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Priority and emerging substances in the textile industry: ongoing measures and prospects of textile industry in Como

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Microinquinanti e Contaminati Emergenti - Milano, 11st June 2018

Textile and apparel- environmental sustainability

The industrial projects

- Involvement and engagement of the entire supply chain, from planning to logistics
- Adoption of «**Codes of Conduct**» including:
 - working conditions, health and safety principles
 - Environmental Protection
 - transparency of information and cooperation
 - chemical risk management - **due diligence**

Drafting of **Restricted Substances Lists**, RSLs, with:

- limits of hazardous substances on the textile product
- limits of hazardous substances in chemical products
- limits for hazardous substances in emissions



DETOX campaign - a report

Toxics threads 2

executive summary

Table 1. The number of samples in which NPEs, phthalates and cancer-causing amines released by certain azo dyes were identified. Results are shown by product brand, with the percentage of positive results for each brand.

	No. of samples	No. tested positive NPEs	Percentage of samples tested positive per brand - NPEs
GIORGIO ARMANI	9	5	56%
benetton	9	3	33%
blozok	4	2	50%
C&A	6	5	83%
Calvin Klein	8	7	88%
DIESEL	9	3	33%
ESPRIT	9	6	67%
GAP	9	7	78%
H&M	6	2	33%

JACK & JONES

LEVI'S

MANGO

YOUR M&S

Metersbonwe

ONLY

TOMMY HILFINGER

VANCL 凡客诚品

VERO MODA

VICTORIA'S SECRET

ZARA



© Greenpeace International



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Greenpeace International Toxics Threads: The Big Fashion Stitch-Up

ZDHC -Chemical Management

ZDHC Programme - cooperation of 24 signatory brands, 53 value chain affiliates, and 15 associates for the implementation of safer chemical management practices



Ø ZDHC

<http://www.roadmaptozero.com/>

Vision:

Apparel and footwear industry that delivers high quality products, using safe chemistries, operating in ways that keep communities free from downstream environmental impacts. Gradual reduction of hazardous substances with technologies compatible with industry



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Centro Tessile Serico- environmental sustainability



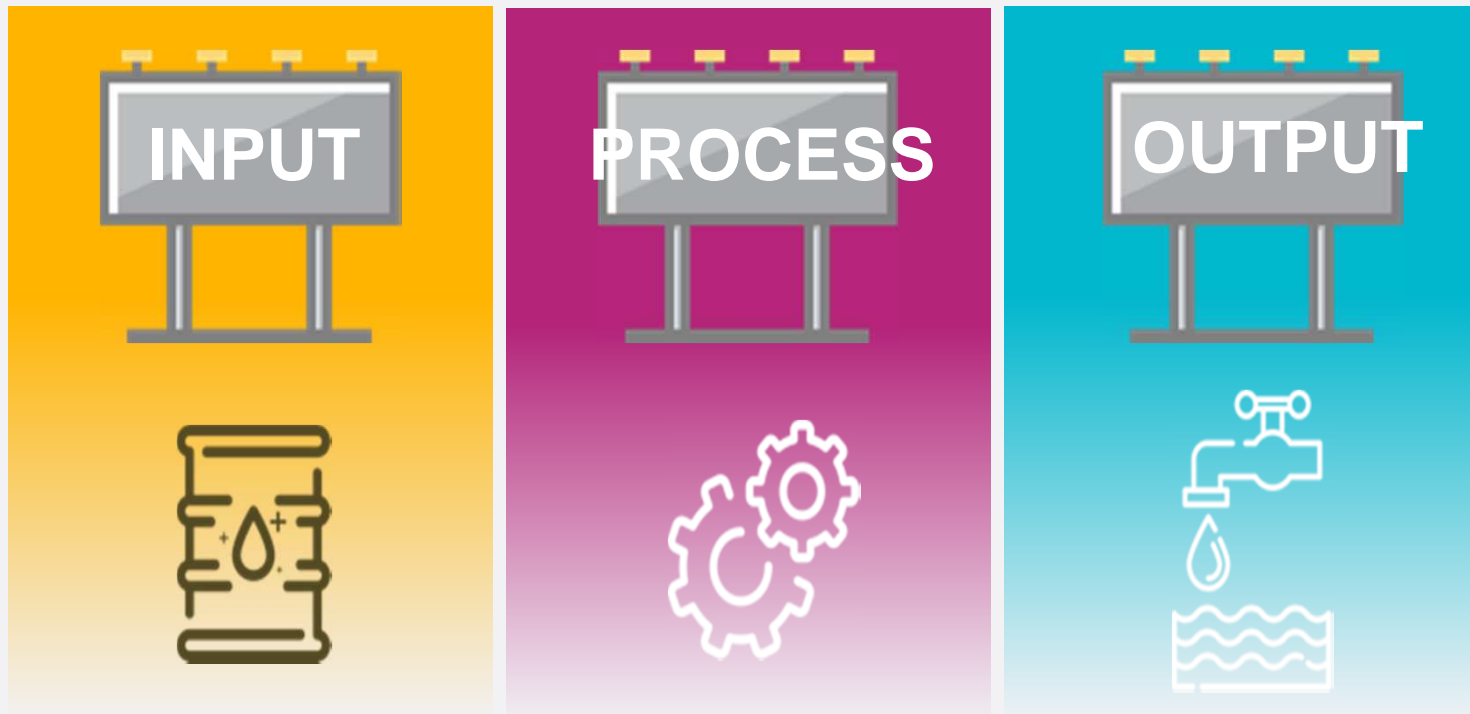
CTS goals:

- Construction of a *network of Companies*;
- *Synergy* (... suppliers, producers, disposers, treatment plants ...), taking a pragmatic approach to an industrial challenge



ZDHC -Chemical Management

A holistic approach to Sustainable Chemical Management



Ø ZDHC
CONTRIBUTOR

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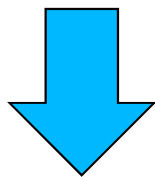
Chemical Management- Como



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Management of substances/chemicals to ensure compliance:

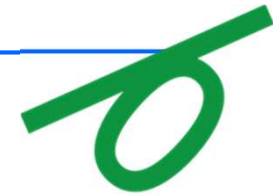
- 1- input control - involvement of suppliers :
 - a- dyes and chemicals (MSDS- chemicals inventory etc.)
 - b- raw or semi-finished materials
- 2- process management - engagement of supply chain- procedures and controls
- 3- *output control: finished or semi-finished textile product (e.g. Seri.co trademark) and environmental emissions*



RESPONSIBLE CHEMICAL MANAGEMENT

Sustainable Control Plan: suitable for the structure of the Company, depending on its type (dyeing, weaving etc.) and depending on supplied textiles

Environmental impact- Seri.co and CTS



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Evaluation output : Wastewaters



- ✓ Evaluation parameters and limits: laws, ZDHC, CNMI, Detox etc.
- ✓ ZDHC Wastewater study- in cooperation with the Consortium Effluent Treatment Plants of the Como district- micropollutants
- ✓ Green Water and Textile Como Project with ETPs of Como, Centro Tessile Serico, Universities (Università Insubria di Como, Politecnico di Milano), Unindustria Como and several Companies - *Emerging micropollutants in relation to the production chain of textile finishing*

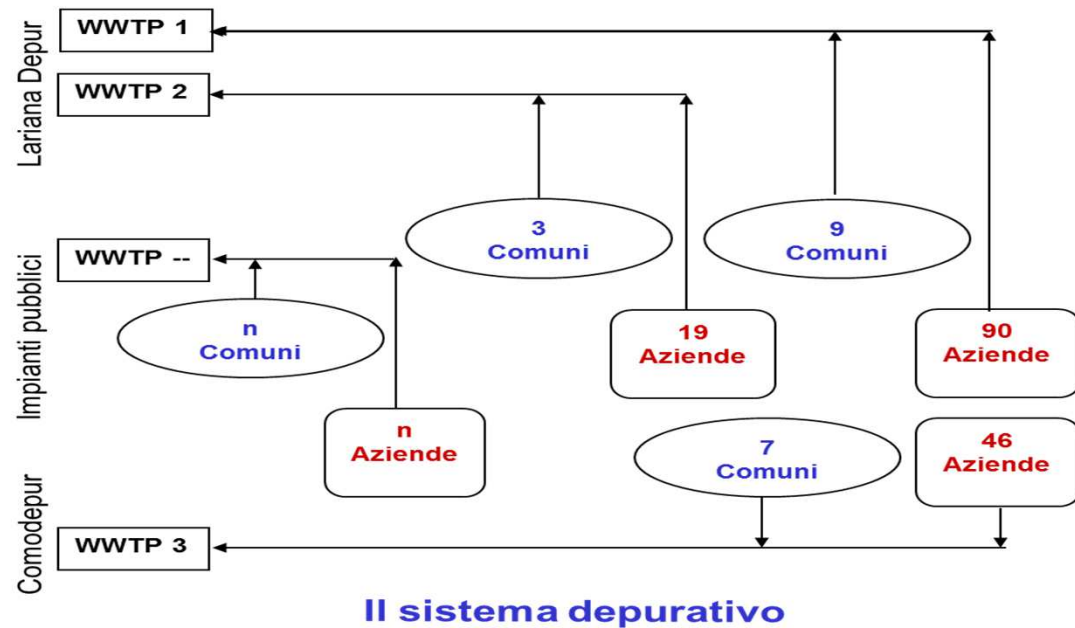
Como -the «industrial water service»



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The industrial wastewater into the sewage system is about **25%** of the urban wastewater in the whole area of Como, but on some basins it reaches more than **50%** of the treated volume

Wastewater treatment system



Micropollutants in industrial textile effluents



List of hazardous chemical groups:

1. Alkylphenols and alkylphenols ethoxylates
2. Phthalates
3. Chlorinated, brominated and phosphate flame-retardants
4. Azo-dyes (amines)
5. Organotin compounds
6. Poly and perfluorinated compounds
7. Chlorobenzenes and chlorotoluenes
8. Chlorinated solvents and other solvents (VOC)
9. Chlorophenols
10. Short Chain Chlorinated Paraffines (SCCP)
11. Metals (cadmium, lead, mercury and chrome VI)
12. Glycols
13. Polycyclic Aromatic Hydrocarbons

Commitment to the elimination ("zero")
throughout the textile product's life cycle

Micropollutants in industrial textile effluents-limits

Substances	ZDHC	CNMI		D. Lgs 152/06	Detox
	Limits (µg/l)	Proactive	Advanced	Sewage network (µg/l)	Industrial effluents (µg/l)
		Sewage network (µg/l)	Sewage network (µg/l)		
AP APEO	5	50 (sum)	5 (sum)	-	1
Chlorobenzenes/toluenes	0,2	200	100	-	0,02
Chlorophenols	0,5	1	1	-	0,5
Aromatic amines	0,1	1	0,1	-	1
Cancerogenic dyes	500	50 (sum)	10 (sum)	-	----
Disperse Dyes	50	50 (sum)	10 (sum)	-	----
Flame retardants	5	-	-	-	5
Glycols	50	-	-	-	10
Halogenated solvents	1	2	2	2	1
Organotin compounds	0,01	1	0,1	-	0,1
PFCs	0,01 1 telomere alcohols	0,05 PFOA and PFOS 1 others	0,05 PFOA and PFOS 1 others	-	0,01
Phthalates	10	10 BBP,DEHP,DIBP, DBP,DINP 50 others	10 BBP,DEHP,DIBP, DBP,DINP 50 others	-	1
PAH	1	1	1	-	0,5

Micropollutants in industrial textile effluents - limits



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Metals

Metals	ZDHC	CNMI		Detox
	Limits (mg/l)	Proactive	Advanced	Industrial effluents (mg/l)
		Sewage network (mg/l)	Sewage network (mg/l)	
Sb	0,1	0,05	0,05	0,005
Cr tot	0,2	0,2	0,1	
Co	0,05	0,02	0,01	0,005
Cu	1	0,4	0,2	
Ag	0,1	--	---	
Zn	5	1	0,8	
Cd	0,1	0,02	0,01	0,0001
Cr (VI)	0,05	0,05	0,05	0,001
Pb	0,1	0,1	0,01	0,001
Hg	0,01	0,004	0,001	0,0005

ZDHC Wastewater study- ETP



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Screening of the input and output wastewater of the consortium treatment plants

Sampling

	October 2017	December 2017	February 2018
Lariana Depur – Alto Seveso	X	X	X
Comodepur - Como	X	X	X
Sud Seveso Servizi - Carimate			X

Next samples also for ASIL (Merone), Alto Lura (Bulgarograsso)

ZDHC Wastewater study- ETP

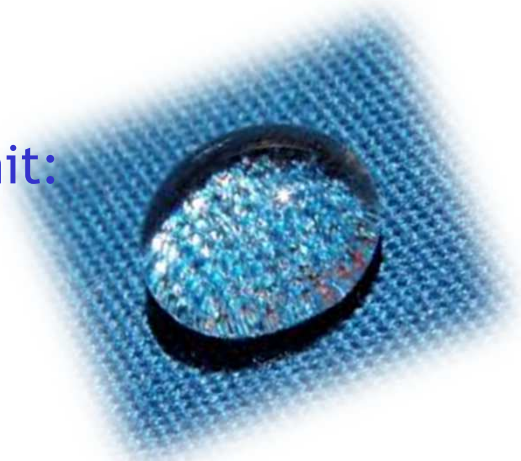


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ETP wastewater –First results

Positive analytic results for:

- 1- **poly and perfluorinated compounds**
concentrations close to the quantification limit:
 - PFOA, perfluorottanoic acid
 - PFBS, perfluorobutansolfonic acid
 - PFPeA, perfluoropentanoic acid
- 2- **flame retardant:**
 - TCPP, tris(2-chloro-1-methylethyl) phosphate
- 3- **flame retardant, plasticiser ...**
 - SCCP, Short-Chain Chlorinated paraffins, C10-C13



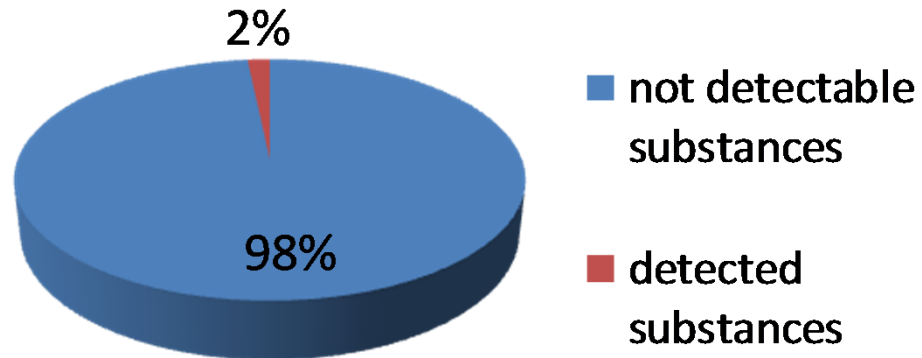
- Positive results for 9 analytes vs over 200 investigated
- Only perfluorinated compounds have concentrations beyond the limits set by ZDHC

Textile Industrial wastewaters - CTS data



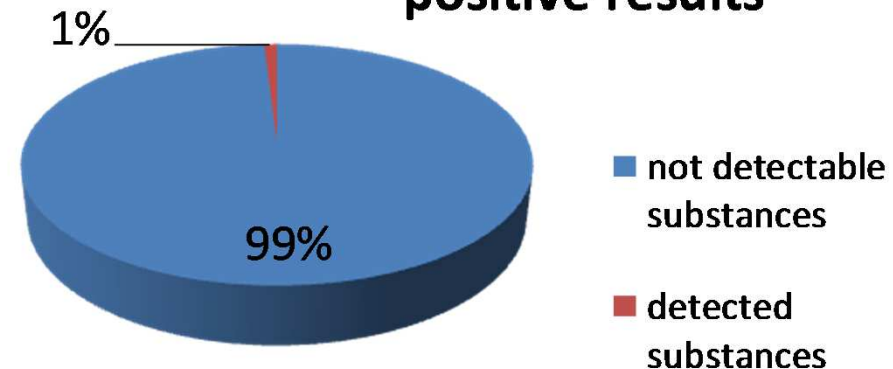
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Wastewater - Positive results



Over 4500 analytical data

Incoming industrial water - positive results

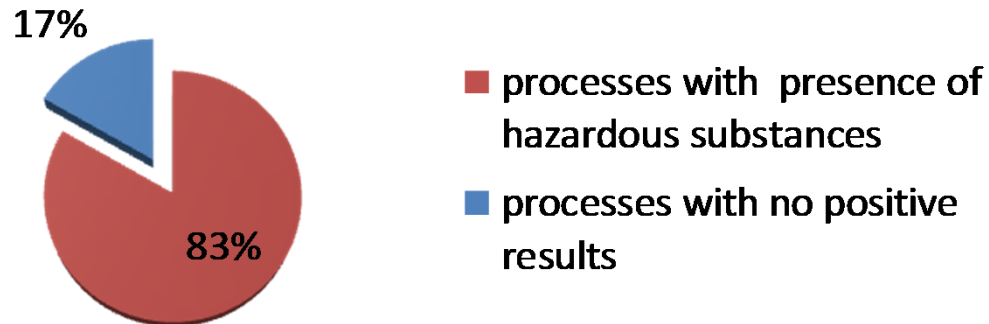


Textile Industrial wastewaters - CTS data



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Companies



*Companies :
dyeing, printing,
finishing*

1-metals (Pb, Cd, Hg, As CrVI) - conc. 0,2-8 $\mu\text{g}/\text{l}$

2-PFC - 0,03-0,45 $\mu\text{g}/\text{l}$

3-flame retardant, phosphate compounds: 0,04-0,30 $\mu\text{g}/\text{l}$

4-phthalates - conc. 0,6-46 $\mu\text{g}/\text{l}$

5-AP+APEO - conc. 0,1-2 $\mu\text{g}/\text{l}$

6- others: VOC, amines, SCCP

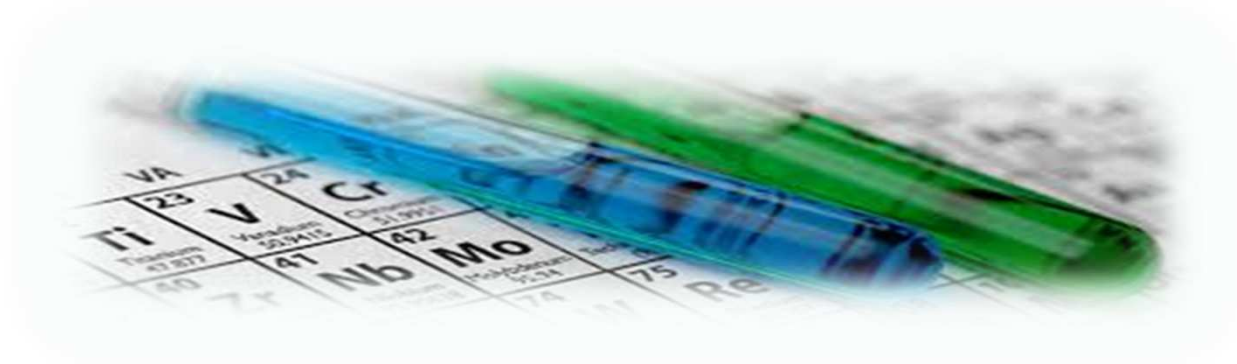


Textile Industrial wastewaters - CTS data



Results

- Main contaminations: alkylphenol and alkylphenol ethoxylates, metals, poly and perfluorinated compounds and phthaletes
- Presence of some of the previous substances in incoming waters, used for the processing



New project: Green Water And Textile Como

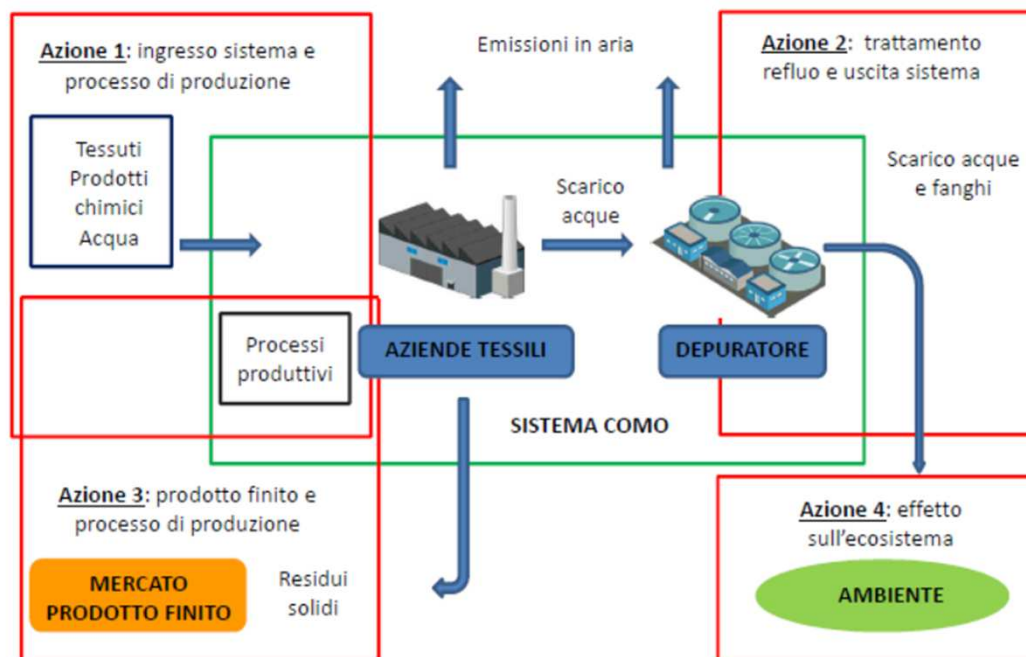


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Emerging micropollutants in the textile supply chain of Como (from production to effluent treatment)

Actors:

Consortium Wastewater Treatment Plants (Lariana Depur, Comodepur, Sud Seveso, Alto Lura, ASIL, Valbe,), Universities (Università Insubria di Como, Politecnico di Milano) and other bodies (Unindustria Como, Centro Tessile Serico)



New project: Green Water And Textile Como

Activities



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➤ Current state assessment

qualitative identification of micropollutants, typical of textile field, into industrial wastewater – enlarged database

➤ Evaluation of processes - minimize input of hazardous substances

- monitoring of production processes
- assessment of chemicals and raw materials (impurities)
- assessment of efficiency
- replacement of chemicals with more sustainable alternatives, development of the organization and skills of companies

➤ Reduction of emissions into the environment

- development of sustainable processes to remove micropollutants with treatments at the factory and in centralized plants
- assessment and monitoring of the impact of discharges on the ecosystem in different environmental compartments (water, sludge etc.)
- assessment of concentration limit values of substances (environmental sustainability)



Thank you for your attention !

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