumes between 2010 and 2025 remain generally low. France exported approximately 2 tonnes in 2016, indicating limited and sporadic supply during that period. In 2025, South Korea exported a significantly higher volume (22 tonnes), marking a notable increase compared to previous years. Tunisia does not manufacture PET resin, which may be explained by the growing preference for recycled PET (rPET). The

[8] http://apps.ins.tn/comex/fr/comex_comex_nsh6.0.php

increasing focus on sustainability and recyclability is driving the adoption of rPET, which in turn stimulates demand for DMT as an essential input in rPET production.



3.6 Composite plasticizers:

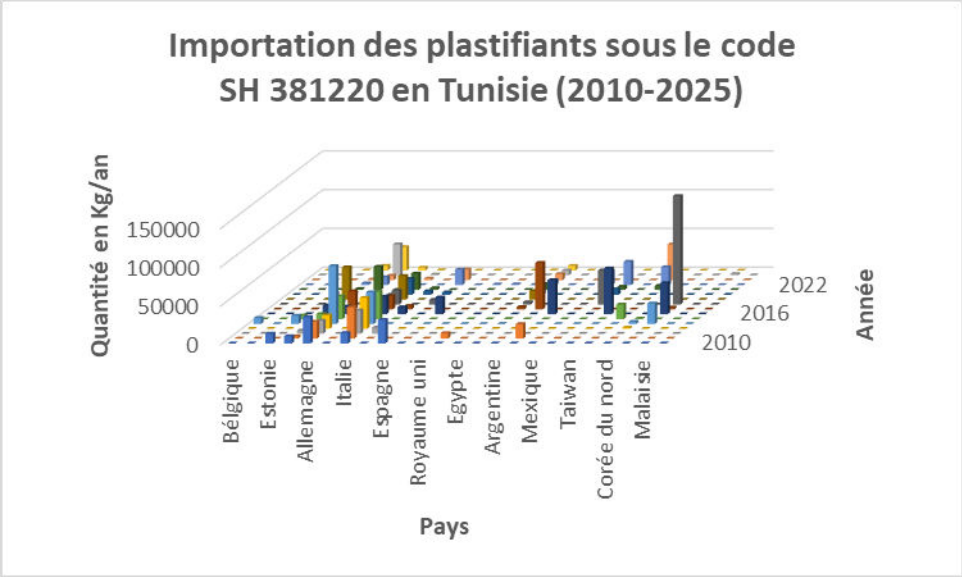
The analysis of imported and exported quantities is not limited exclusively to phthalates, as the relevant customs code covers a broad family of chemical substances.

According to INS data, Tunisia regularly imports plasticizers, but volumes show strong fluctuations depending on the year and supplier countries. Italy and Germany appear as the most consistent trading partners in which Italy long dominated import flows, followed by a gradual decline from 2015 onward. Germany also recorded significant imports, with a major peak in 2014, followed by an irregular trend.

Tunisia also sources plasticizers from Argentina and Brazil, as well as from the United States, Mexico, and Chile, indicating diversified transatlantic supply chains. In more recent years, China and India have become increasingly important suppliers. China provided steadily increasing volumes up to 44 tonnes in 2017. India reached a record level of 46 tonnes in 2023.

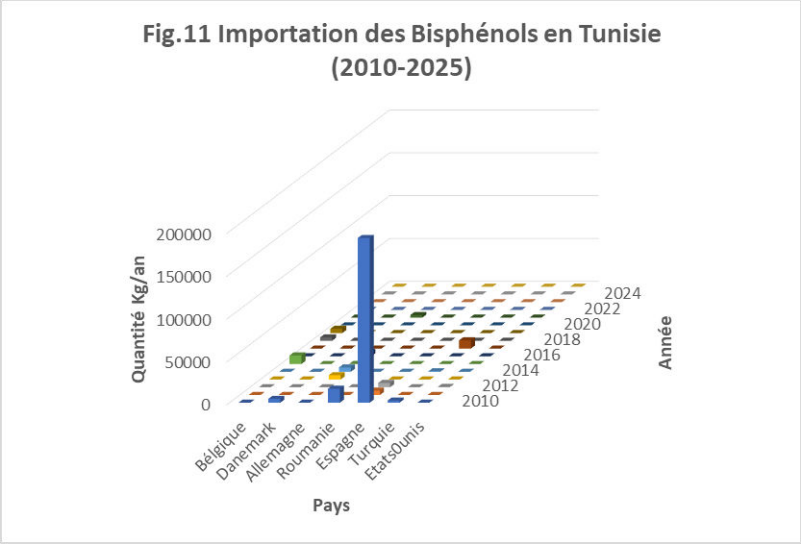
South Korea and Taiwan, China also recorded notable volumes in certain years, particularly 2016 and 2018.

The relative decline in imports from some European countries after 2015 can be linked to restrictive phthalate regulations, which encouraged Tunisia to diversify its trade partners.



3.7 Bisphenol A (BPA):

No imports have been recorded during from 2022 to 2024, indicating a near absence of BPA trade in recent periods. Overall, Tunisia demonstrates a clear shift of phthalate imports from Europe to Asia and Turkey over the last two decades, while exports remain limited and largely regionally focused. BPA trade is characterized by irregular imports and negligible exports, reflecting the country's dependence on foreign suppliers and the absence of a domestic production base for these substances.



4. Regulatory controls on phthalates and bisphenols in Tunisia

At present, Tunisia does not have specific national legislation that explicitly regulates or restricts the production, import, or use of phthalates and bisphenols. Existing chemical and product safety regulations address general aspects of consumer safety and food contact materials but do not explicitly target these substances or establish substance-specific limits.

However, they are regulation specific to plastic in general and plastic packaging:

- ✓ The Decree of the Ministers of Trade and Handicrafts, Agriculture and Water Resources, Health, Industry, Energy and Small and Medium Enterprises of 15 September 2005, relating to materials and articles intended to come into contact with foodstuffs stipulates the following:
  - Article 3 – Plastic materials and articles must be manufactured in accordance with good manufacturing practices and must not transfer their constituents to foodstuffs in quantities which could: a) endanger human health; b) bring about an unacceptable change in the composition of the foodstuffs; c) bring about a deterioration in their organoleptic characteristics.
  - Article 5 – The overall migration limit for plastic materials and articles is set at 60 mg/kg of food or 10 mg/dm² of surface area.
  - Article 6 – The specific migration limits of certain substances such as BPA and BPS are set out in Annexes I and II.
  - Article 7 – Plastic materials and articles intended to come into contact with foodstuffs must comply with the limits expressed in mg/kg or mg/dm², depending on the type of product. Done at Tunis, 15 September 2005.
- ✓ The specification of the plastic packaging for food under the Ministry of Health regulation :
  - Chapter 7: Plastic materials used for packaging food products must meet the following conditions:
    - They must not react with the food substance.
    - No chemical substances must migrate from the plastic into the food in a way that could reflect negatively on the quality of the food product and lead to the transfer of certain harmful substances.
  - Chapter 9: The minimum limit for the migration rate (migration rate – Taux de migration) must comply with the applicable specifications and standards.
  - Chapter 10: It is prohibited to use any plastic material for packaging food products if it has been reprocessed (Recyclage) by transforming materials previously used for packaging.

Since 2010, Tunisia prohibited the importation and sale of baby bottles containing Bisphenol A (BPA)[9].

Nevertheless, Tunisia is indirectly influenced by European regulations through its trade relations with the EU. The recent adoption of EU Regulation (EU) 2024/3190, which entered into force in January 2025 and bans BPA and other hazardous bisphenols in food contact materials, is expected to affect products exported from the EU to Tunisia. However, without national transposition or enforcement mechanisms, this influence remains partial and uneven. Tunisia has participated in awareness-raising initiatives and research projects addressing plastic pollution and chemical safety. However, major challenges remain, including limited analytical capacity, absence of a national chemical inventory, economic dependence on imported materials, and lack of incentives for industrial substitution.

[9] http://www.ancsep.rns.tn/wp-content/uploads/2018/03/Bulletin-ANCSEP-2.pdf

5. Known impacts and exposure in Tunisia

Available studies demonstrate that phthalates and bisphenols are widely present in the Tunisian environment, food products, consumer goods, and the human body, indicating diffuse and chronic exposure of the population. Although the number of national studies remains limited, the existing evidence consistently points to multi-pathway exposure and potential health and environmental risks.

Human biomonitoring data show widespread exposure to bisphenol A (BPA). A pilot study conducted in Tunis detected BPA in 64.7% of urine samples from adult women, with a mean concentration of 0.4 ng/mL, indicating continuous exposure likely linked to food packaging, consumer products, and daily-use plastics. The study highlighted the need for larger-scale biomonitoring, particularly among women of reproductive age.

Table 1: Presence of phthalates and bisphenols in the environment and the human body

Domain	Matrix	Substance/Concentration	Reference
Human body (Tunis)	Urine (women)	BPA (0,4 ng/mL)	(Jiménez-Díaz et al., 2016)[10]
Food	Cheese	DBP (0,46 mg/kg) DEHP (2,339 mg/kg)	(Beltifa et al., 2018)[11]
Cosmetic Product	-*	-*	(Beltifa et al., 2018)[12]
Pharmaceutical Product	Medicine	DIBP (1,07mg/kg) Diethyl phthalate (DEP) (17,03 mg/kg)	(Beltifa et al., 2021)[13]
Marine Environment (Mahdia)	Fish	DBP (0,389 – 0,817 mg/L), DIBP (0,101 – 0,921 mg/L) DEHP (0,726 – 1,771 mg/L) DEHT[14] (9,191 – 23,251 mg/L)	
	Sea water	DBP (0,017 mg/L – 0,055 mg/L) DIBP (0,075 mg/L – 0,219 mg/L) DEHP (0,071 mg/L– 4,594 mg/L) DEHT (0,634 mg/L – 2,424 mg/L)	(Gugliandolo et al., 2020)[15]
Marine Environment (Mahdia)	Water and Sediment	DEHP (0,0717 – 4,59 µg/g) DEHT (0,634 – 2,42 µg/g)	(Jebara et al., 2021)[16]

10 https://www.sciencedirect.com/science/article/abs/pii/S004896971630626X?utm_source=chatgpt.com

11 https://pubmed.ncbi.nlm.nih.gov/29255980/

12 https://www.researchgate.net/publication/326428904_Preliminary_evaluation_of_plasticizer_and_BPA_in_Tunisian_cosmetics_and_investigation_of_hazards_on_human_skin_cells

13 https://pubmed.ncbi.nlm.nih.gov/33956323/

14 Téréphtalate de di(2-éthylhexyle)

15 https://www.frontiersin.org/journals/marine-science/articles/10.3389/fmars.2020.589398/full?utm_source=chatgpt.com

16 https://www.sciencedirect.com/science/article/abs/pii/S0025326X21000011

		DEHP (0,726 – 1,77 µg/g) DEHT (9,19 – 23,2 µg/g)	
	Seagrass and Fish	DEHT (1,181 mg/kg) DEHT (1,121 mg/kg) DEHT (1,86 mg/kg)	Souaf et al., 2023)[17]
Marine Environment (Mahdia)	Sediment	DEHP (3,339 – 0,053 mg/kg) DBP (0,46 mg/kg) DIDP (4,86 mg/kg)	
	Seagrass	DINP (0,634 mg/L) DEHT (0,9355 mg/L) DEHP (0,0711 mg/L) DBP (0,0171 mg/L)	Belaid et al., 2024)[18]
	Mussel	DEHP (4,59 mg/kg) DEHA (3,819 mg/kg) DEHT (2.42 mg/kg)	

* : paper not accessible

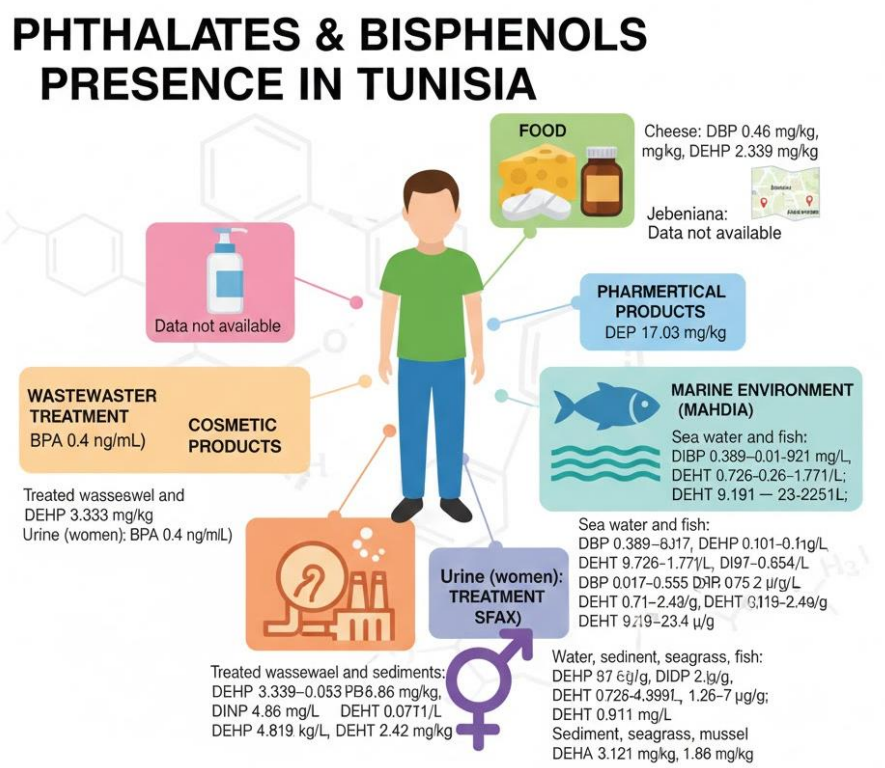
Phthalates have been detected in several food products and consumer goods marketed in Tunisia. Analyses of cheeses packaged in plastic films revealed elevated concentrations of dibutyl phthalate (DBP) and di(2-ethylhexyl) phthalate (DEHP), reaching 0.46 mg/kg and 2.34 mg/kg, respectively. Toxicological studies in mice demonstrated liver and kidney damage following exposure, with more pronounced effects when products were exposed to heat or sunlight. Phthalates were also identified in pharmaceuticals and cosmetics, where in vitro assays showed significant cytotoxic effects on human epithelial cell lines, suggesting potential risks from long-term consumer exposure.

Environmental studies reveal substantial contamination of coastal waters, sediments, fish, and shellfish by phthalates and non-phthalate plasticizers, particularly DEHP and its substitute: Di(2-ethylhexyl) terephthalate (DEHT). Sediments act as major reservoirs of contamination, and bioaccumulation has been confirmed in marine organisms, indicating risks to seafood safety. Wastewater treatment plants were identified as key pathways, as conventional treatment processes do not effectively remove these substances, leading to their release into the marine environment.

Overall, these findings demonstrate that the Tunisian population is exposed to a mixture of plastic additives through dietary, environmental, and consumer-product pathways, raising concerns about long-term health and ecological impacts.

17 https://link.springer.com/article/10.1007/s11356-023-25687-1

18 https://iwaponline.com/wpt/article/19/8/3262/104070/Investigation-of-in-vivo-toxicity-and-biochemical



6. National endeavors to phase out bisphenols and/or phthalates

Currently, Tunisia has no formal national campaigns or targeted programs to phase out phthalates or bisphenols. Existing efforts are embedded in broader environmental, waste management, and plastics pollution initiatives, including participation in international treaties (Basel, Rotterdam, Stockholm) and engagement in the Global Plastics Treaty. Research by universities and institutes has documented the presence of these substances in food, the environment, and human biomarkers, raising awareness among scientific and policy communities.

6.1 Challenges:

- Lack of substance-specific regulations; existing laws do not explicitly restrict phthalates or bisphenols.
- Limited chemical monitoring and reporting, hampering evidence-based policymaking.
- Data gaps due to absence of large-scale biomonitoring programs.
- Economic dependence on imported industrial inputs and plastic additives.
- Low public and stakeholder awareness of health and environmental risks.

6.2 Recommandations and strategic actions:

- Establish a national chemical safety framework aligned with EU REACH and international best practices.
- Implement systematic monitoring of phthalates and bisphenols in environmental, food, consumer products, wastewater, and human samples.
- Strengthen laboratory capacity with advanced analytical tools and training.

- Promote pilot projects in key sectors (food packaging, textiles, plastics) using safer, non-toxic alternatives.
- Provide incentives for companies adopting safer additives.
- Introduce mandatory labeling and chemical disclosure.
- Launch awareness and education campaigns for stakeholders and the public.
- Leverage international cooperation and funding to support standards adoption, laboratory upgrades, and phase-out roadmaps.

7. Conclusion

The report identifies several areas where Tunisia can achieve significant progress:

- Developing local capacities for green chemistry and safer alternatives (bio-based polymers, non-toxic plasticizers).
- Strengthening national monitoring programs using local laboratories and partnerships with international institutions.
- Enhancing waste management systems, with an emphasis on reducing leakage of plastic and chemical additives into the environment.
- Improving coordination between ministries, customs, research centers, and industrial actors.
- Leveraging international funding and programs, especially from the EU, UNEP, and African chemical safety initiatives.
- Strengthen regulation and enforcement by harmonizing national legislation with EU REACH and food-contact material standards.
- Strengthen public awareness through national campaigns targeting high-risk groups (children, pregnant women, workers).

The analysis of data on the production, import, and use of phthalates and bisphenols in Tunisia highlights a persistent dependence on foreign markets, particularly in Europe and Asia. Trade patterns have evolved notably over the past two decades, marked by a gradual shift of supply from Europe to Asia and Turkey, due to the tightening of European regulations on these substances, classified as endocrine disruptors. This trend illustrates the dynamics of the global plasticizer market and the “market displacement effect,” whereby restricted substances are redirected to countries that do not yet have a strict regulatory framework.

In Tunisia, despite the presence of some local distributors and formulators (IMCD, Brenntag, Azelis, Safic-Alcan, etc.), there is no significant domestic production of phthalates or bisphenols except one company. However, these companies play a central role in the supply chain and constitute the main channels for introducing these substances into the Tunisian market, particularly in the plastics, textiles, paints, and coatings sectors. On the regulatory front, Tunisia currently lacks a specific national framework governing the use of phthalates and bisphenols. This gap, combined with the permissiveness of international trade, exposes the country to the import and use of substances that are prohibited or restricted elsewhere. Gradual alignment with European standards, particularly within the framework of trade agreements and the ecological transition, is therefore an essential step to reduce the health and environmental risks associated with these compounds.

Scientific studies conducted in Tunisia confirm the measurable presence of phthalates and bisphenols in the environment, foodstuffs, wastewater, and, more worryingly, in the human body. These findings indicate widespread contamination and chronic exposure of the population to potentially harmful substances. They call for strengthened monitoring, analytical research, and the establishment of a national system for tracking emerging chemical contaminants.

In conclusion, Tunisia today stands at a strategic crossroads: on one hand, it benefits from a dynamic industrial sector and significant trade openness; on the other hand, it must urgently implement a robust regulatory and control framework to support this growth while protecting public health and ecosystems. The transition to toxics-free, sustainable plasticizers and additives thus emerges as a national and regional priority to ensure safer industrial development aligned with international commitments to combat plastic and chemical pollution.