

OBTAINING OF ACTIVATED COAL to LEAVE OF WASTE OF TANNERIES AND THEIR IMPORTANCE IN THE REMOVAL OF I CHROME HEXAVALENTE

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SUMMARY

Presently work got ready coal activated starting from waste of tanneries in order to removing I chrome hexavalente in watery solutions. The samples were carbonized at 400, 450, 500 and 550 °C during 30 minutes in atmosphere of nitrógeno (flow of 110 mL /min, rate of heating of 10 °C/min), they were milled and they sifted to a size of particle of 0.125 mm, they were activated chemically with hidróxido of potassium to 35% with constant agitation during 4 hours, they warmed in nitrogen atmosphere (flow of 110 mL /min), 600 5 °C warmed for 60 minutes (you condition mentioned) and lastly they were washed with hot water and fry until pH 8. he/she got ready a solution of 70 ppm of Cr(VI) starting from dicromato of potassium, 0.5 grams of each material were weighed, they were added 50 mL of this solution and after shaking to ambient temperature to 120 rpm during 12 hours, the solutions were analyzed for UV-VISIBLE (espectrofotómetro PERKIN ELMER Lambda 3B UV/VIS).

The materials were characterized carrying out next analysis (Ashy 4.23%, Humidity 3.8%, Matter volatile 55.7% and high content of fixed Carbon: 40%) for norms ASTM. The microporos was determined by means of the index of iodine and they were obtained for the coal activated at 400, 450, 500 and 550 values of 830, 892, 901 and 932 (bigger superficial area) mg I₂/g of coal comparable with the commercial coal NORIT PK - 0.6-2 (between 900 and 1100). For our coal activated between 400 and 550°C you capacities of removal of 0.69 0.92 1.05 1.85 mequiv Cr+6/g of coal respectively, results that they showed that the capacity of chromium adsorption depends on the microporos area.

EXPERIMENTATION

2.6 CHEMICAL ACTIVATION

They took 20 grams of each material and they were impregnated with Hidróxido of potassium, Chloride of zinc and phosphoric acid to the 10 P/V. Then they dried off to 105 °C during 24 hours. The previous samples underwent a later laundry(1)

2.7 LAUNDRY AND DRYING

The samples, after being activated dried off to 105 °C during 12 horas5.

After the activations the loss of weight of the samples was determined keeping before in mind the weight and after the process.

2.8 CHARACTERIZATION DeI ACTIVATED COAL

The characterization of the activated coal was based on next analysis and index of iodine, which you/they were carried out according to norms ASTM

2.9 ADSORPTION OF I CHROME HEXAVALENTE

They were introduced 0.2 grams of obtained activated coal, their targets and the commercial activated coal approximately (Norit RO3515) in a recipient plastic laundry with distilled water and drying. Later on 25 mL of solution of chromium hexavalente was added (elaborated with $K_2Cr_2O_7$) whose concentration was 70 ppm (the solution one prepares PH 6.1). The content of the flasks underwent agitation to ambient temperature in an agitator (Cole Palmer marks Ploystat, model you/he/she indexes 12050-00 Circulator) during 18 hours to 100 rpm. Last the 18 hours you filter the content of the flasks stops then to quantify the concentration of chromium filtrate. To determine the quantity of cromo(VI) the method colorimeter was used reported in the Standard methods for the examination of water and wastewater(4), for the mensuration of absorption in UV_VIS lambda 3B, you adjusts the wave longitude to 540 nm, they concentrated it I determine in the calibration curve. The calibration curves were carried out with a range of concentrations from 1.043 to 104.276 ppm. The concentrations of the studied solutions were 100, 150, 200, 250 and 300 ppm, which were used to measure the capacities of removal of the obtained coal and the commercial coal.

3. RESULTS AND DISCUSSION:

DETERMINATION OF THE INDEX OF IODINE (ÁREA DE MICROPOROS)

Coal	Agent activante	Index of iodine mg de I / g de Carbon)
DS400H3PO4	ACIDO FOSFORICO	396,58
DS400KOH	HIDROXIDO DE POTASIO	431,67
DS400ZNCL2	CLORURO DE ZINC	983,29
Comercial	NORITR03515	988,87

Coal	Agent activante	Index of iodine mg de I / g de Carbon)
DS500H3PO4	ACIDO FOSFORICO	711,57
DS500KOH	HIDROXIDO DE POTASIO	323,26
DS500ZNCL2	CLORURO DE ZINC	393,27
Comercial	NORITR03515	988,87

When making the comparison of the superficial area of this coal with the commercial coal NORIT PK - 0.6-2 whose superficial area moves between a range of 900 and 1100 mg of I₂ for g of coal, we can appreciate that the superficial area of our coal is inside this range, when we use sour match to 500°C and chloride of zinc at 400°C which he/she makes it capable for its commercialization.

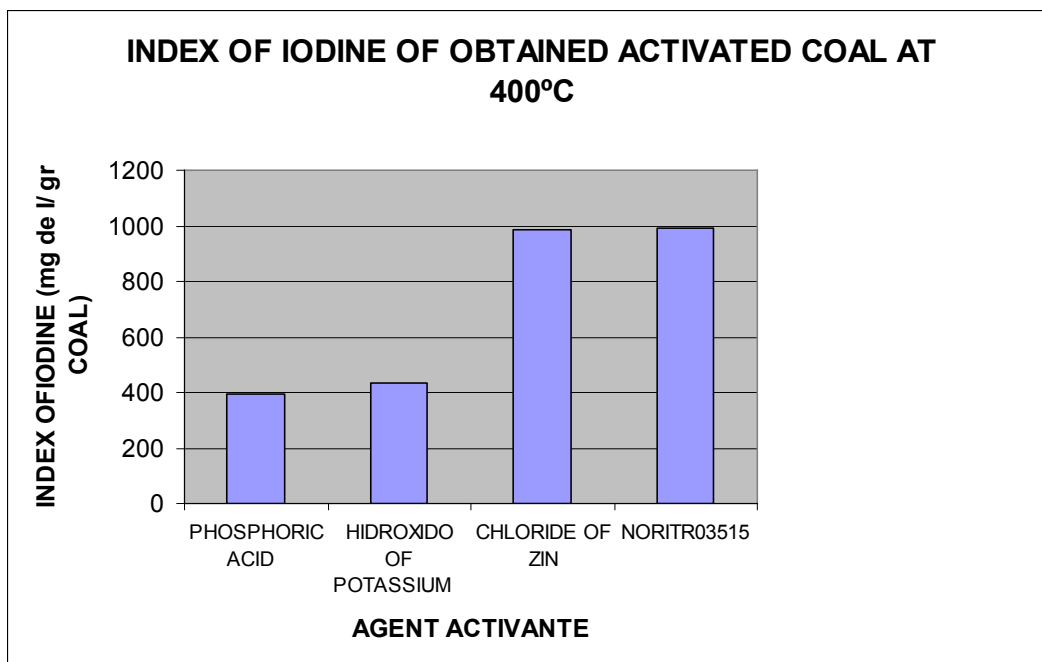
CAPACITY OF REMOVAL OF I CHROME HEXAVALENTE OF THE OBTAINED MATERIALS

Chart 6. Capacities of removal of chromium hexavalente of the charred and activated materials

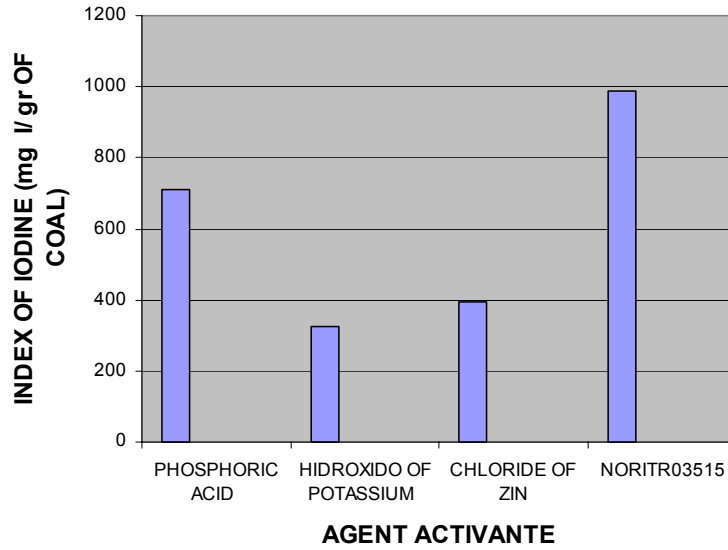
Coal	Agent activante	mg Cr/g Coal
DS400H3PO4	ACIDO FOSFORICO HIDROXIDO DE	4,99
DS400KOH	POTASIO	3,35
DS400ZNCL2	CLORURO DE ZINC	7,92
Comercial	NORITR03515	8,01

Coal	Agent activante	mg Cr/g Coal
DS500H3PO4	ACIDO FOSFORICO HIDROXIDO DE	6,16
DS500KOH	POTASIO	3,3
DS500ZNCL2	CLORURO DE ZINC	4,91
Comercial	NORITR03515	8,01

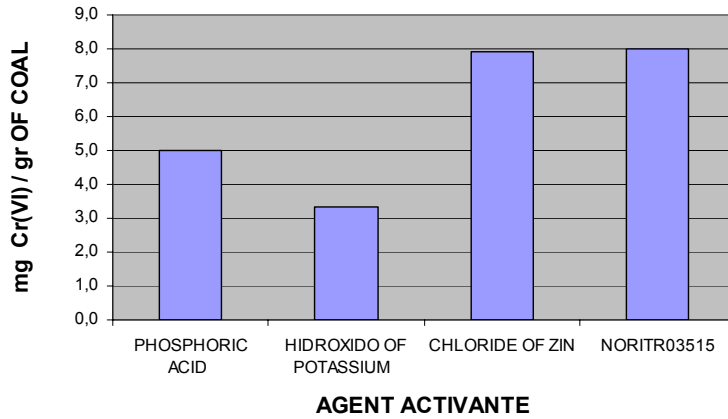
The data show to 400 °C for chloride of Zinc very near values of chromium removal to those of the commercial coal, likewise for 500°C the coal obtained with phosphoric acid presented similar behavior.



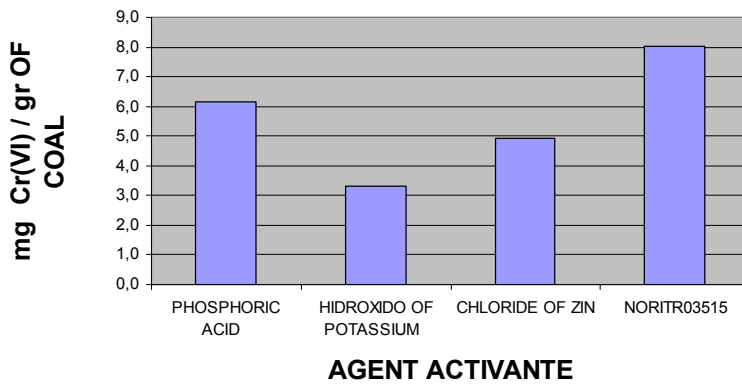
INDEX OF IODINE OF OBTAINED ACTIVATED COAL AT 500°C



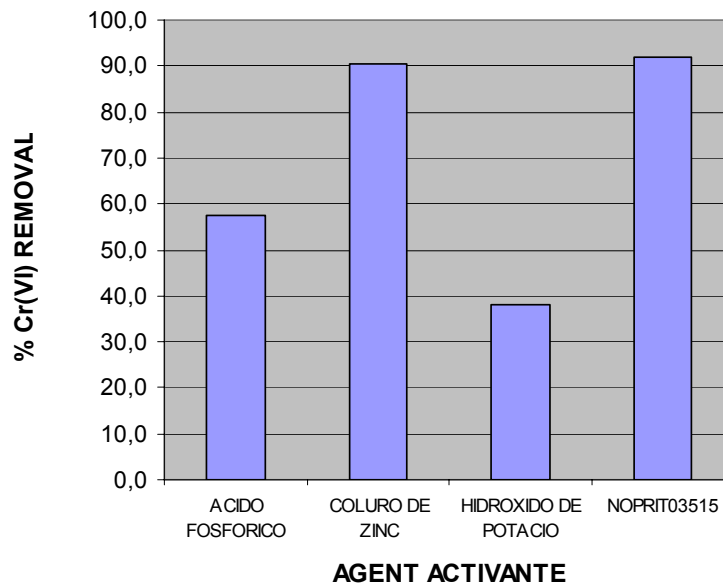
REMOVAL DE CROMO(VI) IN OBTAINED ACTIVATED COAL AT 400°C

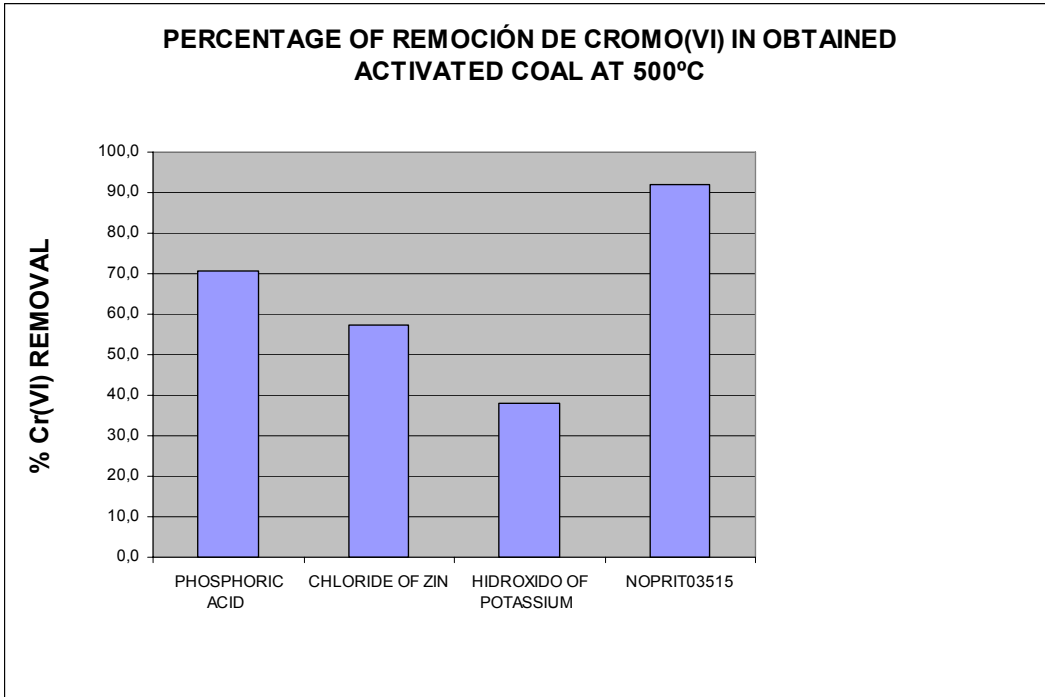


REMOVAL DE CROMO(VI) IN OBTAINED ACTIVATED COAL AT 500°C

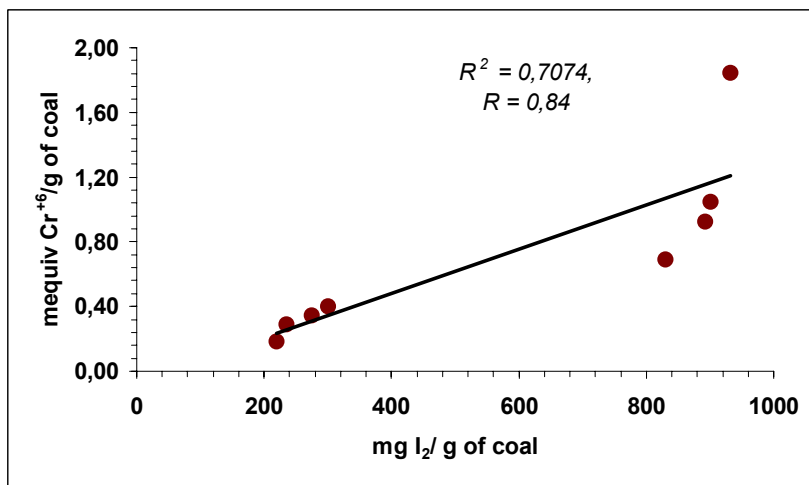


PERCEPERCENTAGE OF REMOCIÓN DE CROMO(VI) IN OBTAINED ACTIVATED COAL AT 400°C





Analyzing the dependence of the capacity of chromium removal with the area of micro pores was found that as the one increases it spurs on superficial there is an increase of the removal capacity, (it figures 1) this is owed that there are many pores in which one could adsorb the metal. The analysis of correlation it was $R=0.84$.



5. 5. CONCLUSIONS

" According to the resulting data starting from the experiences carried out in the laboratory, the coal obtained to the temperature of 400°C is the but good for the removal of solutions of chromium hexavalente, the one which to possess bigger superficial area (983.29 mg I2 / gr coal) which removed 90% of chromium exavalente for an used chromium Concentration of 70 ppm; Reaching this way one of our main purposes.

Finally the work showed that the organic waste of tanneries can be used to obtain activated coal, with area superficial chord to the commercial coal.

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