



4th International Conference
on Sustainable Solid Waste Management

Characterization of waste materials originating from Portuguese restaurants and an assessment of recycling potential

Veronica Oliveira¹, J. Rodrigues¹, P. Lopes², C. Dias-Ferreira^{1,3}

¹ **Research Centre for Natural Resources, Environment and Society (CERNAS)**, College of Agriculture, Polytechnic Institute of Coimbra, Bencanta 3045-601 Coimbra, Portugal

² **Aveiro City Council**, Cais da Fonte Nova, 3800-200 Aveiro, Portugal

³ **Materials and Ceramic Engineering Department, CICECO**, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal



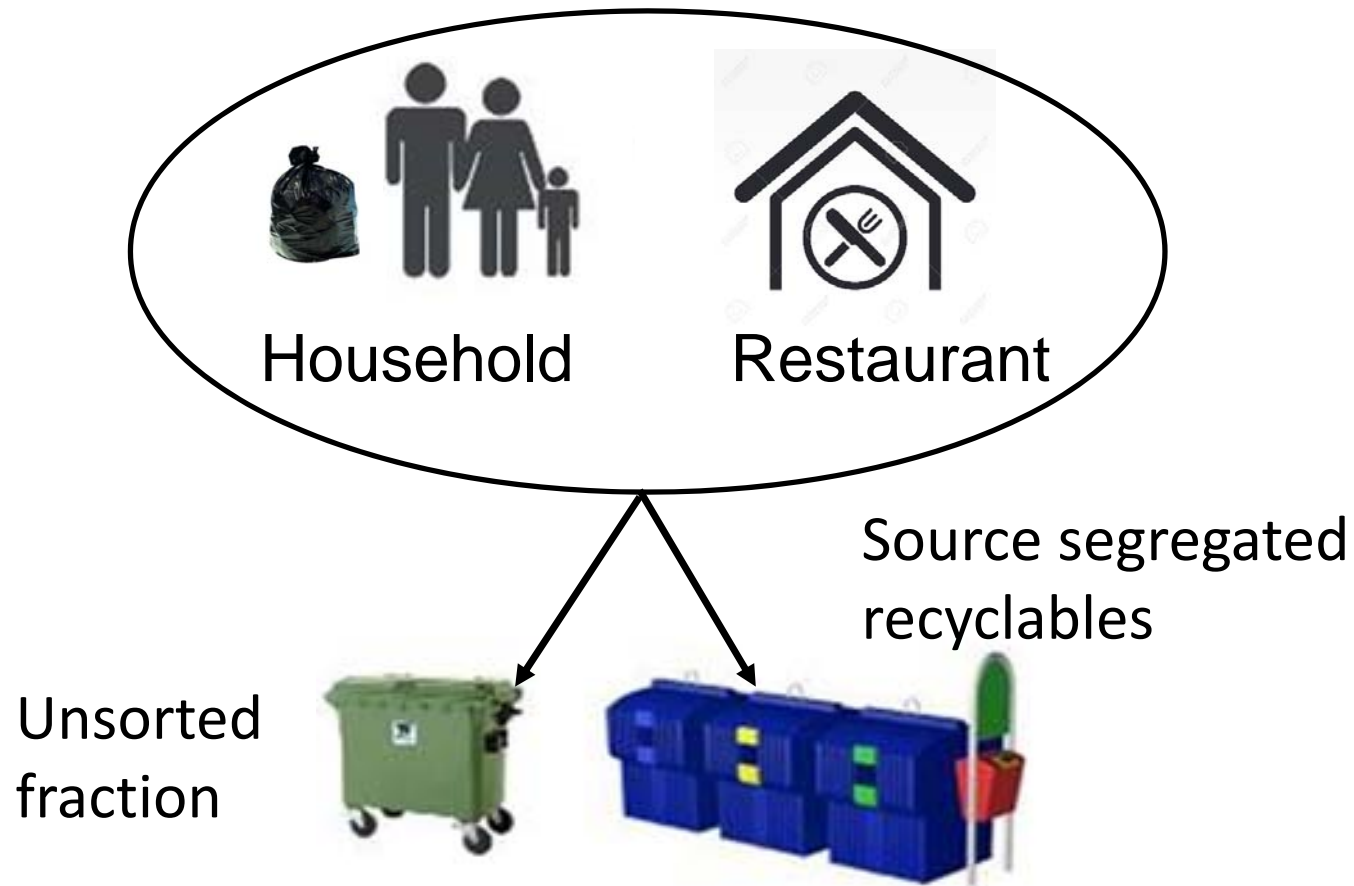
Research questions

How much waste is discarded by meal?

What are the differences between restaurant waste and other municipal wastes?



Waste collection in Portugal





Characterization campaign – September 2014

- **City:** Aveiro (78,000 pop.), Portugal
- **Restaurants:** 11
- **Sampling:** Twice at each restaurant
- **Types of waste:** Unsorted waste and source segregated recyclables (paper, glass, metal and plastics)





Characterization campaign – September 2014

- **door-to-door collection**, using bags
- **Sorting:** Manually by a team of 2-3 people
- **Categories:** Organic matter, paper, plastic, glass, metal and others





Results – amount of waste collected

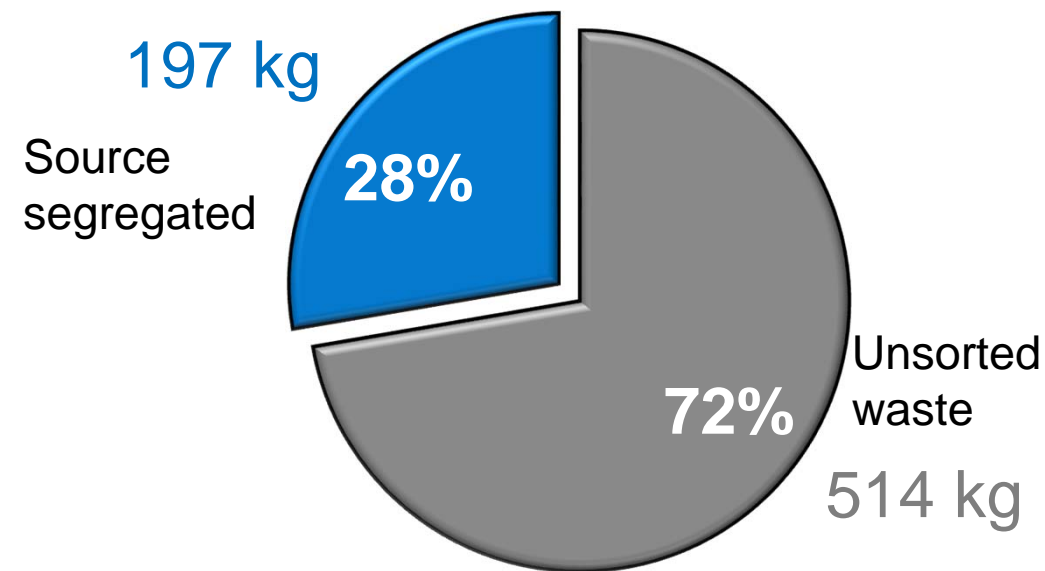
Total waste collected
710 kg

Unsorted waste

+

Source segregated
recyclables

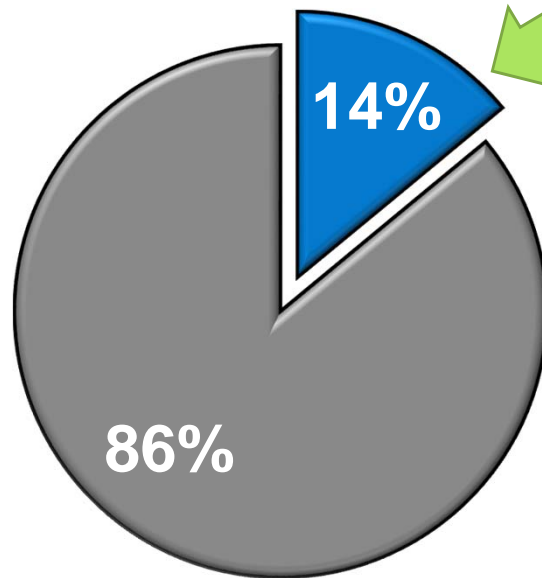
Restaurant Waste
(Own samples, 11 restaurants)





Results – Municipal waste

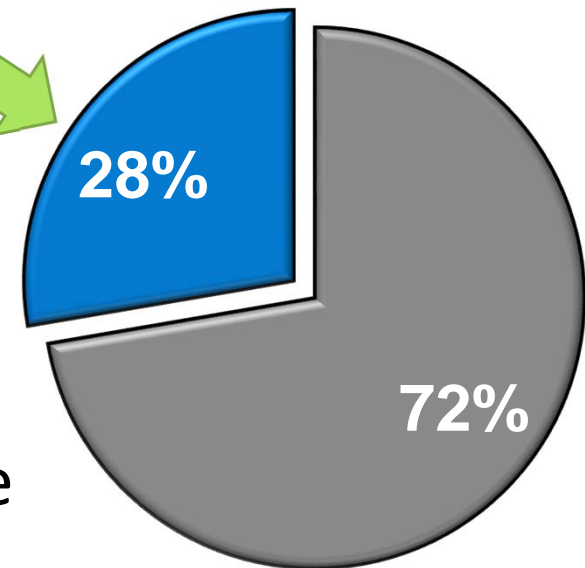
National average, 2014



Source segregated
recyclables

VS.

Restaurant Waste
(Own samples, 11 restaurants)



Restaurants produce
twice as much
recyclables as other municipal sources

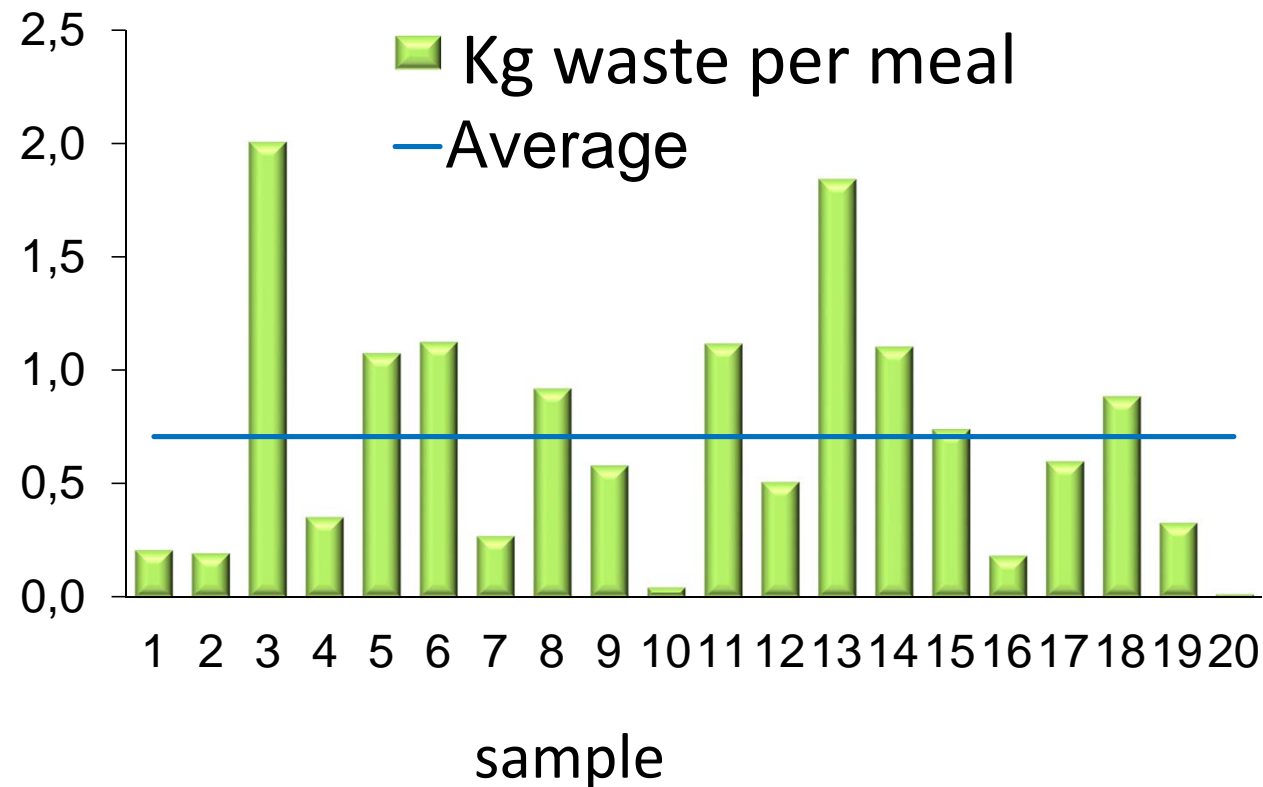


Results – Total waste discarded by meal served

Range:
0.01 – 2.01 kg meal⁻¹

Average :
0.71 kg meal⁻¹

only unsorted waste:
0.5 kg meal⁻¹



How do the figures compare to other works?

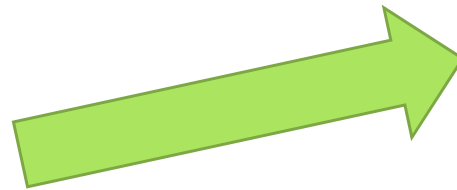


Results – Total waste discarded by meal served

Range:
0.01 – 2.01 kg meal⁻¹

Average :
0.71 kg meal⁻¹

only unsorted waste:
0.5 kg meal⁻¹



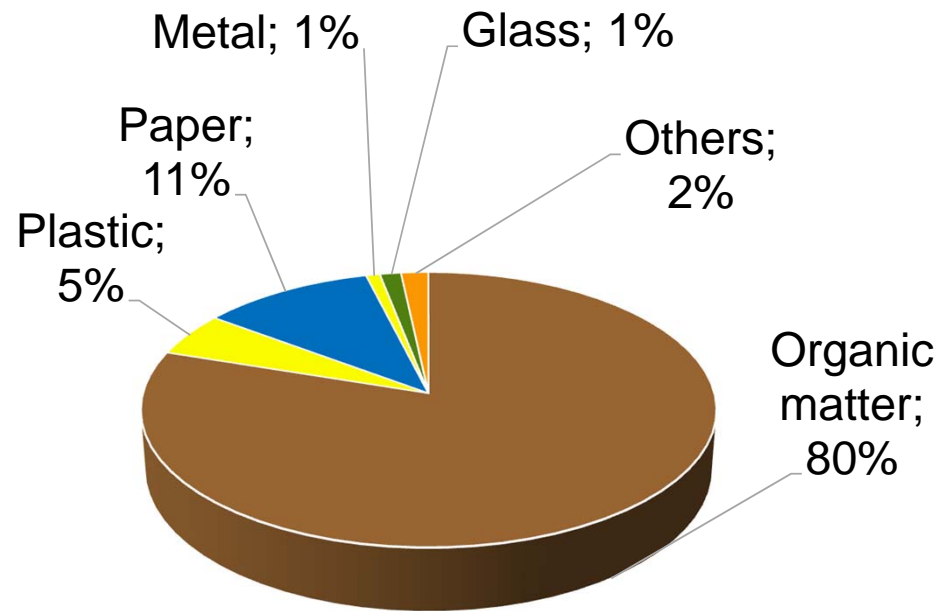
Sustainable Restaurants
Association (2013, UK)

0.48 kg meal⁻¹

The amount of waste discarded by meal is
similar in both studies



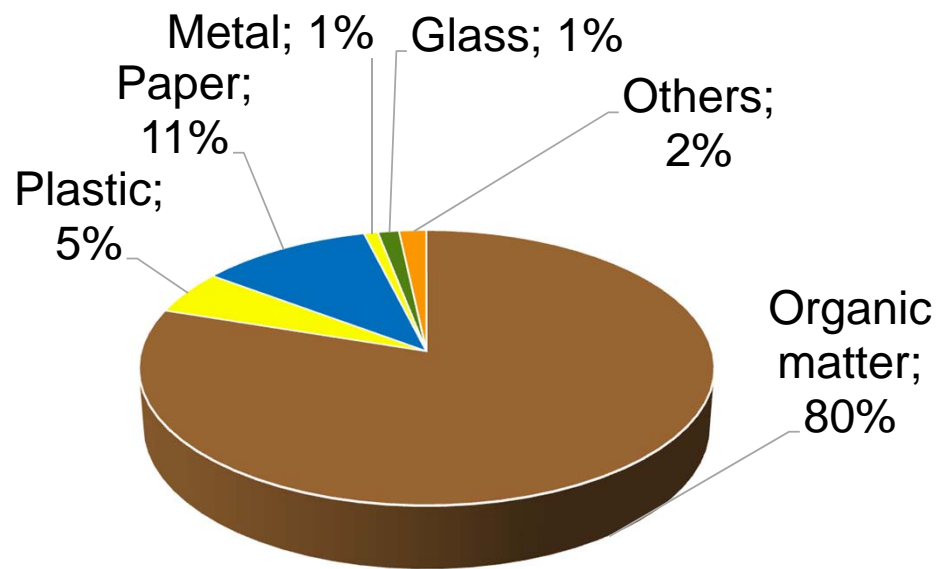
Results - characterization of unsorted waste



- 80% of unsorted waste is organic matter
- 18% of unsorted waste is easy to recycle

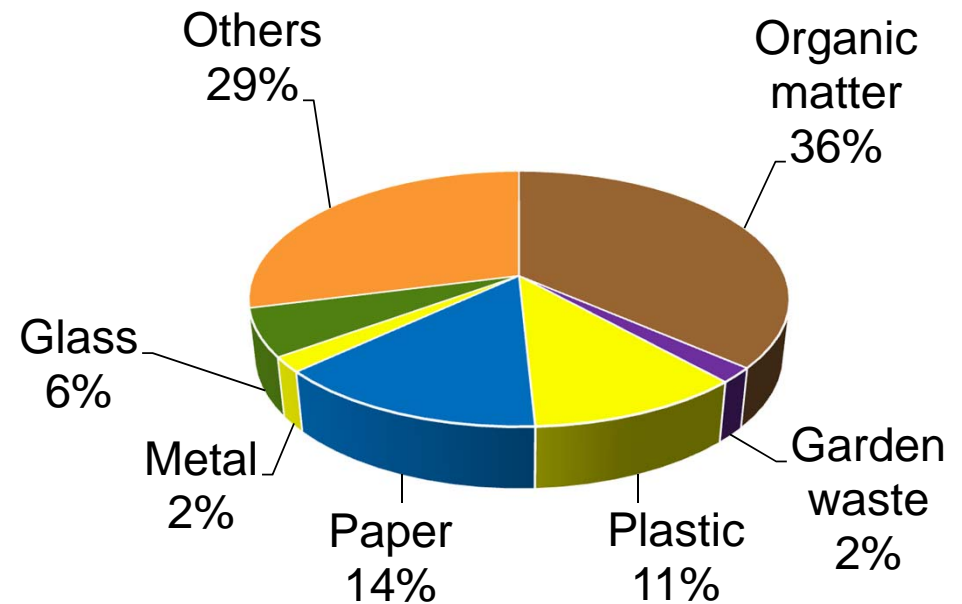


Results - characterization of unsorted waste



Restaurant Waste (n=11)

VS



Municipal Waste – Portugal average. Source: APA 2014



Conclusions

- **72%** of restaurant waste is delivery as **unsorted waste**
- **0.71 kg meal⁻¹** is wasted
- The composition of restaurant waste is different from municipal waste
- Up to **18% of restaurant waste** could be valued by recycling



Thank You!