

## Removal of Lead and Zinc in Wastewater Applying Activated Carbon: A Review of Articles

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### Resumen

La investigación tuvo como objetivo revisar la bibliografía de artículos referentes a la remoción de Plomo y Zinc en aguas residuales aplicando carbón activado. Los resultados indican que la nuez logra mejores resultados para remoción de plomo y la pulpa de manzana van logra mejores resultados para remoción de zinc.

**Palabras clave:** Carbon activado, aguas residuales, plomo, zinc.

### Abstract

The objective of the investigation was to review the bibliography of articles referring to the elimination of Lead and Zinc in wastewater by applying activated carbon. The results indicate that the walnut achieves better results for the removal of lead and the apple pulp will achieve better results for the removal of zinc.

**Keywords:** Activated carbón, wastewater, Lead, zinc.

### 1. Introduction

Heavy metals are considered highly toxic since they affect the ecology due to their low degradability, among the most relevant we have lead (Pb) and zinc (Zn), which contain a density greater than 4 g / cm<sup>3</sup>, mass and atomic weight above 20, they also affect the operation of biological treatment if they are discharged into the sewer system in high concentrations (Jun et al., 2020).

Biomass is considered as any type of organic matter that originates through a biological process, it occurs in two ways, naturally or by human activity, such actions produce organic and inorganic waste. Likewise, activated carbon is an efficient method of bioadsorption, which is carried out thanks to the reuse of agricultural residues that are used for its elaboration, which through a process manages to reduce contamination by metals found in bodies of water (Adigun et al., 2019).

### 2. Materials and Methods

To carry out the research, the systematic review methodology was chosen and its purpose is to compile and provide a summary on a certain topic and once the research question has been answered. Consequently, this research applies a systematic review to analyze and estimate the

information obtained from various studies with multiple results, to evaluate the application of activated carbon in the removal of lead and zinc in wastewater.

The adsorption of metals by activated carbon is shown in the following figure.

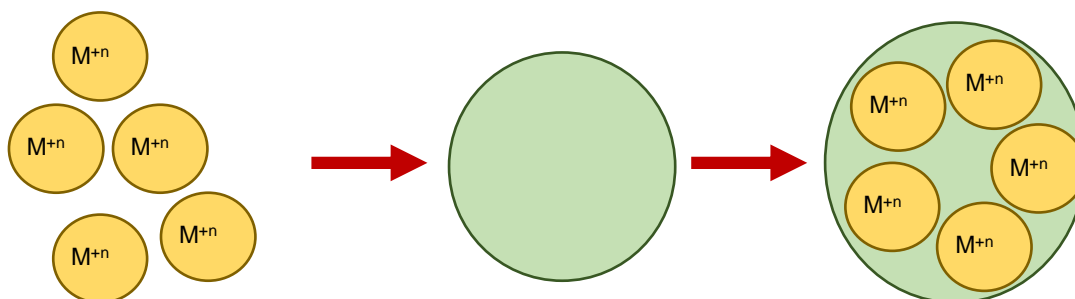


Figure 1. adsorption of metals by activated carbon

### 3. Results

The following investigations have been found: using pea shells as biochar reduced 81% of Pb, 66.5% of Zn (Novoseltseva, Yankovych, Kovalenko, Vaclavikova and Melnyk, 2020), apple pulp as activated carbon reduced 55% of Pb, 72.5 Zn% (Tolga Depci, Ali Rıza Kul and Yunus Önal, 2012), Walnut shells reduced 96.2% of Pb, 71% of Zn (Maryam, Mehdi, Shabnam, Majdeh and Kermani, 2008), Banana peel as activated carbon reduced 71% of Pb (Surchi, Kafia 2011), papaya peel as activated carbon reduced 93% of Pb (ABBASZADEH et al., 2016), Cultivation straw as activated carbon reduced 80.7% of Pb (Wang et al., 2020 ).

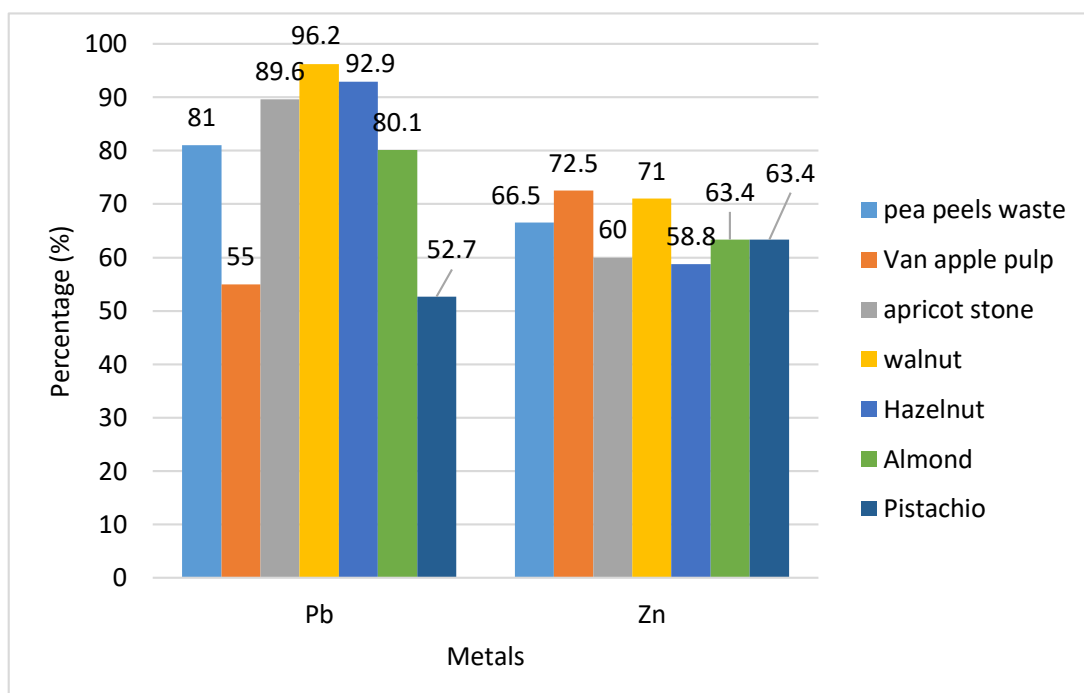


Figure 2. Comparison of activated carbon to remove Pb and Zn

#### 4. Conclusions

According to the results obtained by authors, it can be concluded that:

- The results indicate that the walnut achieves better results for the removal of Lead and the apple pulp will achieve better results for the removal of zinc.

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