

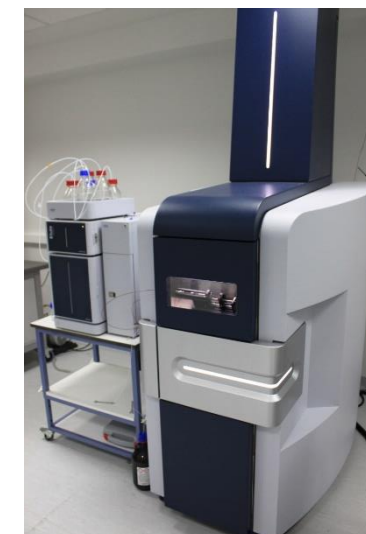
Βιο-ανακύκλωση συσκευασιών τροφίμων

Κέντρο Διεπιστημονικής Έρευνας & Καινοτομίας ΚΕΔΕΚ ΑΠΘ

- Συντονιστής : Καθ. Γ. Θεοδωρίδης, Τμ. Χημείας
- ΔΕΓΓΑΠΟ Τμήματα Χημείας, Ιατρικής, Φαρμακευτικής, Βιολογίας
- 24 νέοι ερευνητές: 11 μέταδιδάκτορες, 8 υποψ. Διδάκτορες
- 5 Μεταπτυχιακοί

Εξοπλισμός Αιχμής

- 5 UPLC-MS/MS (QTOF-IMS-MS, QqQ...)
- 2 GC-MS/MS, 2 GC-MS
- HPLC, GC, CE....
- Λογισμικά και αλγορίθμους, βάσεις δεδομένων, βιβλιοθήκες φασμάτων, Bio-Sample Banks



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Πρόσφατες ερευνητικές δημοσιεύσεις

Food Chemistry 345 (2021) 128739

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Food Chemistry

journal homepage: www.elsevier.com/locate/foodchem

ELSEVIER

Analysis of PBT and PET cyclic oligomers in extracts of coffee capsules and food simulants by a HPLC-UV/FLD method

Joao Alberto Lopes^a, Emmanouil D. Tsochatzis^{a,*}, Lubomir Karasek^a, Eddo J. Hoekstra^b, Hendrik Emons^a

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Analytica Chimica Acta 1130 (2020) 49–59

Contents lists available at ScienceDirect

Analytica Chimica Acta

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ELSEVIER

Development and validation of a fast gas chromatography mass spectrometry method for the quantification of selected non-intentionally added substances and polystyrene/polyurethane oligomers in liquid food simulants

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Food Chemistry 317 (2020) 126427

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ELSEVIER

Quantification of PET cyclic and linear oligomers in teabags by a validated LC-MS method – *In silico* toxicity assessment and consumer's exposure

Emmanouil D. Tsochatzis^a, Joao Alberto Lopes^{a,*}, Oliver Kappenstein^b, Thomas Tietz^b, Eddo J. Hoekstra^a

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Analytical and Bioanalytical Chemistry (2020) 412:5419–5434
<https://doi.org/10.1007/s00216-020-02758-7>

RESEARCH PAPER

Development and validation of a multi-analyte GC-MS method for the determination of 84 substances from plastic food contact materials

Emmanouil D. Tsochatzis¹ · Joao Alberto Lopes¹ · Eddo Hoekstra² · Hendrik Emons¹

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Type of the Paper (Article)

Polystyrene biodegradation by *Tenebrio molitor* larvae: identification and investigation by GC-MS based untargeted screening

Emmanouil Tsochatzis¹, Joao Alberto Filipe Lopes², Helen Gika^{3,4,5} and Georgios Theodoridis²

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Δομή

- 1. Βιο-ανακύκλωση. Ορισμός και Σκοποί
- 2. Ιδέα και στόχοι
- 3. Ταυτοποίηση χημικών ενώσεων από βιο-ανακύκλωση πολυστυρολίου (PS)
- 4. Επόμενα βήματα
- 5. Συμπεράσματα

1. Βιο-ανακύκλωση. Ορισμός και Σκοποί

Η βιο-αποικοδόμηση είναι η ανακύκλωση της φύσης (bio-recycling).

Ορισμός¹: "*degradation caused by biological activity, leading to a significant change in the chemical structure of a material*" .

ΣΚΟΠΟΣ:

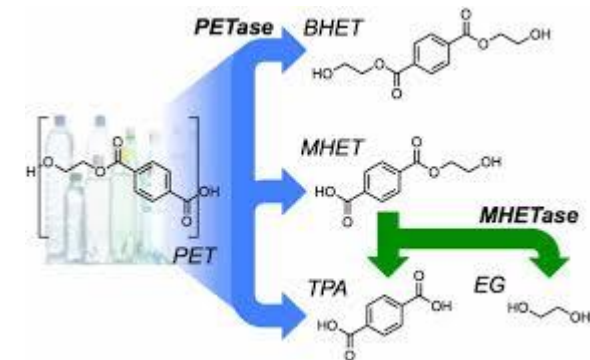
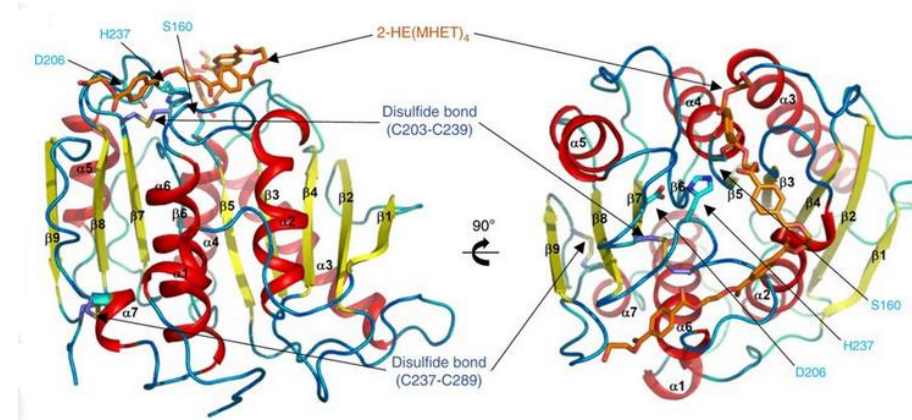
1. Προστασία περιβάλλοντος.
2. Βιωσιμότητα (sustainability).



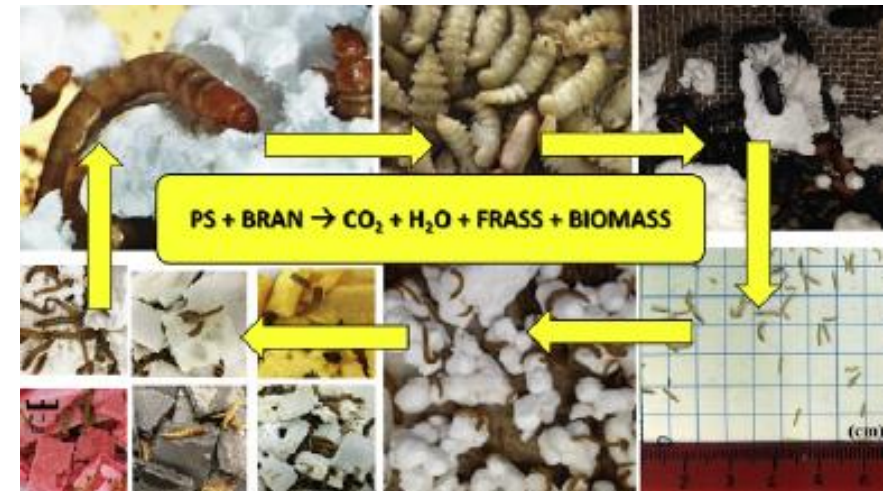
¹International Standards Organization 2013. ISO 472:2013, Geneva, Switzerland.

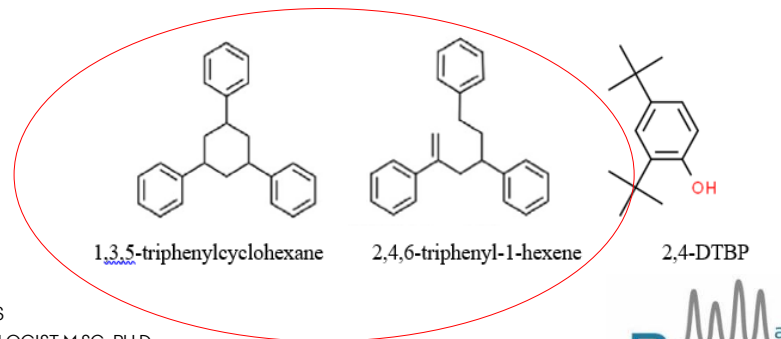
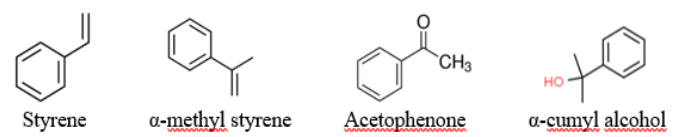
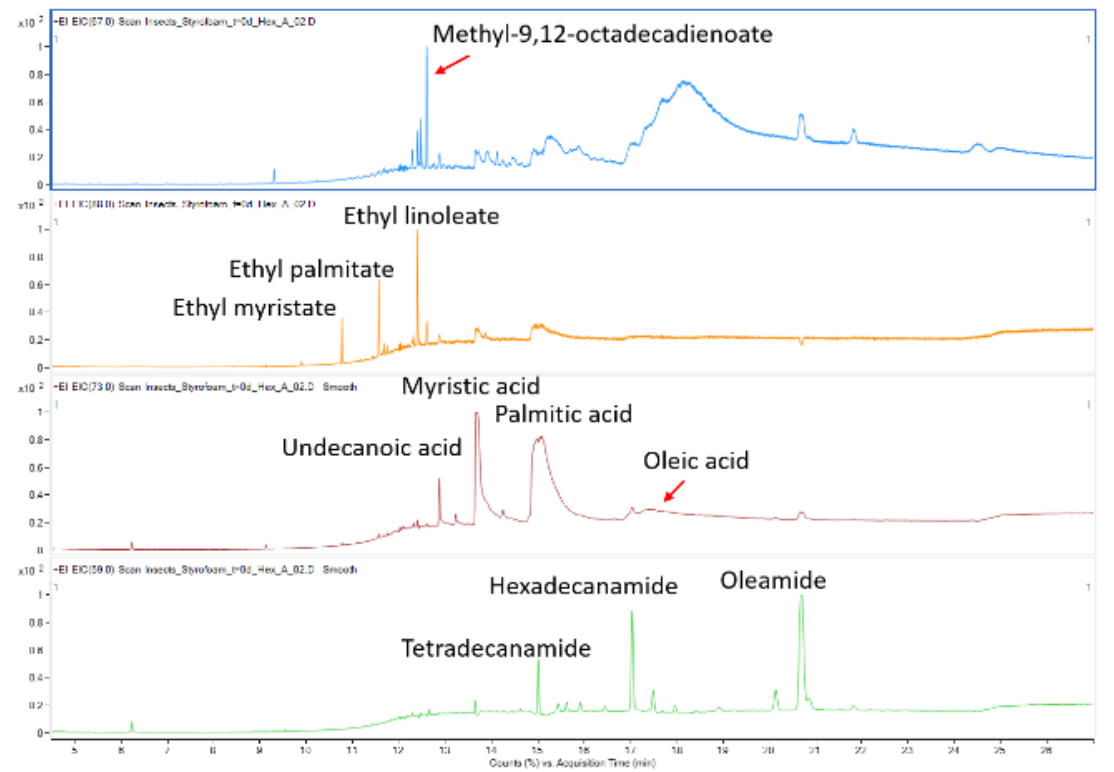
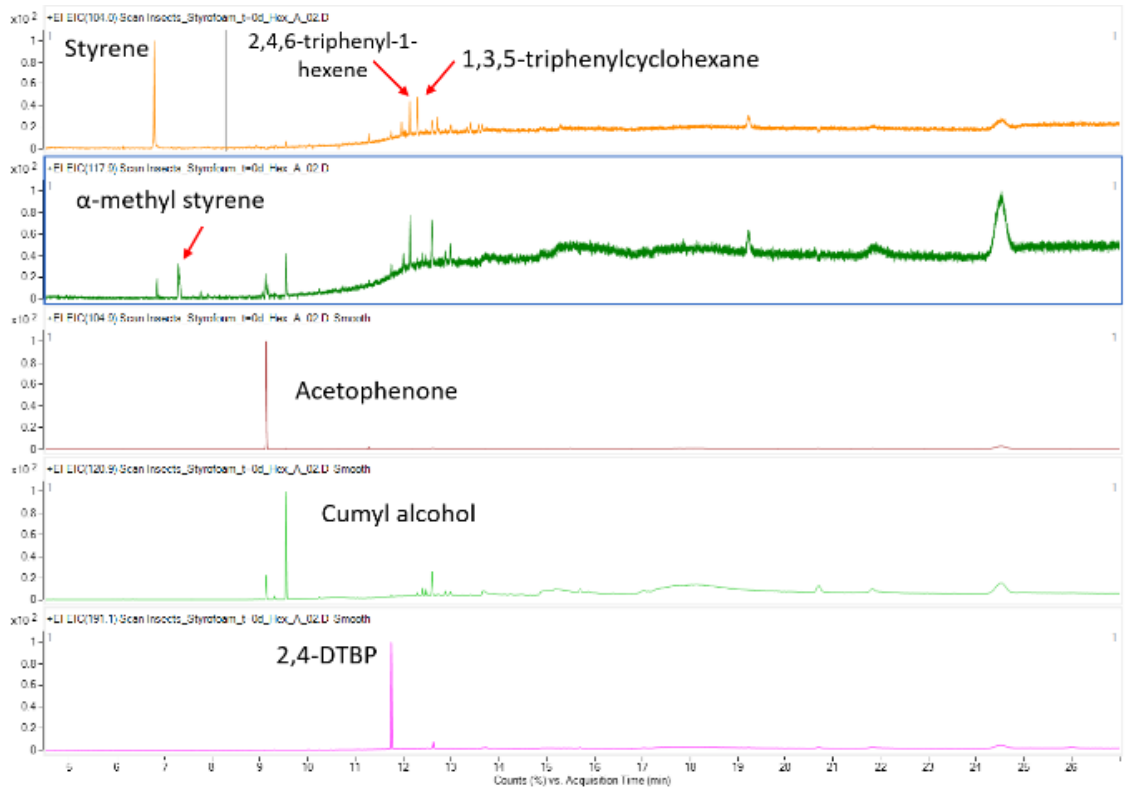
2. Ιδέα και στόχοι

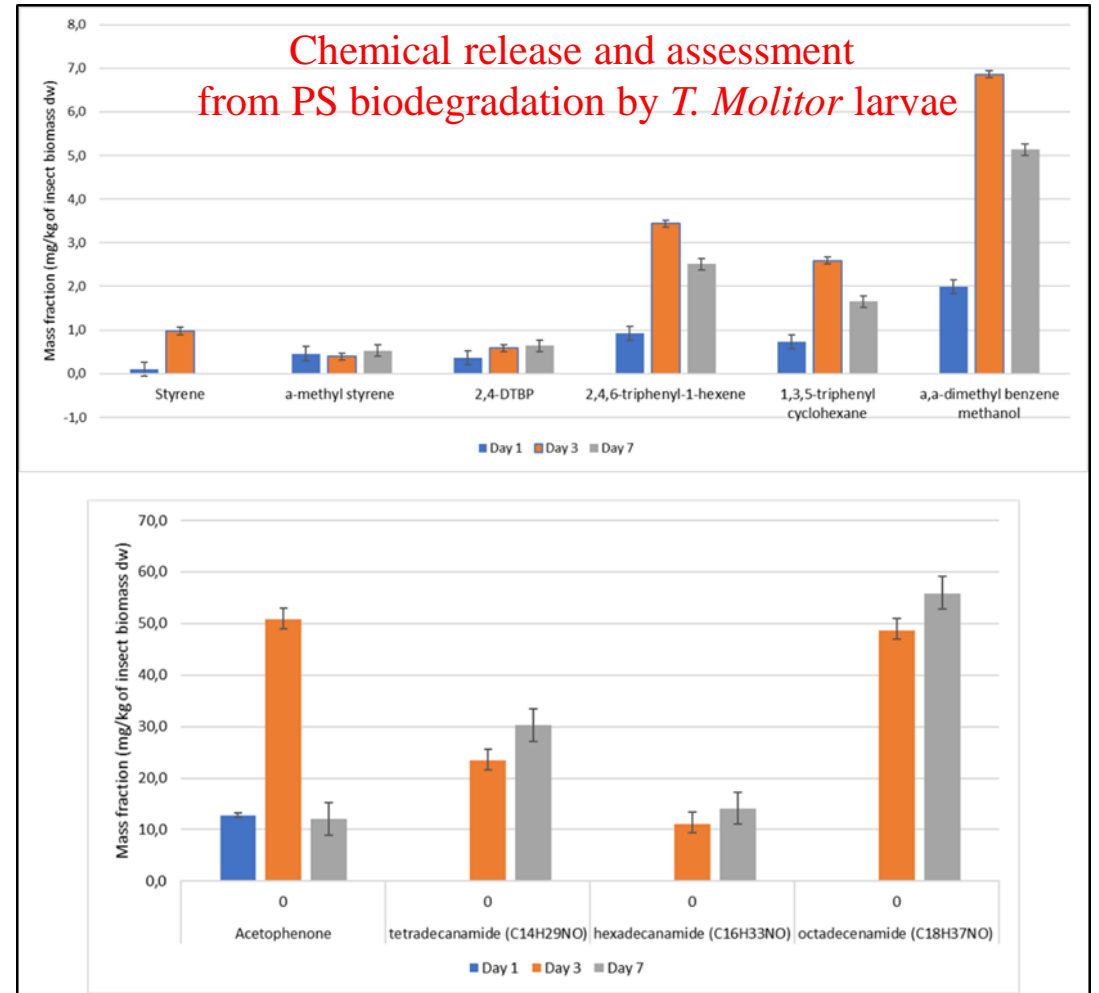
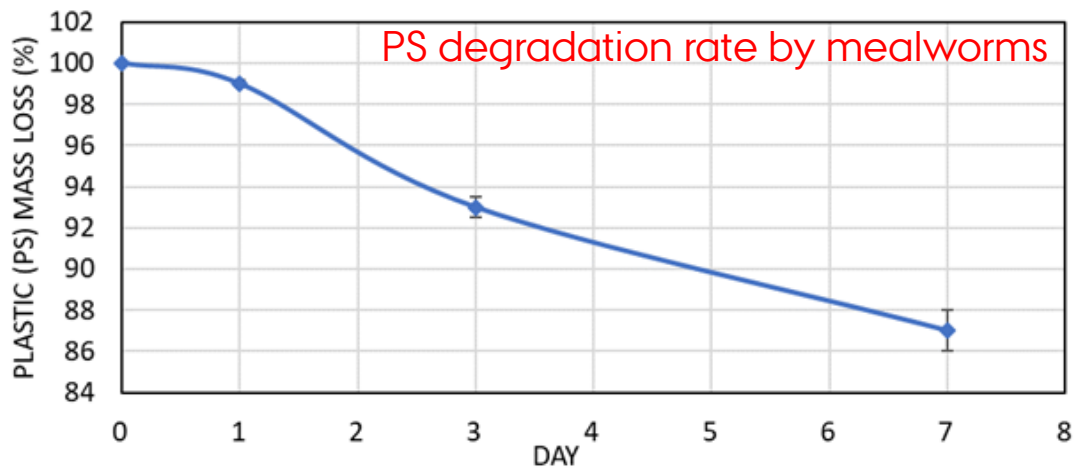
- Οδηγούμενοι από την περίπτωση της ΠΕΤάσης (PETase) !!
- **Βιο-ανακύκλωση** πλαστικών υλικών συσκευασίας (**PS, PE**) από έντομα/μικροοργανισμούς (sustainability).
- Αναλυση και προσδιορισμός χημικών υπολειμμάτων (μονομερή).
- Εντοπισμός βιοχημικών οδών αποδόμησης (metabolomics).
- Εντοπισμός ενζύμων ενδιαφέροντος (proteomics).



3. Ταυτοποίηση χημικών ενώσεων από βιο-ανακύκλωση πολυστυρολίου (PS)







Polystyrene biodegradation by *Tenebrio molitor* larvae: identification and investigation by GC-MS based untargeted screening

Emmanouil Tsochatzis^{1*}, Joao Alberto Filipe Lopes², Helen Gika^{3,4,5}, and Georgios Theodoridis²

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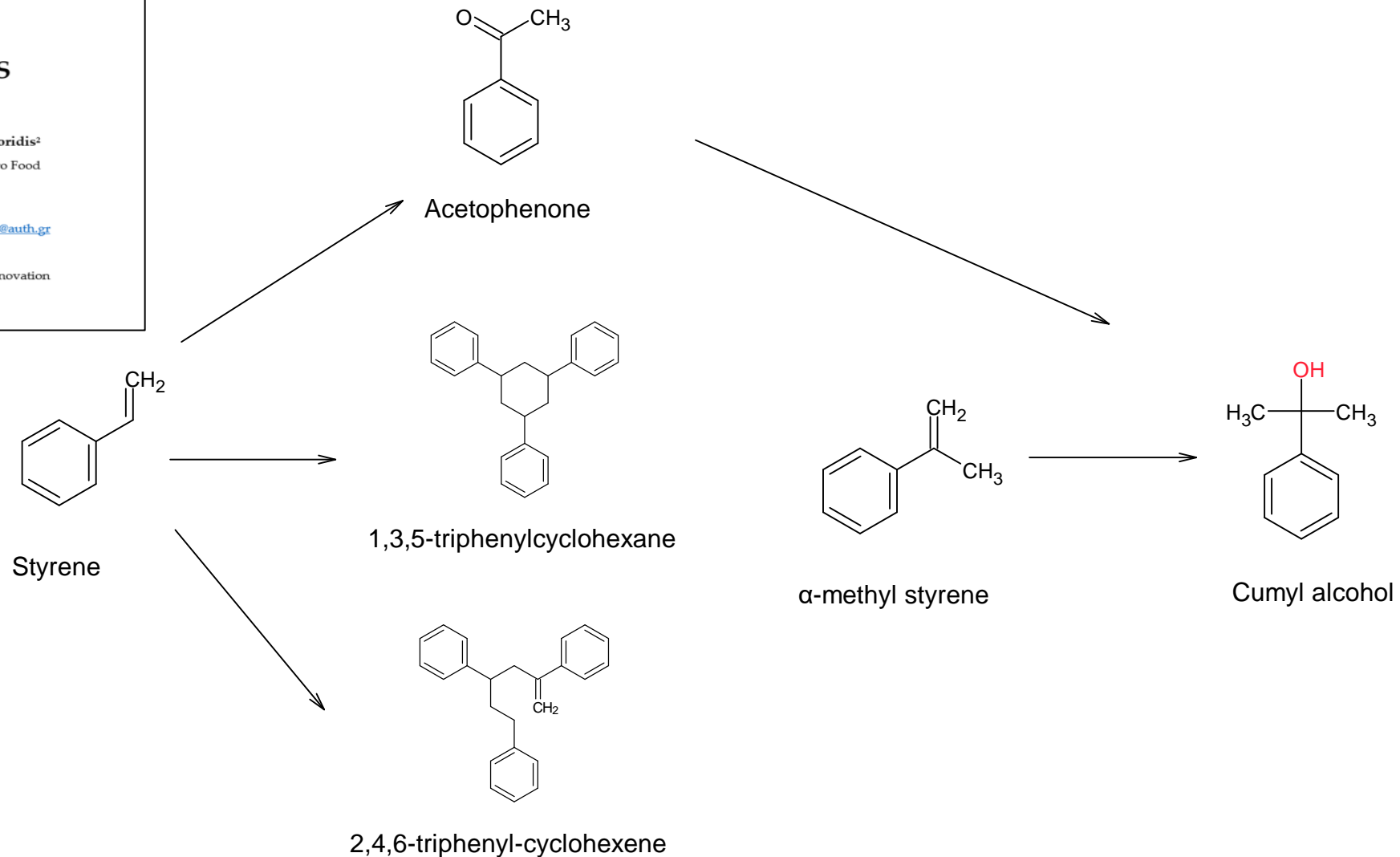
² European Commission, Joint Research Centre (JRC), Geel, Belgium; Joao-Filipe.ALBERTO-LOPES@ec.europa.eu

³ Department of Medicine, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece; gkikae@auth.gr

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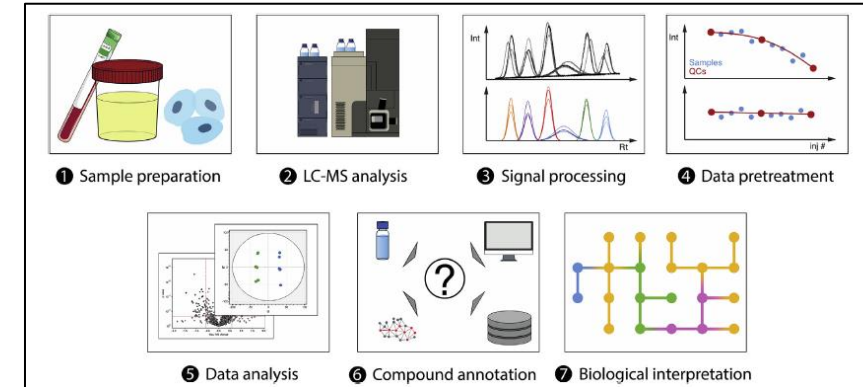
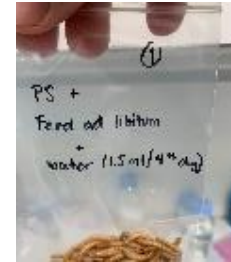
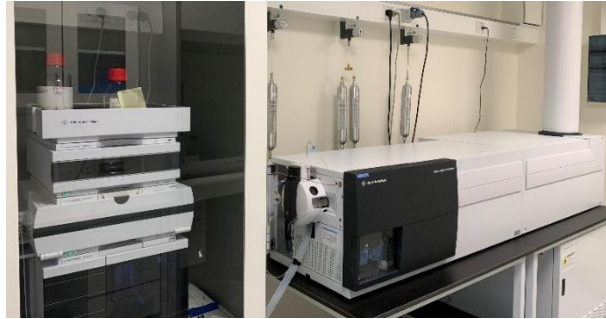
⁵ FoodOmicsGR Research Infrastructure, AUTH Node, Center for Interdisciplinary Research and Innovation (CIRI-AUTH), Balkan Center B1.4, 10th Km Thessaloniki-Thermi Rd, P.O. Box 8318, GR 57001 Thessaloniki, Greece

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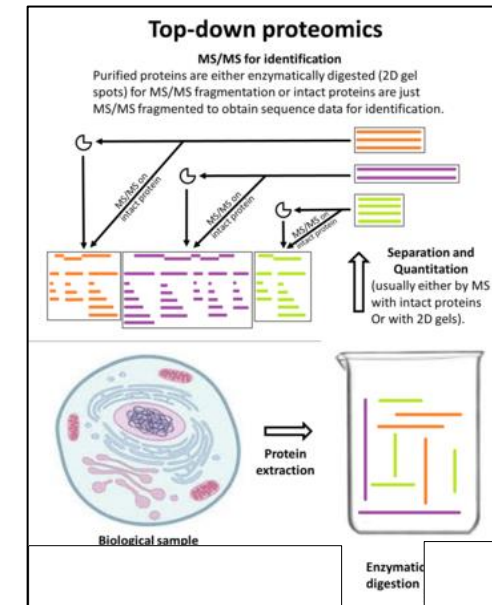


4. Επόμενα βήματα

1. Untargeted metabolomics analysis (LC-HR-MS, GC-HR-MS, ^1H NMR)



2. Top-Down proteomics in insects (ταυτοποίηση ενζύμων ενδιαφέροντος)



5. Συμπεράσματα

- Η βιο-ανακύκλωση πλαστικών είναι εφικτή και χαμηλού κόστους.
- Χημικές ενώσεις ταυτοποιήθηκαν, προερχόμενες από το PS (μονομερή, oligομερή).
- Δράση ενζύμων προκαλεί αποδόμηση των πλαστικών σε CO₂ και H₂O.
- Απομόνωση πρωτεϊνών/ενζύμων.
- Ανάπτυξη και βελτιστοποίηση βιο-διεργασίας.

Σας ευχαριστώ για την προσοχή σας!