Pyrolysis of cork residues - preliminary results

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1. Introduction - The energy from renewable sources is a topic that has been widely discussed and studied, especially since the use of fossil fuels in industrial processes are the principal source of environmental pollution. ln, this context, the processes of biomass gasification and pyrolysis are alternatives for energy enhancement, especially in rural areas [1]. One novel area that has begun to be investigated is the use of cork residues. Gasification studies have been conducted using several) samples of residues obtained during different phases of the cork manufacturing process in order to test their ability to produce energy [2]. An alternative to gasification is pyrolysis, which involves the carbonization of solid materials in an inert atmosphere, resulting in three distinct products: gas, oil and a carbon-rich solid residue. The formation of pyrolytic products is influenced by the operating conditions and the characteristics of the raw material [3].
The aim of this study was to investigate possible innovation in the cork industry by analysing the efficiency of pyrolysis of natural cork waste and by identifying optimal operating conditions, and the characteristics of the products obtained. ln, this paper some preliminary results are reported.

2. Experimental - Pyrolysis of the cork residues was carried out using a bench scale apparatus formed by a vertical reactor, heated by a split face. During the experiments, the reactor was fed with N_2 at a flow rate of 200 mL/min and atmospheric pressure. The operating temperature ranged from 400 to 900 ºC and two heating rates were used (5 º C/min and IO º C/min). The raw material to be processed consisted of granulated cork residues with a particle size ranging from 2.88 to 4.00 mm. After pyrolysis, only the solid phase was characterized due to limitation s existing in the experimental apparatus.

3. Results and Discussion - The experimental results show that solid residues with the highest carbon content were obtained after pyrolysis at temperatures of 600 and 800 ºC. lt was also found that the percentage of hydrogen present in the residues decreases with increasing operating temperature.
Regarding the influence of the heating rates on the pyrolysis process, it appears that there is no significant effect either on the weight of residue obtained compared to the initial mass of cork granules or on the final composition of the residue.

4. Conclusions - The solid residue obtained after pyrolysis has the potential to be used as a fuel or as a raw material for the production of activated carbons.

5. References

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