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Estimation of the water footprint in a small scale gold ore beneficiation plant located in the municipality or Vetas, Santander, Colombia.

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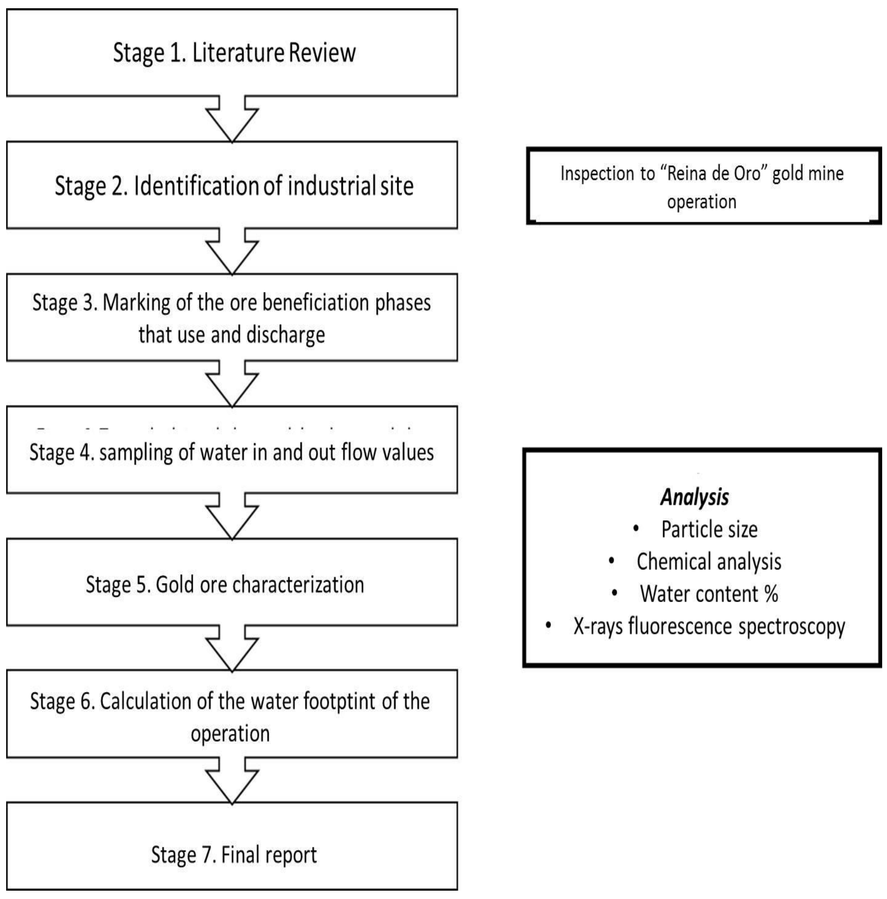
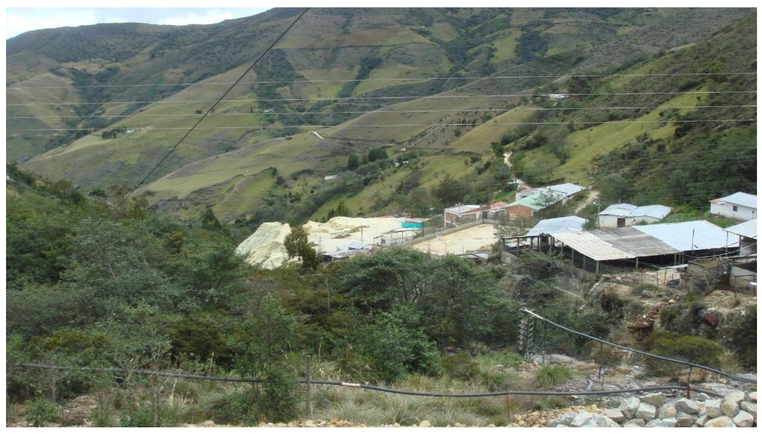
ABSTRACT

The aim of this work was the calculation of the water footprint and the assessment of the water usage in the gold ore beneficiation plant "Reina de Oro", located in the town of Vetas (Santander) in Colombia. From the metallurgical standpoint, the environmental impact of the operations of concentration and gold recovery on nearby water streams was evaluated. Under local considerations, the water footprint of the "Reina de Oro" plant was calculated, and compared with similar operations in Segovia municipality (Antioquia, Colombia), being found to be favorable, due to the nature of the different processes involved.

METHODOLOGY

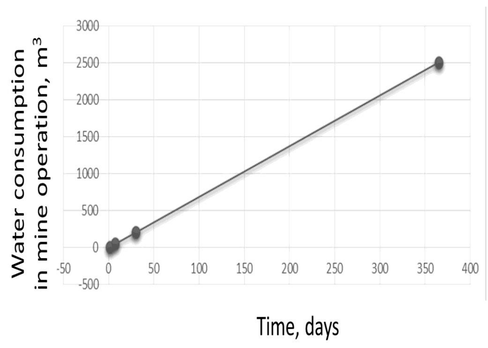
The general scheme of the methodological approach of this work is shown in figure 1. The general view of the "Reina de Oro" beneficiation plant can be seen in figure 2, that the upper facilities correspond to the ore treatment installations, while the lower facilities are, in fact, housing buildings of the local villagers.

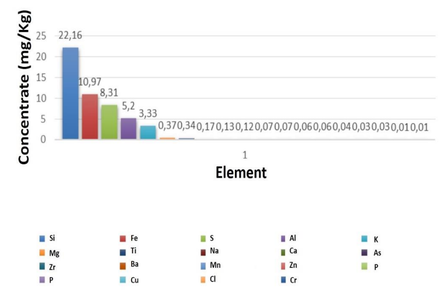




RESULTS

The sampling of flows was carried out by means of selected plastic flasks, of known calibrated volume (ml). The time of filling was measured using a chronometer and annotated as hundredths of a second (CS). For rock material with low water content, the water the flow was estimated from the weight percentage of water in the solid material. The time lapse related to the stream of solid material was obtained from production data available in the "Reina de Oro" plant.





Sample number	Mineral Weight (gr)	Pulp flow at the outlet of Wilfley table #1 $\frac{ml}{CS}$	Pulp flow at the outlet of Wilfley table # 2 $\frac{ml}{CS}$
1	20,01	$\frac{1000}{117}$	$\frac{1000}{134}$
2	18,975	$\frac{1000}{116}$	$\frac{1000}{111}$
3	18,864	$\frac{1000}{103}$	$\frac{1000}{145}$
4	18,9863	$\frac{1000}{95}$	$\frac{1000}{146}$

CONCLUSIONS

The determination of the flow rates corresponding to each unit operation shows that the operation of the mill as initial zone consumes a blue water sub-footprint equal to 1.14 m^3 daily the two wilfley tables located in the gold processing and recovery plant show a use of water for Its process of 0.55 m^3 per day and the final stages of sedimentation of the tails and media of the mineral, the subsequent shedding of process tailings to the Suratá River and the process of casting the obtained concentrates show a consumption equal to 5.16 m3 per day

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