Tackling the plastic problem in the lab: where to start?

itqb.unl.pt

THANK YOU

to all the labs that participated in this study

How did we get here?

NOVA sustainABILITY
UNIVERSIDADE NOVA DE LISBOA

GREEN LABS NOVA

Carina Valente
Joana Belo
Helena Matias
Luís Lima
Telma Fernandes
Vanessa Pereira

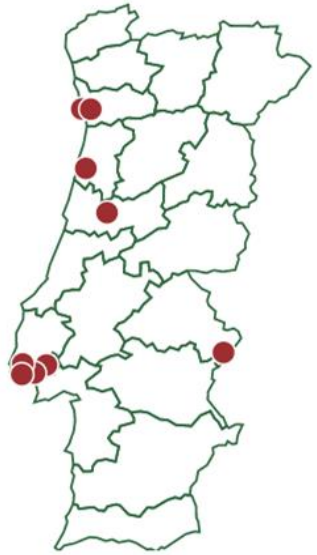
ZERO WASTE

Helena Matias
Paula Chicau

Sustainability @ITQB NOVA

Ana Sanchez
Carina Valente
Dalila Farinha
Joana Belo
Nelson Saibo
Nuno Monteiro
Renata Ramalho

GreenLabs Portugal
https://greenlabs.pt/



itqb nova green labs
3S
GREENLAB INITIATIVE
lab ibimed GreenLab
GREEN TEAM
GreenLabs CIBB
InPP GREENERS
INSTITUTO GULBENKIAN DE CIÊNCIA
LIMAR GREEN LAB
Fundação Champalimaud
GREEN TEAM @ CCU

How much waste do laboratories produce?

"Labs are estimated to **trash 5.5 million tons of plastic waste in a single year**; that is the weight of 67 cruise liners!"

Scientists contribute ~2% of plastic waste worldwide.

Urbina et al "Labs should cut plastic waste tool" *Nature* (2015)

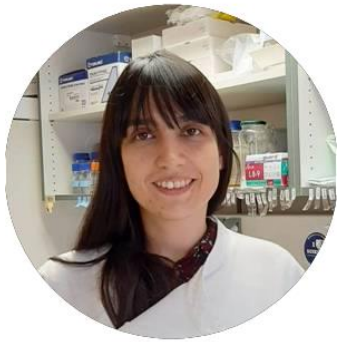
Krause et al "Reducing plastic waste in the lab" *Chemistry World* (2020)

Source: © M-H Jeeves
A pipette tip here, a nitrile glove there – lab waste soon piles up

How much waste do ITQB NOVA labs produce?

Document the baseline levels of single-use plastic and other common valuable residues generated in the laboratory

THE TEAM



Carina Valente

Carolina Santos

Joana Belo

Luís Lima

Pedro Brandão

Rita Escórcio

Telma Fernandes

Vanessa Pereira

How much waste do ITQB NOVA labs produce?

Document the baseline levels of single-use plastic and other common valuable residues generated in the laboratory

1 Establishment and validation of a protocol for separation and quantification of waste

1 MONTH

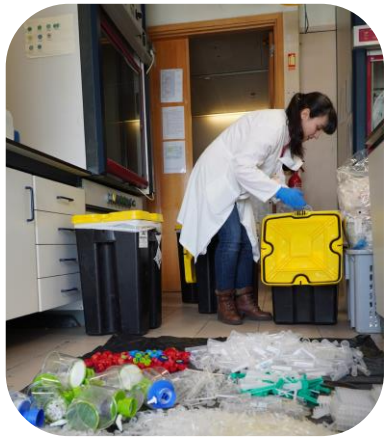
- Non-Contaminated
- Biological Residues
- Toxic

2 Recruitment of volunteers

Study participants

12 labs (5 divisions)
74 “wet lab researchers”

3 Management of waste collected

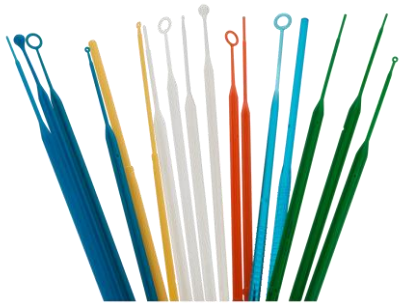


4 Data analysis

Follow up measures

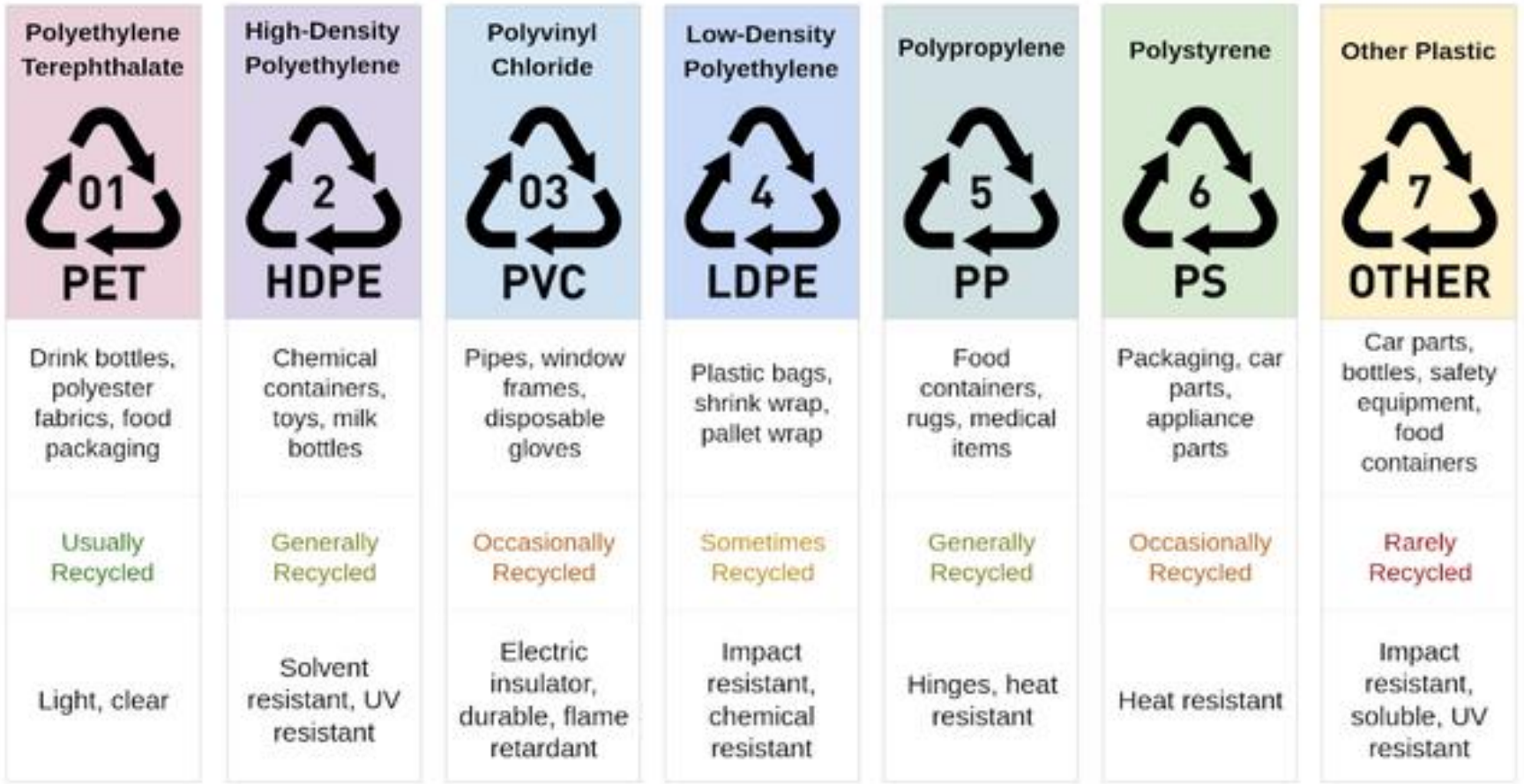
Material targeted in the study

PLASTIC



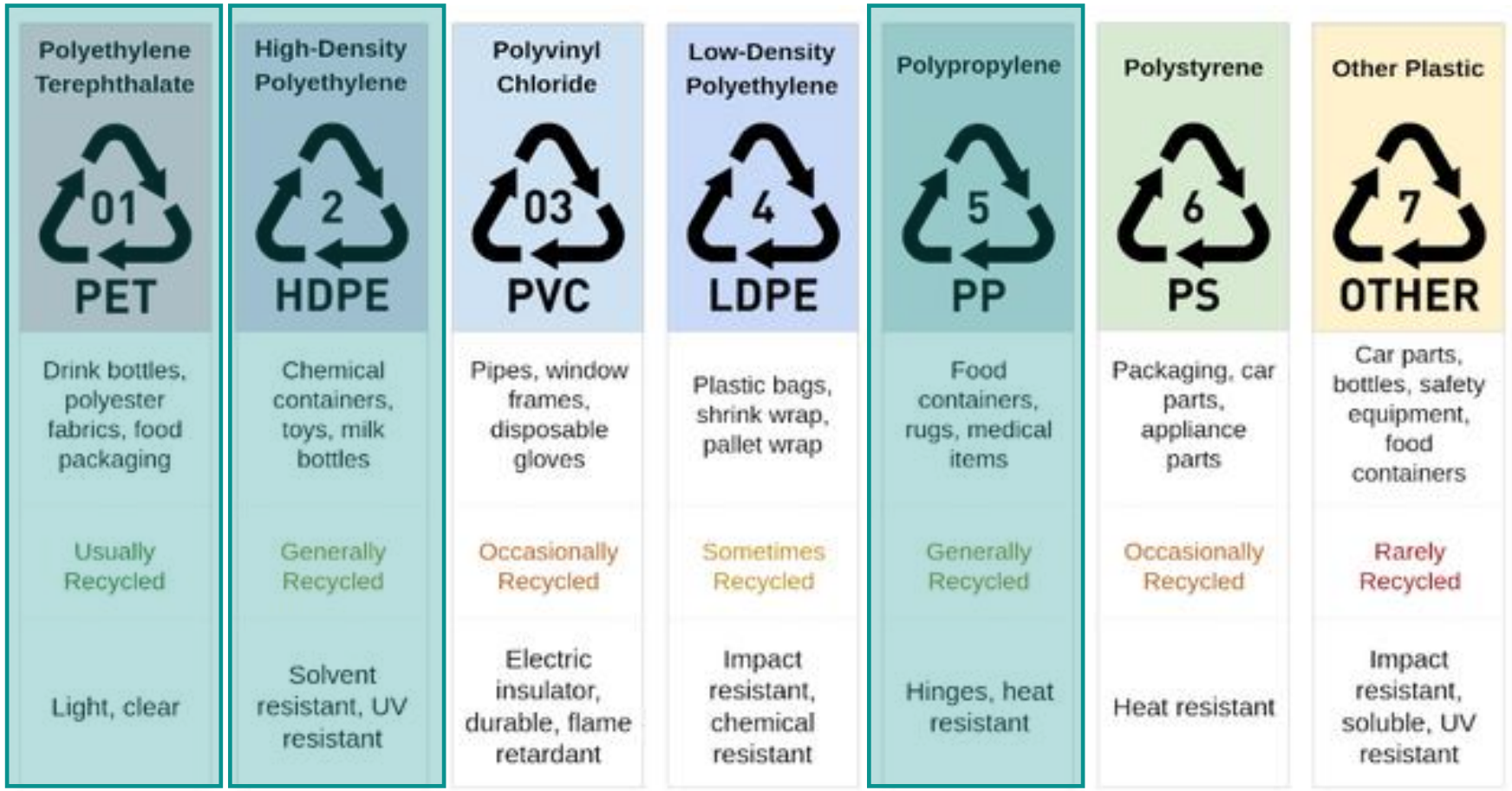
OTHER

“Not all plastics are created equal”



Resin identification codes

“Not all plastics are created equal”

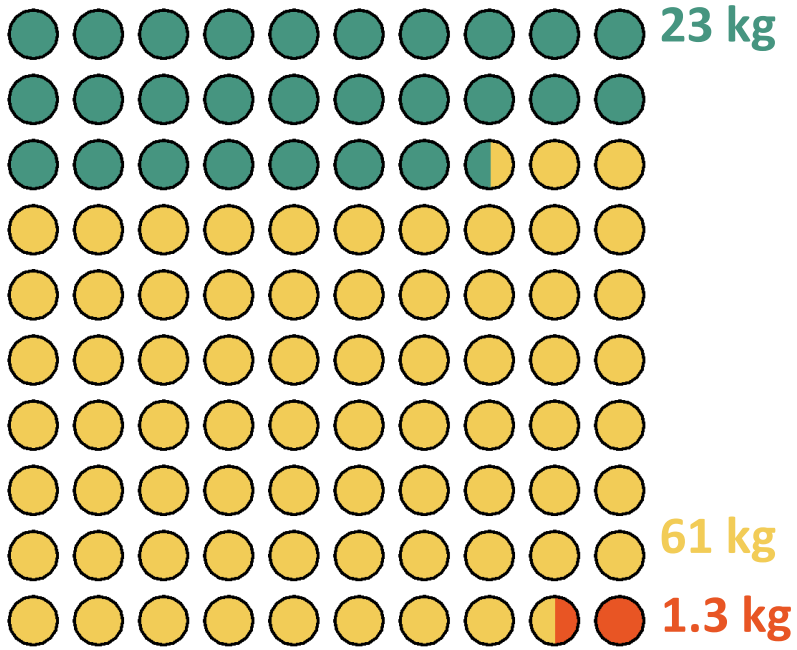


Resin identification codes

The waste bill @ITQB NOVA

PLASTIC

74 researchers
1 month



Non-contaminated

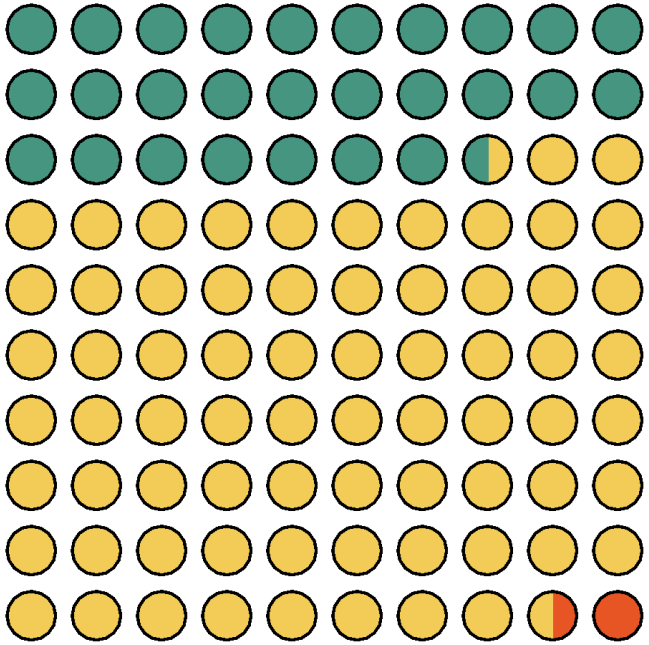
Biological residues

Toxic

The waste bill @ITQB NOVA

PLASTIC

74 researchers
1 month



360 researchers
1 year

1300 kg

3600 kg

70 kg

Non-contaminated

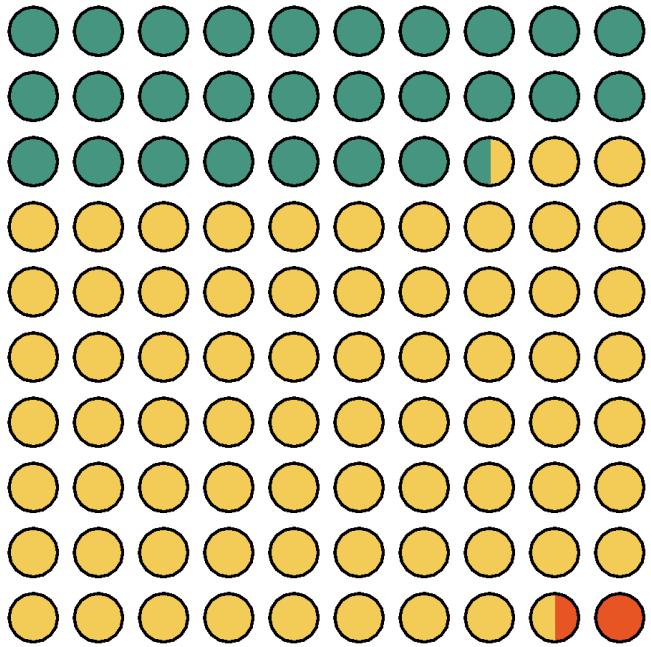
Biological residues

Toxic

The waste bill @ITQB NOVA

PLASTIC

74 researchers
1 month



360 researchers
1 year

1300 kg

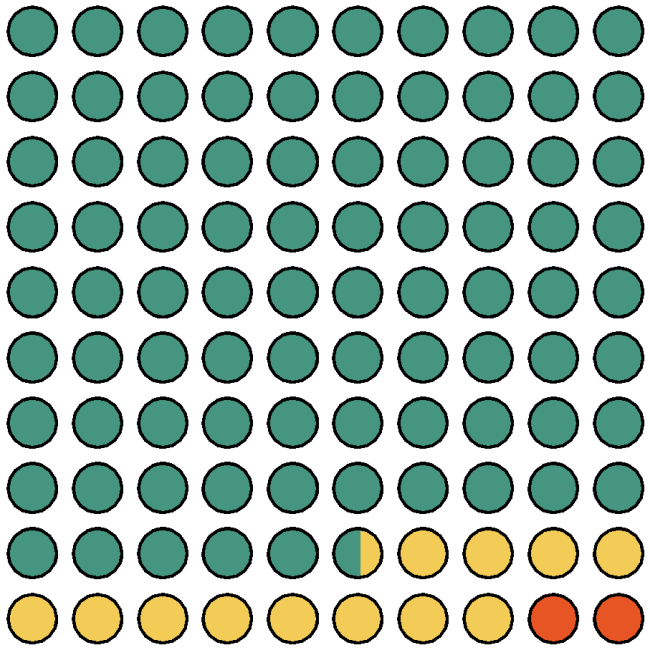
3600 kg

70 kg

OTHER

74 researchers
1 month

25 kg



3.6 kg

0.64 kg

Non-contaminated

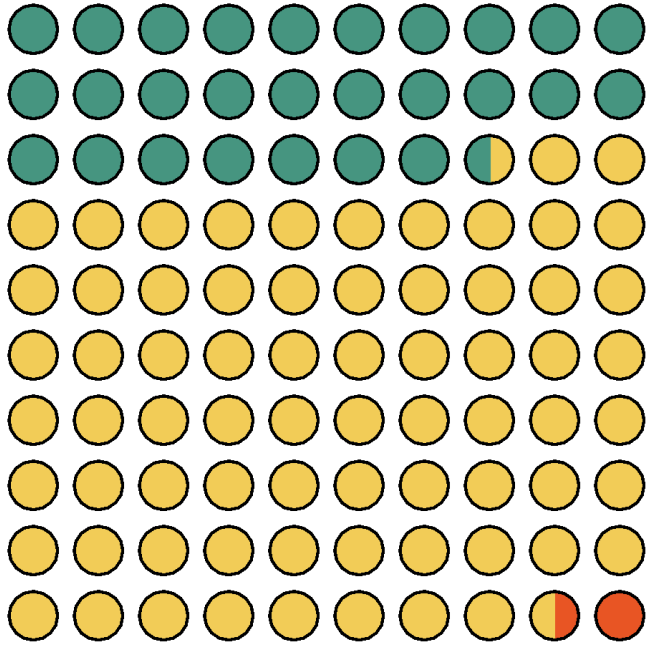
Biological residues

Toxic

The waste bill @ITQB NOVA

PLASTIC

74 researchers
1 month



360 researchers
1 year

1300 kg

3600 kg

70 kg

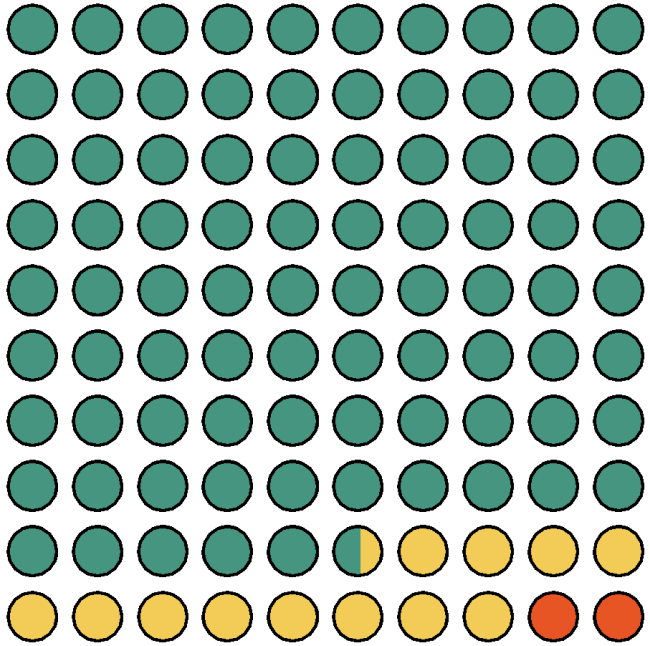
OTHER

74 researchers
1 month

1500 kg

210 kg

40 kg



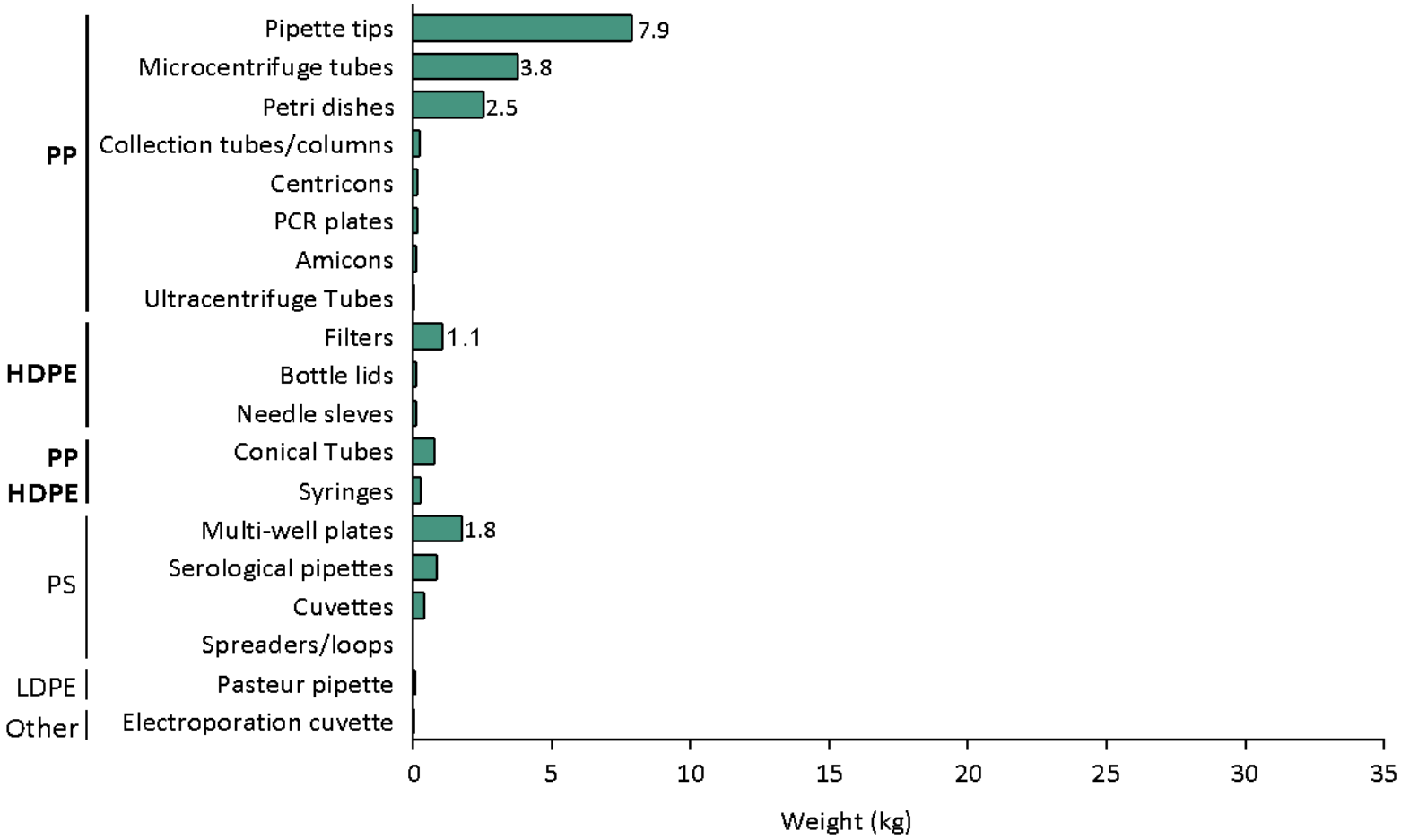
Non-contaminated

Biological residues

Toxic

Which plastics add to the waste bill?

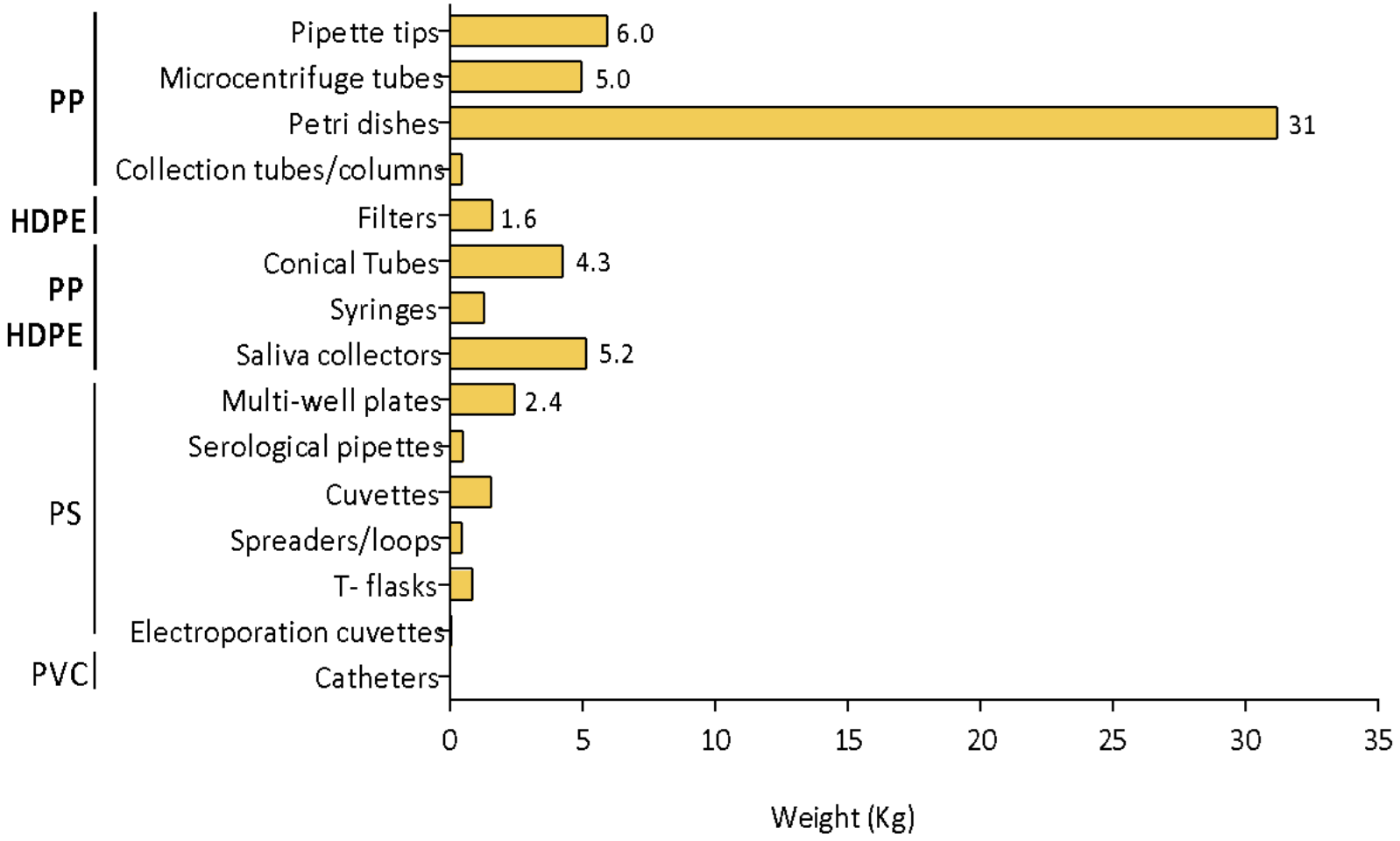
87% Recyclable



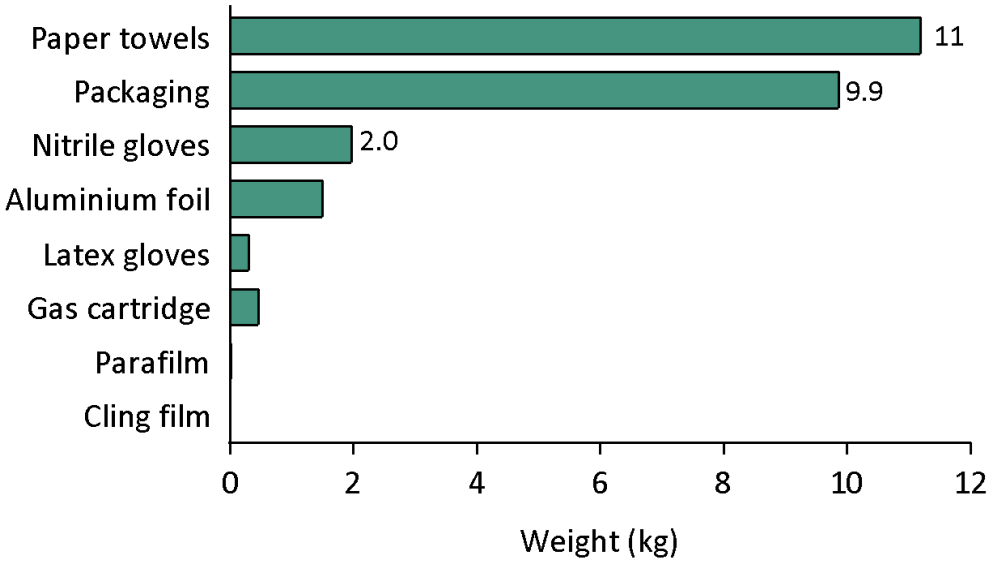
Non-contaminated

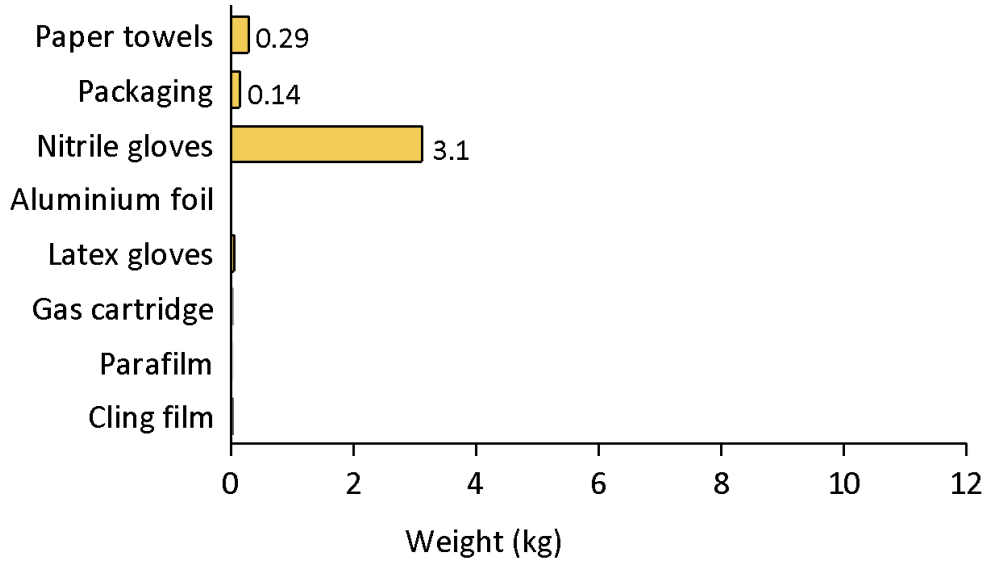
Which plastics add to the waste bill?

90% Recyclable



Other additions to the waste bill



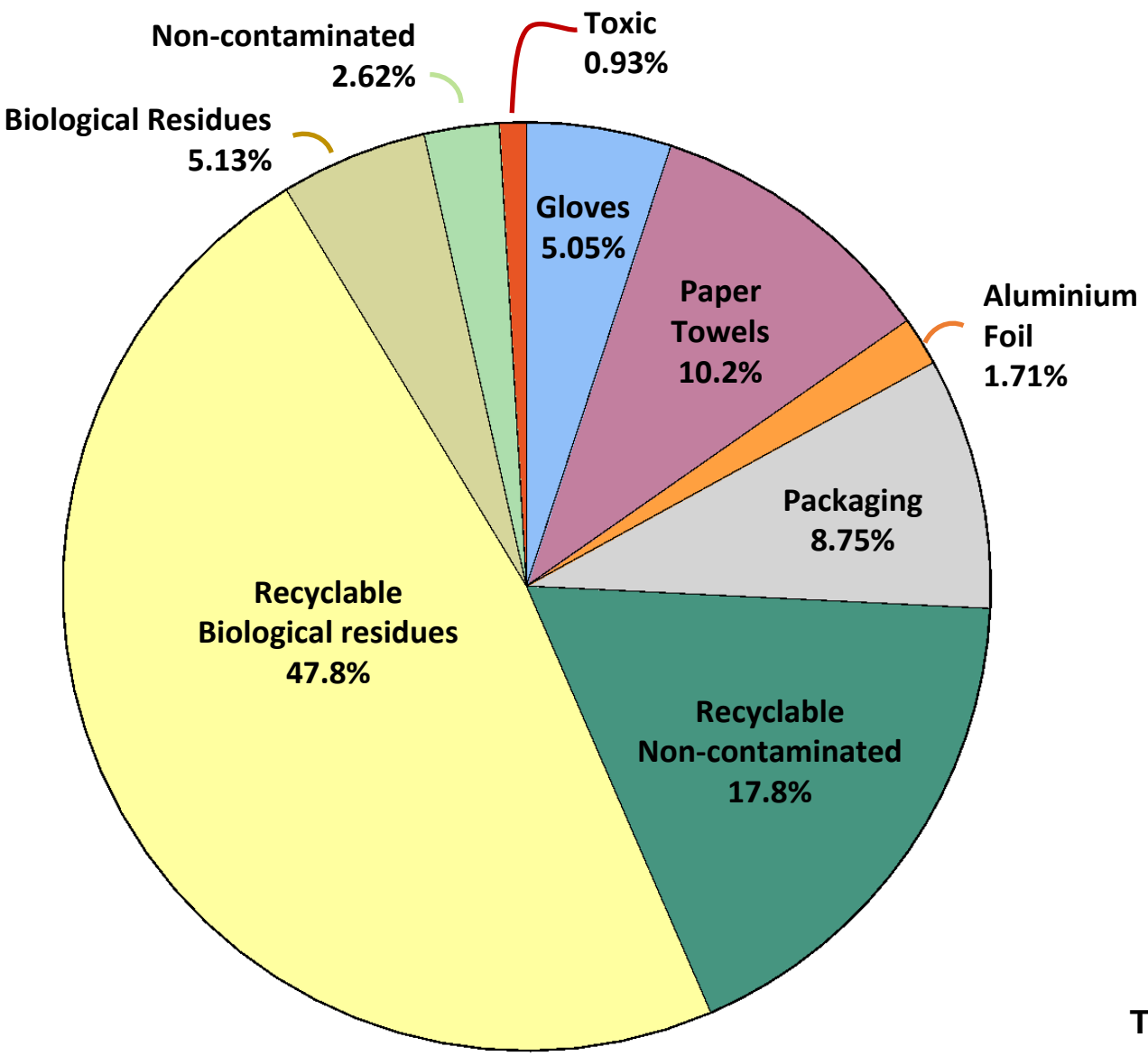


Non-contaminated

Biological residues

Where we are and how to move forward

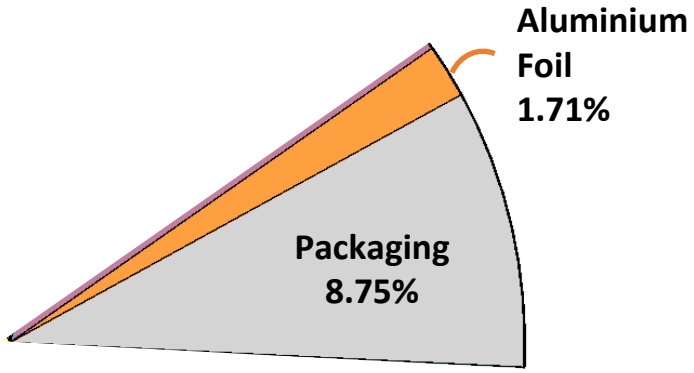
Where we are and how to move forward



Study participants	**ITQB Universe**
12 labs (5 divisions)	56 labs (5 divisions)
74 "wet lab researchers"	360 "wet lab researchers"
2 kg	114 kg
10 kg	586 kg
20 kg	1 191 kg
55 kg	3 203 kg
6 kg	344 kg
3 kg	176 kg
1 kg	63 kg
6 kg	338 kg
12 kg	686 kg
TOTAL	115 kg/$_{month}$	6700 kg/$_{year}$

Where we are and how to move forward

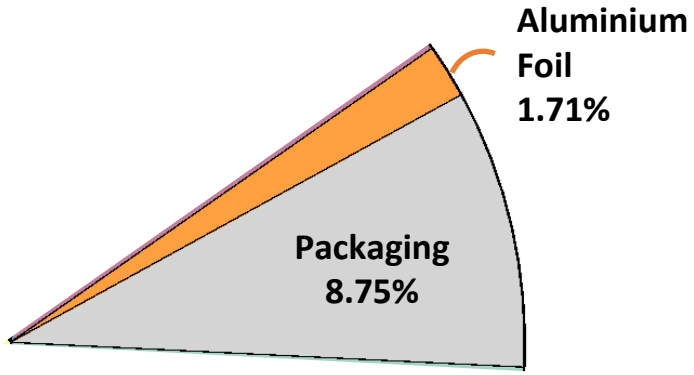
$700/_{6700}$ kg can be recycled



Is ITQB NOVA on board?

Where we are and how to move forward

$700/_{6700}$ kg can be recycled



Is ITQB NOVA on board?

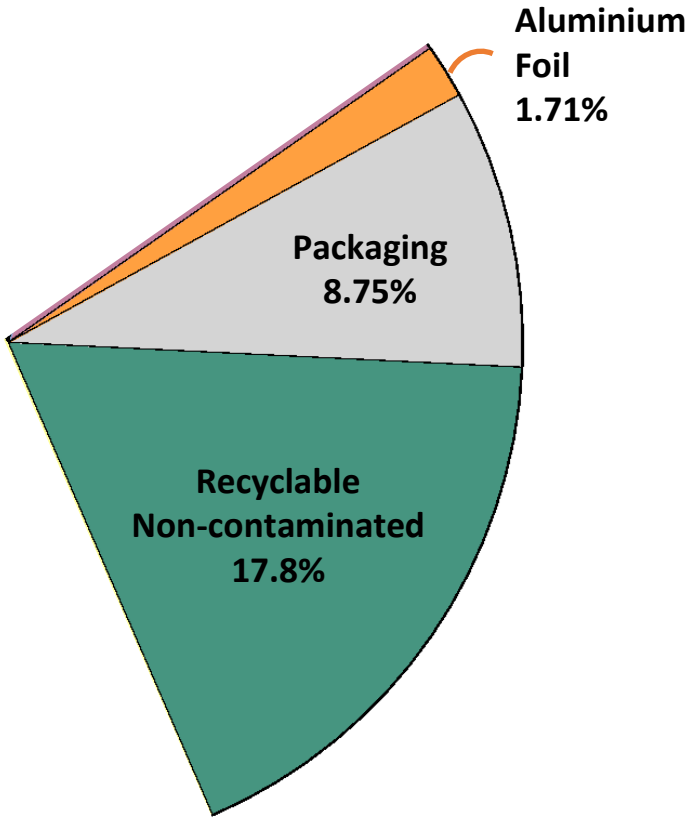
Serological pipettes casing in contact with contaminated pipettes

Non-toxic reagent bottle inside the toxic waste

Spreader casing inside a biological residues bin

Where we are and how to move forward

$1900/_{6700}$ kg could be recycled



Companies on board

Waste management

ambiwaste
Resíduos | Plásticos | Consumíveis | Serviços

Take-back programs

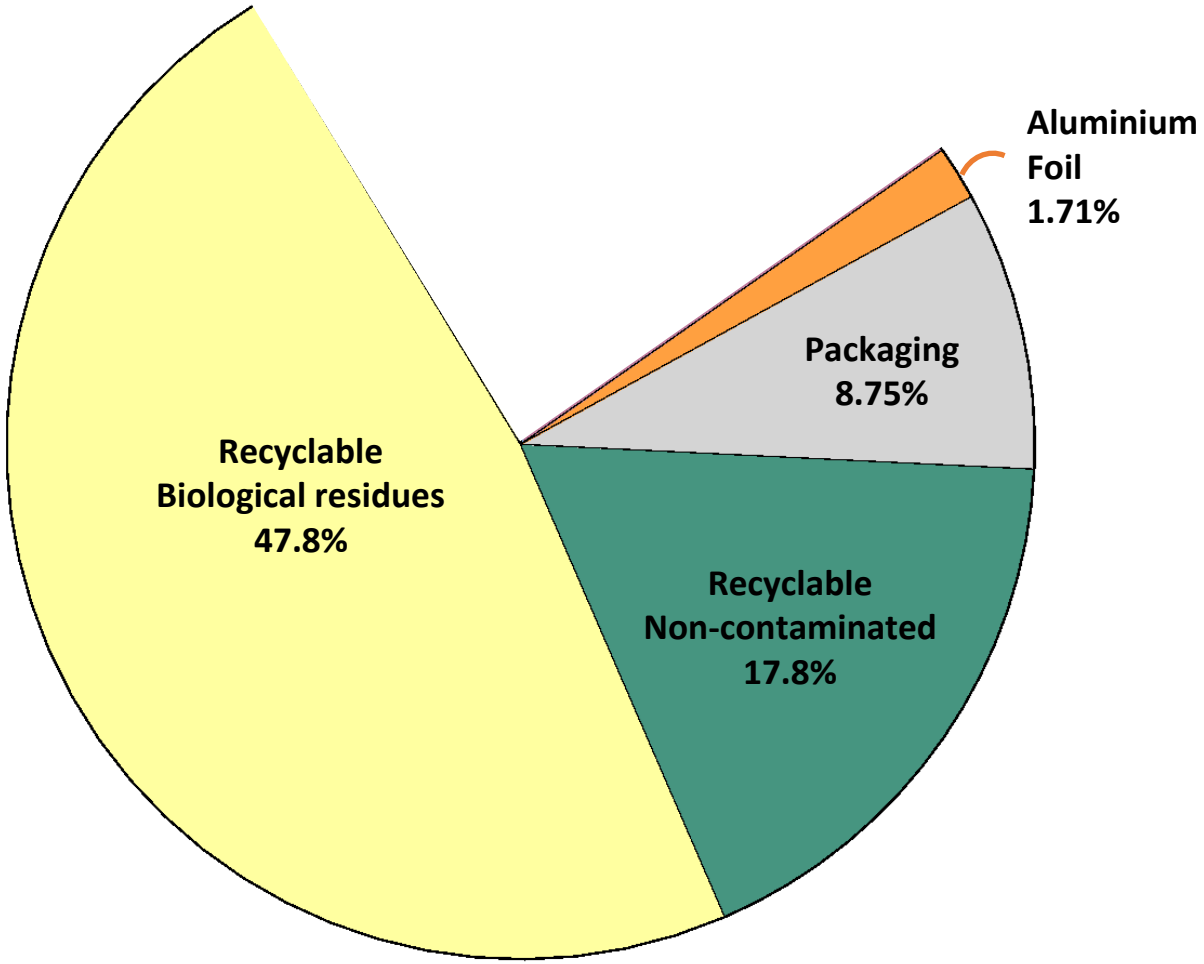
nzytech
genes & enzymes
(coolers)

SARSTEDT
(empty tip boxes)

Other?

Where we are and how to move forward

$5000/_{6700}$ kg could be recycled

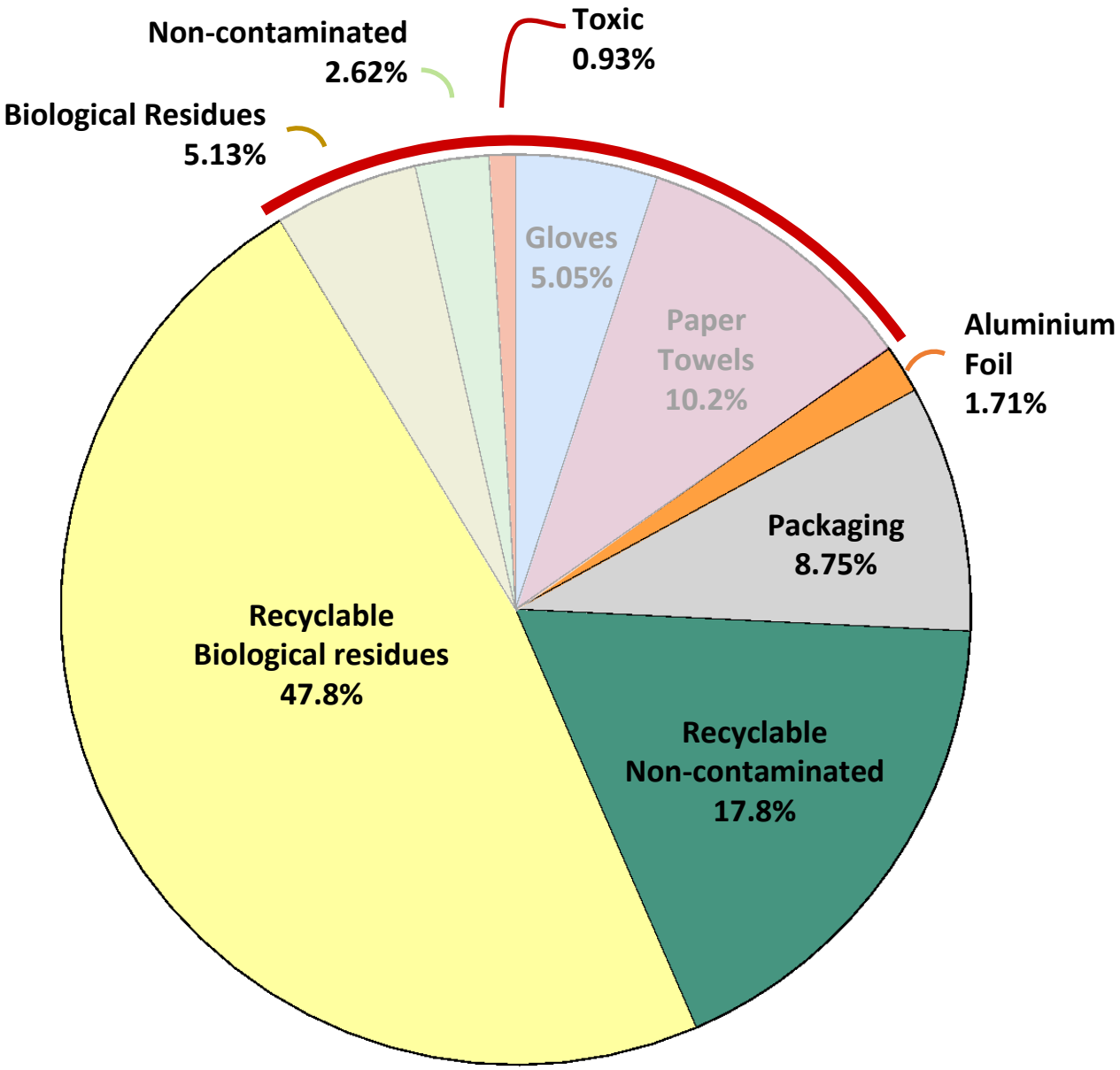


All on board

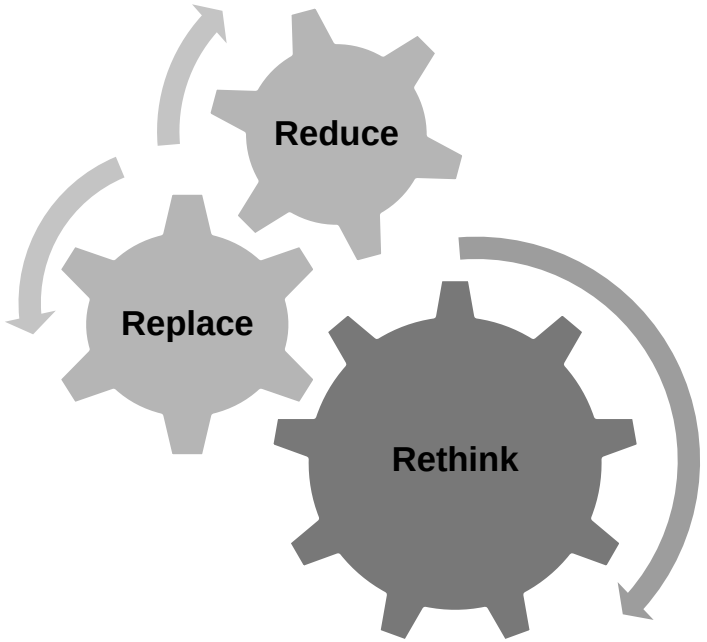
ambiwaste
Resíduos | Plásticos | Consumíveis | Serviços

NOVA UNIVERSITY
LISBON

Where we are and how to move forward



$1700/_{6700}$ Kg of non-recyclable material



Reducing waste is the first step for environmental sustainability

Plan experiments efficiently to minimize plastic usage

Replace single-use plastics with reusable alternatives that can be decontaminated and washed between uses

The energy used for washing and decontaminating is far less than that to remake, transport and dispose of plastic

Rethink lab practices

Reuse/repurpose what was considered single use

Share your sustainable ideas with your lab colleagues

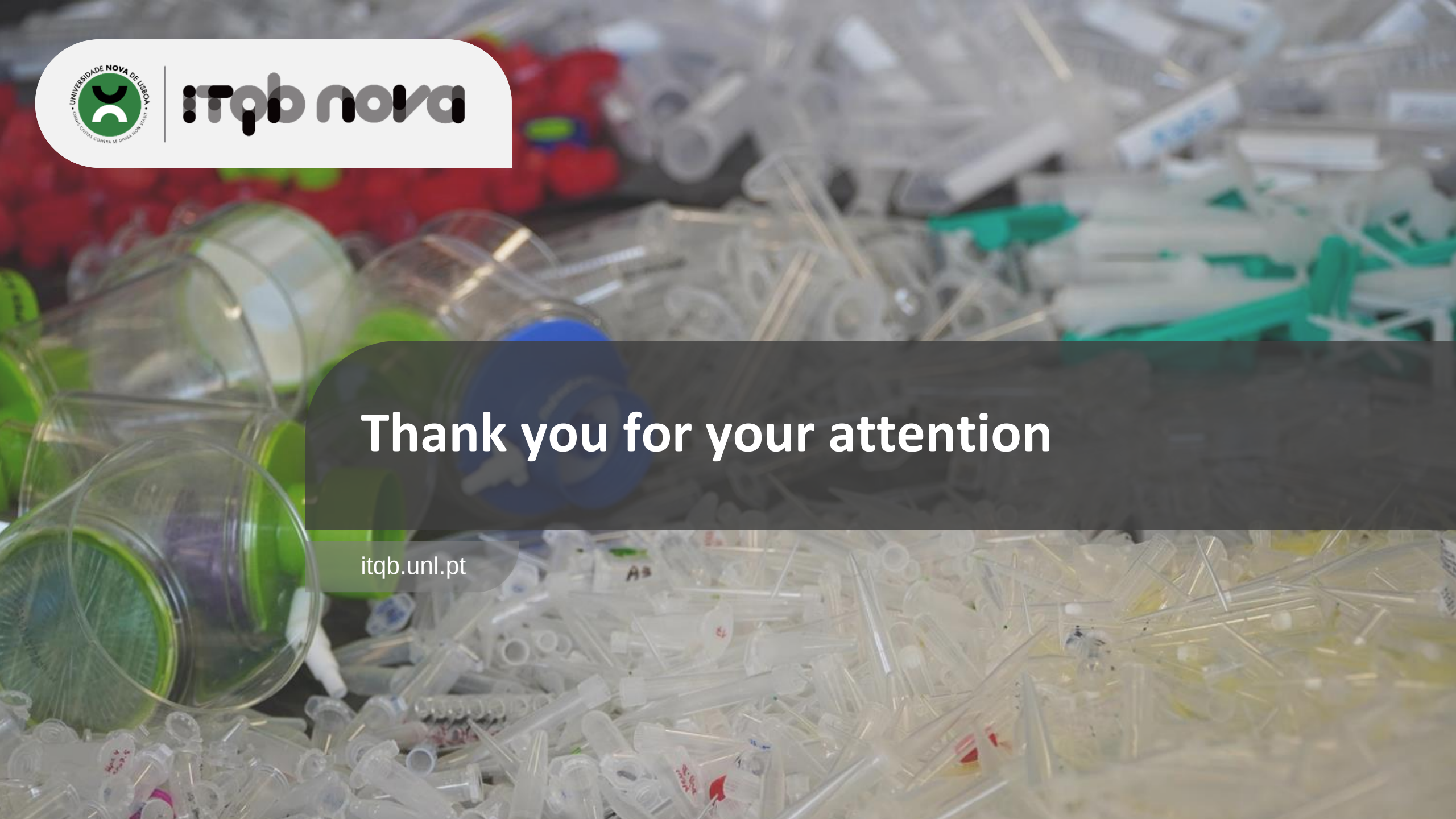
Test out what works for your lab with a smaller group

Be adaptable

What are we doing?

- Approaching companies to recycle our lab waste
- Compelling suppliers to develop take-back programs
- Share a guide to Reducing Single-Use Plastic within the ITQB NOVA community

  -please send us examples of practices that are in place in your labs
- NOVA GREEN LABS



Thank you for your attention

itqb.unl.pt