

Control banding for assessing chemical risks Belgian companies experience (Regetox and Toxtrainer projects)

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Risk assessment practices among Belgian companies

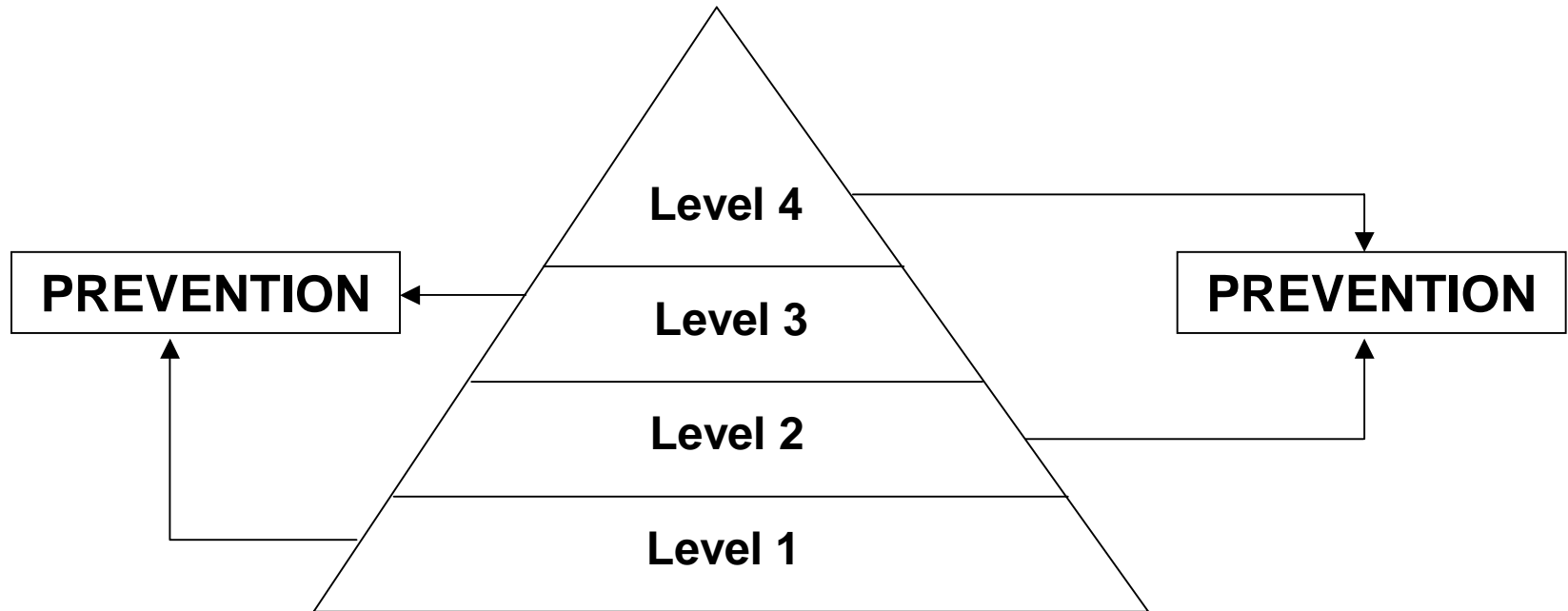
- Hazards identification based on SDS
- Risk assessment ... on the basis on common sense judgement
- No structured approach for risk assessment in most companies (survey sample : 20)



Study aims

- To develop a strategy for assessing chemical risks using methods adapted to SME's
- Testing this strategy in three companies

A stepwise approach



Level 1 : light expertise – wide analysis

Level 4: high expertise – restricted to some worksituations

A stepwise approach : choice of two assessment methods

- The « **Potential Risk** » method developed by Vincent, Bonthoux and Lamoise (INRS) – France (2000)
- The « **COSHH Essentials** » developed by Russel, Brooke and Maidment (HSE) - United Kingdom (1998)

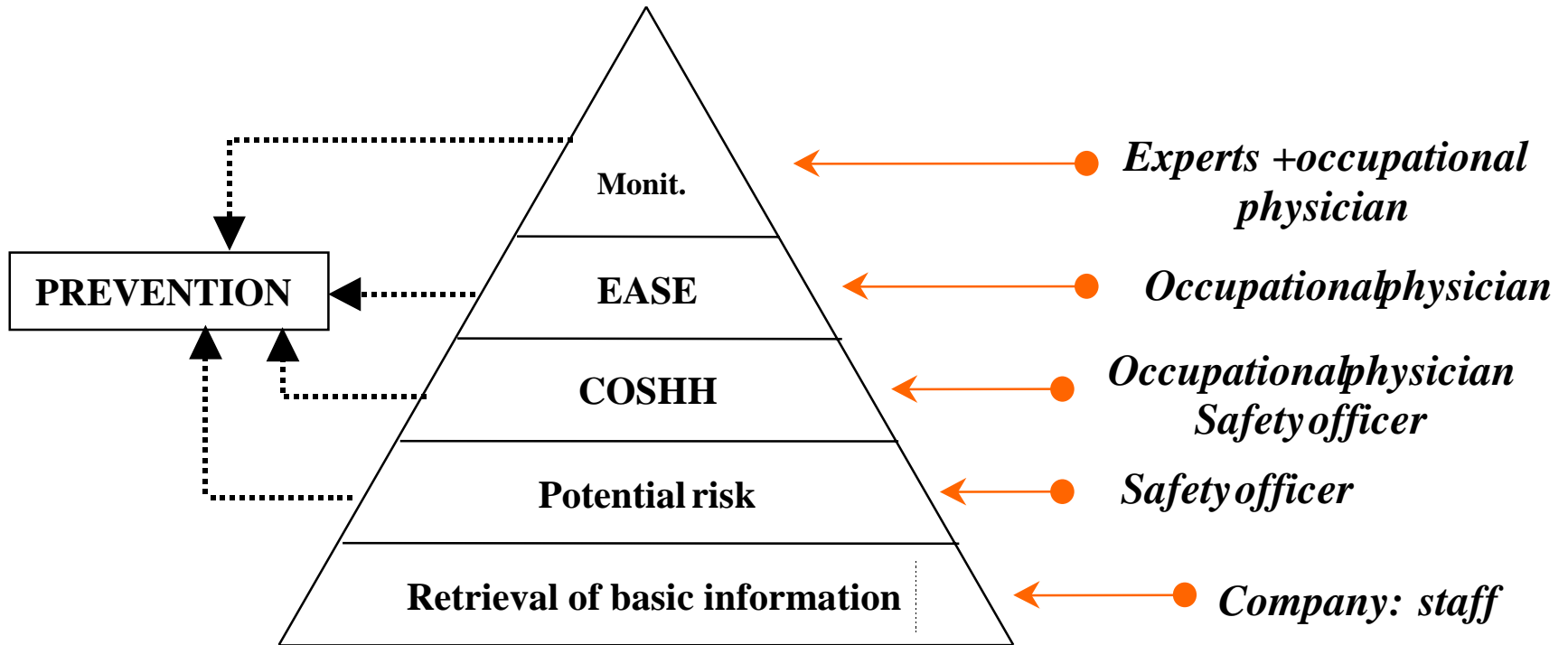
Summary of information needed for each method

	Potential risk	COSHH Essentials
Hazard	R-phrases for health/ chemical product (MSDS)	R-phrases for health/ chemical substance (MSDS-toxicological databases)
Exposure	<ul style="list-style-type: none"> - Annual used quantity/product - Frequency of use/product 	<ul style="list-style-type: none"> - Quantity by operation - Ability of being absorbed by the respiratory tract : size of dusts (little, medium, large), volatility for vapours (boiling point and process temperature) - Control strategy level

Results given by each method

	Potential risk	COSHH Essentials
Results	<ul style="list-style-type: none">● Classification of products by priority order	<ul style="list-style-type: none">● Risk assessment in reference with OEL's for each work situation● Control strategy required for protecting health● Model validated for an 8 hour exposure and for pure substances

A stepwise approach



Feasibility study

Companies	Size	Nature of activities analysed
A	80	Filling operations
B	950	Painting & spraying operations
C	29	Painting and spraying operations

Company A : manufacturing plastic foam

Company B : maintenance

Company C: car repair workshop

Feasibility study : method

- The following categories of workers were involved to retrieve the data for the calculation of the « potential risk »:
 - Workers (products inventory)
 - Safety officer (MSDS, yearly quantity and frequency of use for each product)
 - Occupational physician (retrieving missing data in MSDS)



Feasibility study : method

- COSHH Essentials was used to assess the risk for each chemical substance in each operation except the aerosols for which the risk was assessed with the EASE model (version 2.0).
- For the interpretation of the results, we took into account the daily time by operation and the OEL when available.



Feasibility study : method

- The TWA8 was estimated for each substance used in several operations by adding the maximum concentrations provided by EASE and COSHH Essentials models for the different operations undertaken on one day use.
- From the annual use frequency of each product, the number of days when half of the OEL was exceeded, was estimated for each substance.

Feasibility study : results

Tasks	Who?	A	B
Products inventory	Workers	Not done	Not done
Retrieving MSDS	Safety officer	OK	OK
Retrieving yearly quantities and frequency of use	Safety officer	OK	Not done
Retrieving missing data in MSDS	Occupational physician	Not done	Not done

The occupational physicians did not take part in collecting data in the workshop for using COSHH method

Study results – The products inventory and the yearly quantities

Companies	Products inventory	Yearly quantities	Comments
A	Yes	Yes	Production process
B	No	No	Order book
C	Yes	Yes	Yearly inventory

Study results – quality of the MSDS files available in the companies

Companies	A	B	C
Number of products	39	42	50
Missing MSDS	0	11	50
MSDS – inconsistent data	4	12	-

- Some MSDS don't match the products actually used in the workshop
- Many MSDS not updated

Results - MSDS accuracy about R-phrases allocation

Company	Accurate	Over-estimated hazards	Under-estimated hazards	Impossible conclusion
A	85%	8%	8%	-
B	48%	14%	21%	17%
C	62%	28%	-	10%

- The MSDS evaluates correctly the hazard or over-estimates it for **93% (A)**, **62% (B)** and **90%** of the products used.
- Poor level of expertise of one of the suppliers of the maintenance company (B)

INRS «potential risks» - application to the preparation of the prepolymer mixture

Code	Product	Q.kg	F.U.	R Phrases	Priorité	C
1906104	catalyseur	5130	2	R22 R43	3	5
1905100	agent gonflant	37200	1	R42	3	5
1909100	additif	10140	3	R23/25 R36	3	5
1907100	charge	8000	1	R40 Carc. Cat.3	2	9
1908100	additif	1410,5	3	R36/38 R43	2	9
Z	charge	418348	2		2	17
1902130	plastifiant	272959	3		2	17
1902310	plastifiant	79469	3		2	17
1904200	SiO2 amorphe	3560	1	TLV	1	19
1904213	additif	1950	1	R36	1	19
1903300	plastifiant	18000	3		1	20
1902312	Plastifiant	24472	2		1	20
1910130	pigment	9225	3		1	20
1906100	catalyseur	4400	3		1	20
1902311	plastifiant	10750	2		1	20
1904110	charge	72500	1		1	20
1904214	additif	25	1	R36/38	1	21
1907410	charge	500	1		1	23
1904101	charge	27500	1		1	23
1908800	additif	1820	3		1	23
1910210	pigment	651	3		1	23
1910320	pigment	2220	3		1	23
1910400	pigment	25	3		1	24
1904210	additif	0,47	1		1	25

Results : semi-quantitative risk assessment (COSHH - EASE)

Company	A	B	C
Safe operations	32	41	34
Operations to be improved (LEV)	11	6	2
Need for further assessment	3	18	48
Total	46	65	84

Need for further assessment :

- Firm A : operation using MDI (OEL : 5 ppb)
- Firm B & C: all operations carried out in the spray painting booth

Results: TWA8 estimation

Substance	TWA8	N° of days	TLV	STEL
2-Ethoxyethyl acetate	304	139	5	
Xylene	302	178	100	150
1,2,4-trimethylbenzene	302	8	25	
toluene	302	6	50	

TWA8: Time weighted average 8 h

N° of days: Number of days when half value limits of each substance has been exceeded

TLV: Threshold limit value: the ACGIH (2003) OEL for a TWA of 8 h.

STEL: Short time exposure limit

Risk assessment – comparison of two strategies

- **Strategy 1** : application of COSHH to all products independently of their «potential risk» ranking
- **Strategy 2** : application of COSHH to the products showing the highest «potential risk» (priority levels 2 and 3)

Risk assessment – comparison of two strategies

- Similar results between strategies 1 and 2 except for one operation in company B
- This operation could have been easily recognised as being unsafe by the safety officer's professional judgement
- Strategy 2 offers a better cost/ benefit ratio

Feasibility study – summary of main observations

- Approach exhaustive and easy to use.
- Allows the prevention advisors to identify prevention measures for implementing the prevention policy and provides targeted information for worker's education, atmospheric monitoring and medical supervision.
- The combination of potential risk and COSHH Essential provides a cost effective way for semi quantitative risk assessment.

Feasibility study – summary of main observations

- The poor reliability of some MSDS seems to be linked to the poor level of expertise of some suppliers.
- Risk of over-estimating the exposure of a substance in a given mixture (solvent mixture, inorganic solution).
- Lack of support to the feasibility study from the prevention advisers.
- As the number of data and calculations is high, a user-friendly software is useful.
- The time required for this approach is important. Therefore, it doesn't seem to be adapted to very small companies contrary to COSHH Essentials.

Feasibility study – summary of main observations

- The participation of the workers is essential for collecting some of the information needed for the risk assessment.
- When visiting the workplace to retrieve the data for COSHH Essentials, the workers asked the researcher relevant toxicological information about the products they daily use suggesting special needs in this field.



Toxtrainer: Planning



- To identify the factors which limit or facilitate the workers' participation in collecting basic information for assessing chemical risks (products inventory, etc);
- To choose objectives able to improve workers' participation;
- To develop a strategy tailored to our objectives;
- To test it in a few companies.

Toxtrainer: results from interview

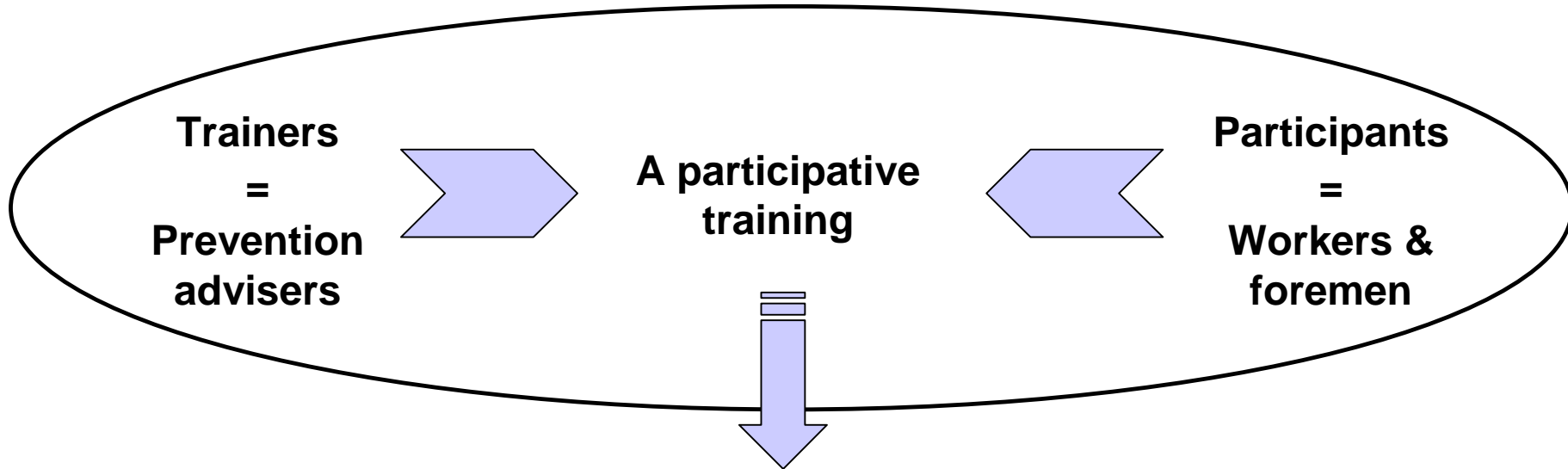
- The workers:
 - Manage themselves the chemical risk from empirical diagnosis;
 - Are aware they lack toxicological information especially for long term health effects;
 - Have to earn one's life. So, they accept to run risks (fatalism);
 - Rely poorly on prevention advisers;
 - Have a very good knowledge of their working conditions and make realistic proposals for prevention measures;
 - Express their satisfaction with talking together about chemical risks;
 - Are not interested in collecting basic information.
- These results were confirmed by prevention advisers.
 - In addition, the prevention advisers say clearly they lack pedagogical skills.



Toxtrainer: objectives

- To give the workers and foremen the means:
 - To enrich their **representations** of chemical risk;
 - To improve **their communication** with prevention advisers;
 - **To be involved in** the chemical risk prevention.

Toxtrainer: the global strategy



The training is based on:

- **The free expression** of the participants about chemical risk (common problems met in the company);
- Proposals of **solutions** to improve prevention.

Toxtrainer: Tools

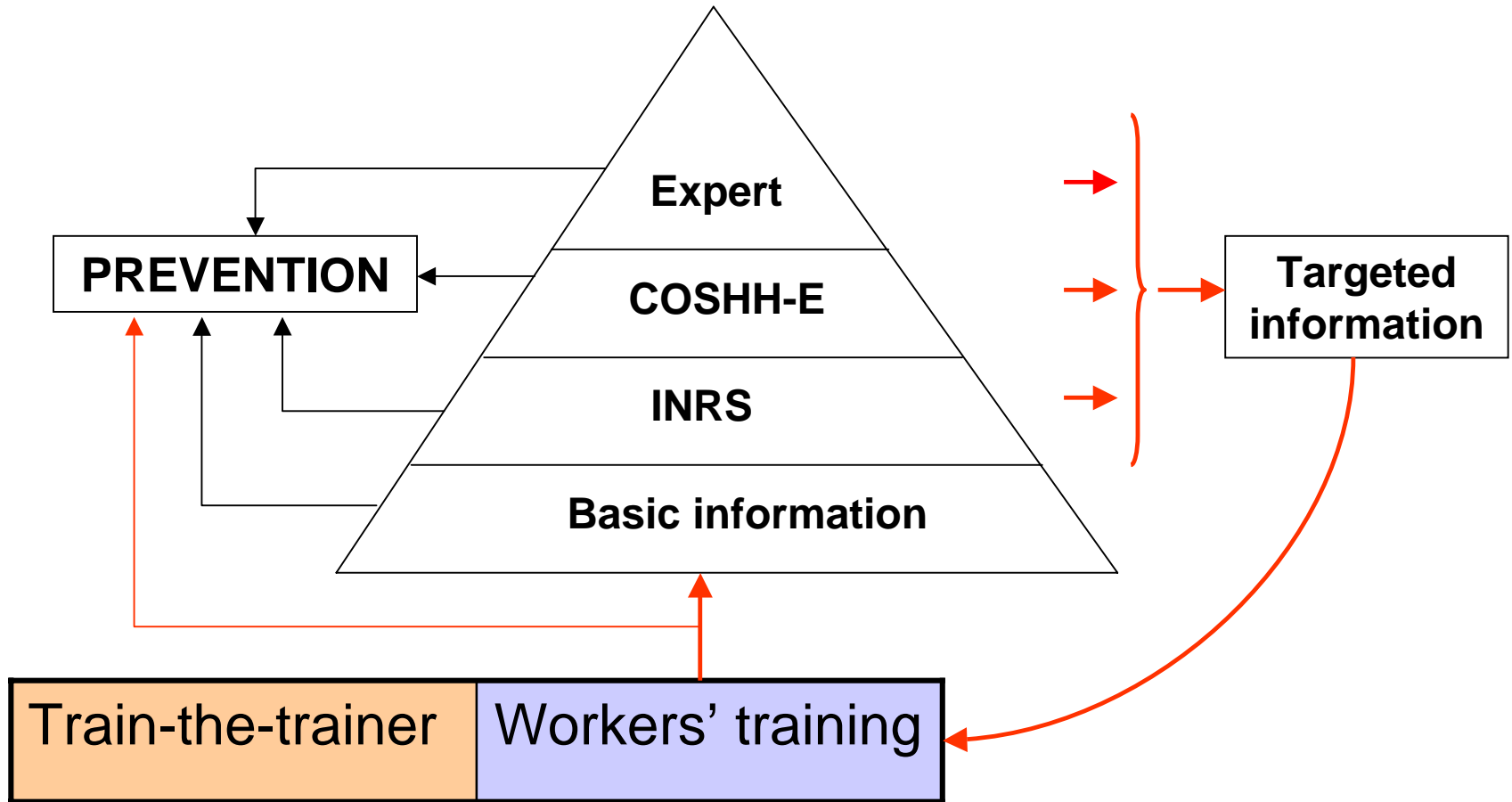


- **A manual** presenting the workers' training to be carried out by the prevention advisers into their company. The manual includes different training units focused either on participation or toxicological information;
- **A train-the-trainer** intended for the prevention advisers, to improve their pedagogical skills and to present the manual content (2 days).

Toxtrainer: testing our approach

- 18 prevention advisers followed the train-the-trainer and back to their companies trained 9 groups of workers and foremen (2nd quarter 2003) (7 companies)
- Results:
 - Adherence to Toxtrainer +
 - Appropriation +
 - Multidisciplinarity +
 - Pedagogical skills +
 - Representations +
 - Communication +
 - Participation +
 - Importance of the employer supporting the approach.

Regetox and the dynamic risks management



Perspectives 2004-2006



- To evaluate Regetox into companies on a large scale in Belgium.
- To implement Toxtrainer in 2% of companies (= 10% of occupational physicians in Belgium);
- To develop e-Toxtrainer and Toxtrainer for SMEs