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Impact of recycling on the circular economy

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ABSTRACT

The transition to a circular economy is one of the objectives of the energy and ecological transition and one of the commitments of sustainable development. Recycling is the cornerstone of this circular economy, as it helps to preserve natural resources, reduce greenhouse gas emissions and minimize pollution. It plays an essential role in sustainable waste management, as these resources are used more efficiently and sustainably. In this work, we have shown the impact that the recycling of solid waste (paper, aluminium and plastic) from an Algerian company located in the locality of Boumerdes has on the circular economy in terms of preserving natural resources, reducing pollution, the possibility of recovering these new materials and creating new jobs. In this work, we were able to use measurements and calculations to show the gains made in terms of raw materials and the reduction in the concentration of polluting gases.

Keywords: circular economy, recycling, polluting gases, aluminium, plastic

1. Introduction

The circular economy is an innovative economic model that aims to transform the way we produce, use and manage resources. The main aim of the circular economy is to minimise waste and maximise the use of resources [1] by keeping them in the economic cycle for as long as possible. Global use of materials was 90 billion tonnes in 2017 and is expected to reach 165-195 billion tonnes by 2060 [2, 3]. In a circular economy, recycling and waste recovery are central. Recyclable materials are collected, sorted and transformed into raw materials for the manufacture of new products. In addition, organic waste can be composted to produce natural fertilisers. This reduces dependence on virgin resources and preserves the environment. In Algeria, only 10% of this enormous quantity of waste is recycled, bearing in mind that one tonne of recycled paper is equivalent to saving 1.41 tonnes of wood, while one tonne of recycled plastic represents a saving of 650 kg of crude oil and 0.04 tonnes of CO₂ equivalent avoided. Not to mention that recycling is a source of new job creation.

2. Experimental

We have calculated the quantities of plastic, paper and glass recovered from recycled waste in 2014, 2015 and 2016 (Fig 1), and we analysed gaseous pollutants such as NO_x, SO₂ and CO from the incineration of the waste studied instead of being recycled (Fig 2).

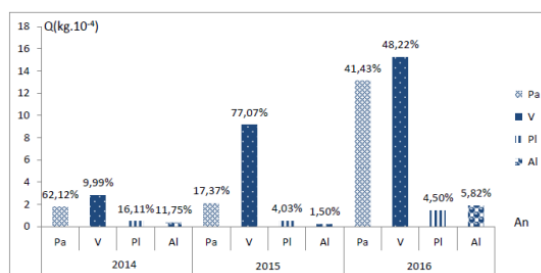


Figure 1: Assessment of the different materials produced by recycling paper, glass, plastic and cardboard from various out-of-date pharmaceutical products.



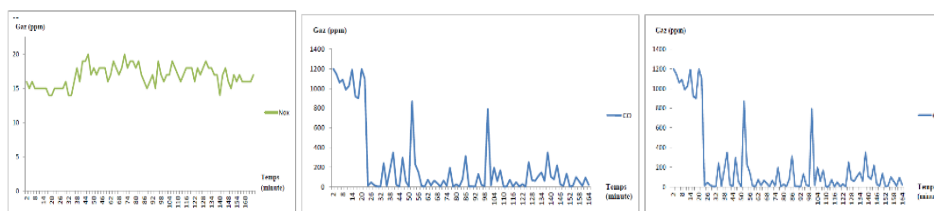


Figure 2: Analysis of gases (NO_x, SO₂, CO) from waste incineration A

3. Results and Discussion

Figure 1 shows the different materials (paper, glass, plastic and aluminium) recycled at the plant over the three years (2014, 2015 and 2016) from expired pharmaceutical waste and chemicals. For example, the quantity of glass and paper recycled during 2016 for pharmaceutical waste is significant compared to 2014 and 2015, since the quantity of glass recycled during 2016 is estimated at (152887 kg) and that of paper is (135132 kg). Figures 2 show the concentrations of No_x, SO₂ and CO that are emitted into the atmosphere during the incineration of a type of waste at the plant. The results show that the average concentrations of No_x are 34.96 ppm, which is well above the standard, as are the concentrations of SO₂ and CO, which are well above the standard, with values of 4.93 ppm and 198.12 ppm respectively.

4. Conclusion

In this study, we found that recycling is a very interesting waste treatment technique for companies, with a considerable impact on the circular economy, because it reduces environmental pollution and allows raw materials to be saved, generating another employment perspective. It also emerges from this work that Algeria today must opt for the transition to a circular economy emerging in the context of sustainability.

References

- [1] Recycleurs de Genève, validé le 15 mai 2012
- [2] UNEP, Global Resources Outlook 2019: Natural Resources for the Future We Want. <https://www.resourcepanel.org/reports/global-resources-outlook>.
- [3] OECD, Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences 2019. <https://www.oecd.org/publications/globalmaterial-resources-outlook-to-2060%E2%80%93939789264307452-en.htm>.