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Booklets

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Title: Alimentación Solar Fotovoltaica para un Prototipo de Electrocoagulación de Aguas Residuales

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Introduction

Methodology

Results

Annexes

Conclusions

References

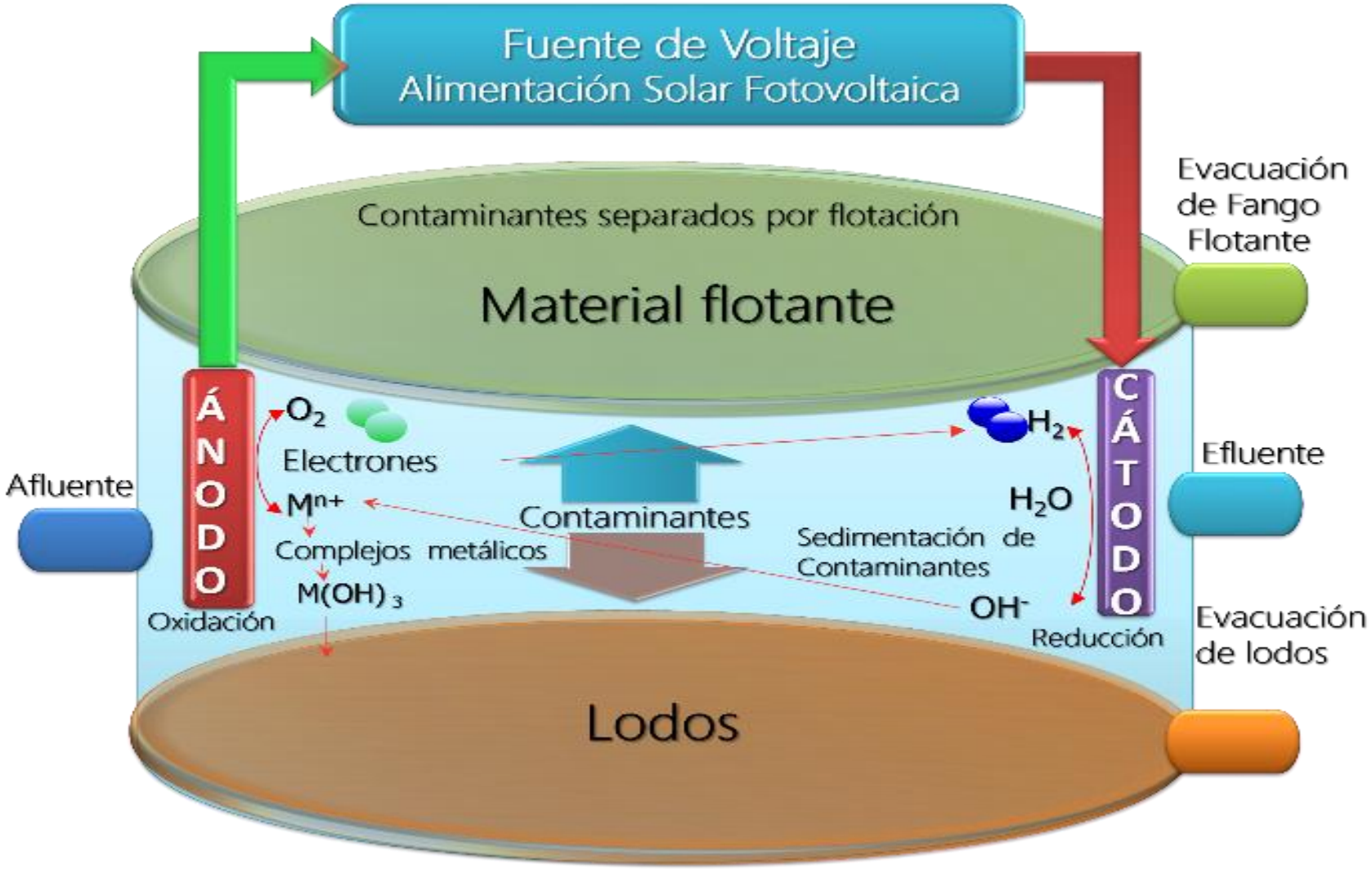
Introduction

Electrocoagulation (EC) is a technique that is applied in the elimination of water pollutants such as: metals, organic pollutants, dyes, pigments, colloidal solids, soluble inorganic pollutants, among others. It has been proposed in recent years as an effective method of treating wastewater.

EC involves the anodic dissolution of a metal, typically aluminum or iron, supplying an electrical current through. Followed by the phenomenon of hydrolysis producing flocs, which destabilize, add suspended particles and absorb dissolved pollutants.

The electric current provides the energy that triggers a series of chemical reactions, the end result of which is the stability of the polluting molecules. When stabilized, it generates less colloidal and less emulsified or soluble solid particles. When this occurs, the contaminants floating material, facilitating its removal through the floating sludge evacuation duct. For its part, the bottom sludge comes from the metal ions that are released and dispersed in the liquid medium and must form metal oxides that electrically attract the contaminants that have been destabilized and are removed by the sludge evacuation duct.

Electrocoagulation system.



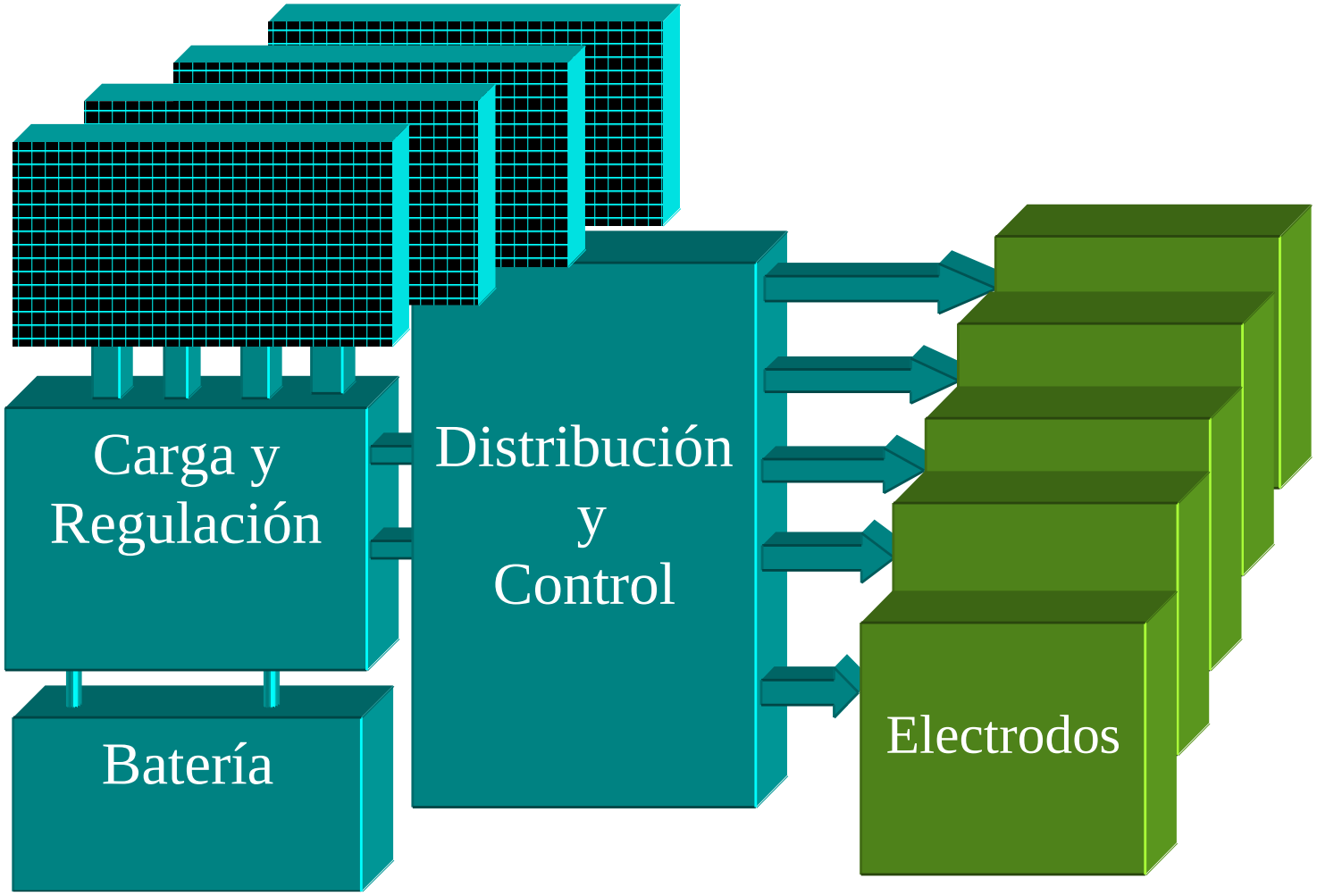
Methodology

The photovoltaic power system must supply a load that demands 10, 20 and 30 Volts at 1000 mA, in periods of 30, 60, 90 and 120 minutes. The power source must provide the necessary and sufficient energy required by the loads, both with incidence of light and in the absence.For this, the current demand of the loads is calculated and the solar panels are dimensioned.

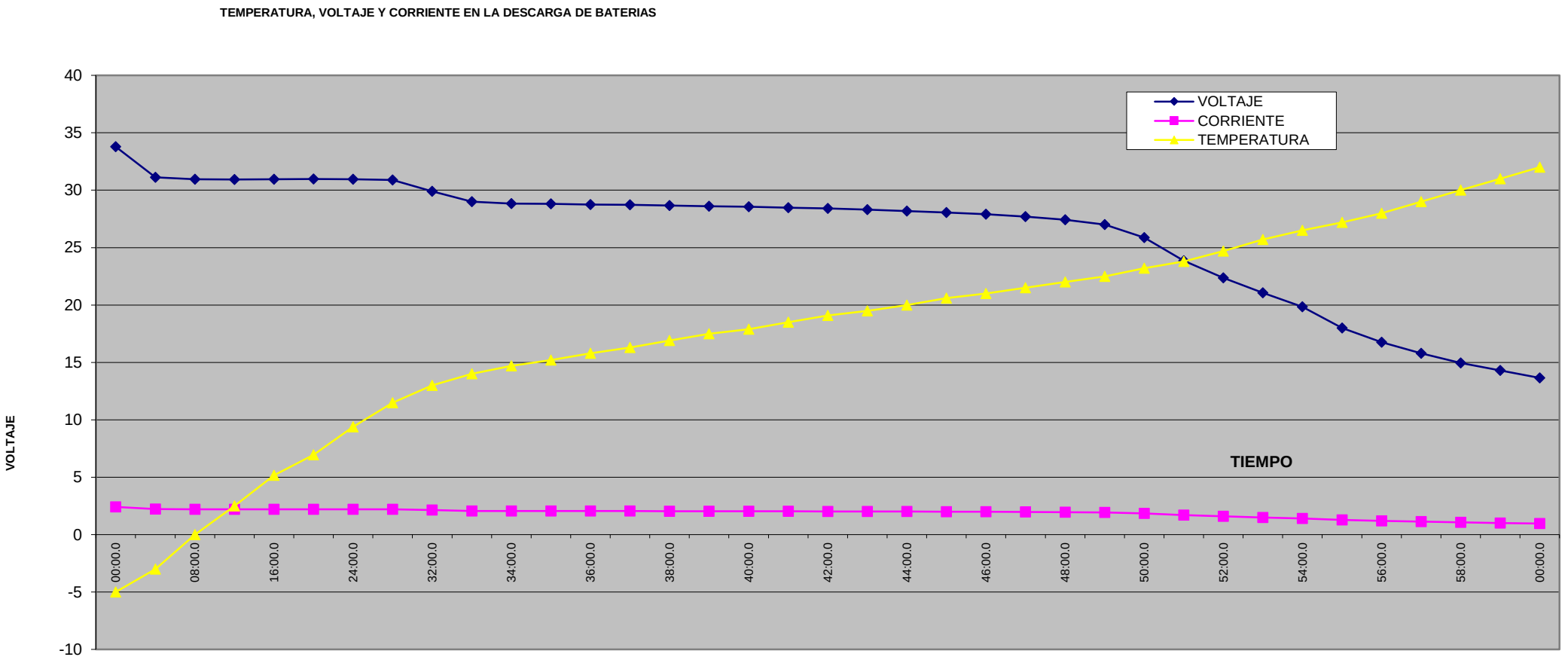
The power subsystem is basically constituted by the elements presented in figure 2, these are:

- A primary source of energy, such as direct solar radiation.
- A device for converting primary energy into electrical energy.
- A device for storing electrical energy to meet demands in case of overloads or hours without light. • A system for conditioning, charging, discharging, regulating and distributing the electrical energy generated at voltage levels specified by the corresponding loads.

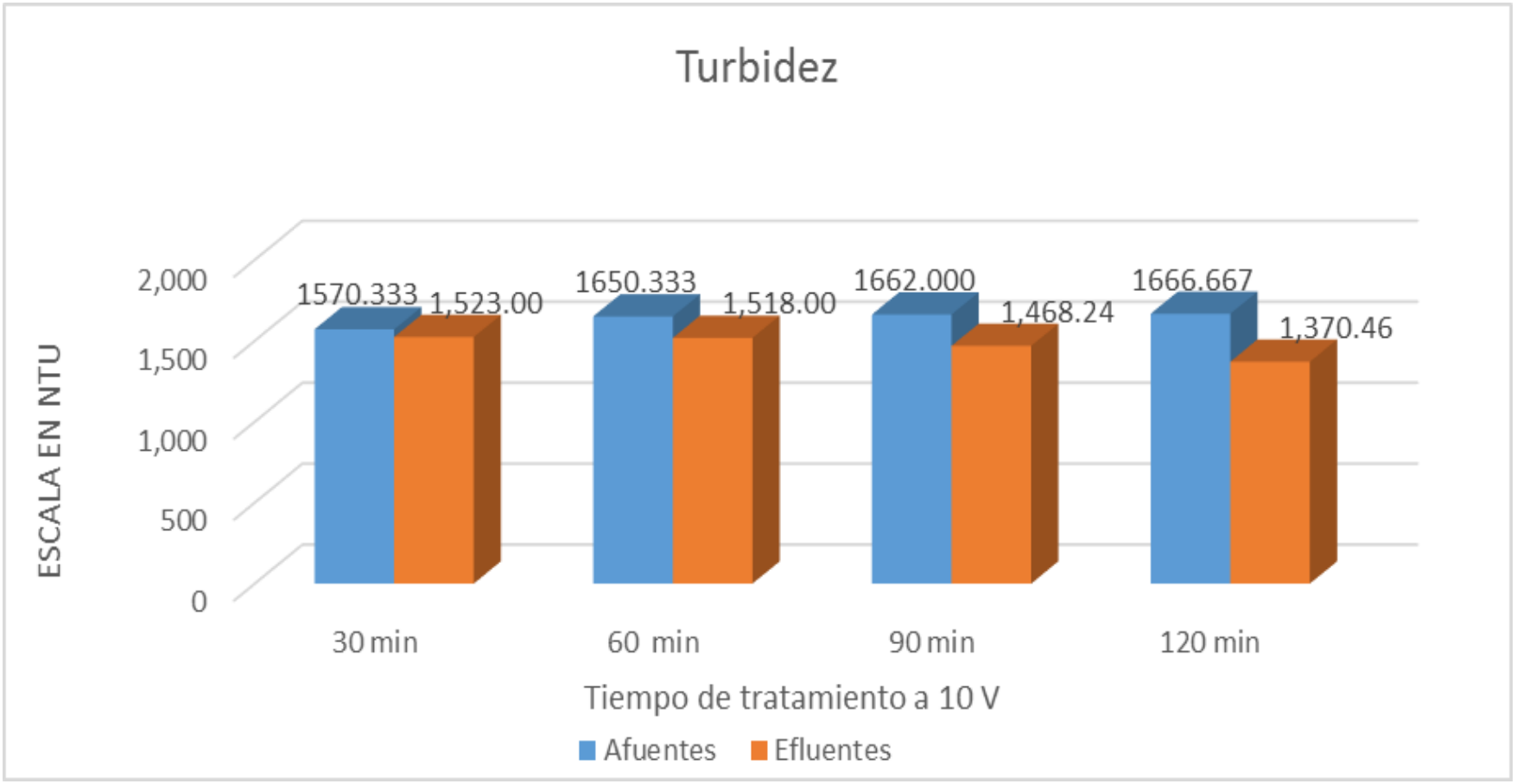
Photovoltaic solar power system and electrocoagulation cells



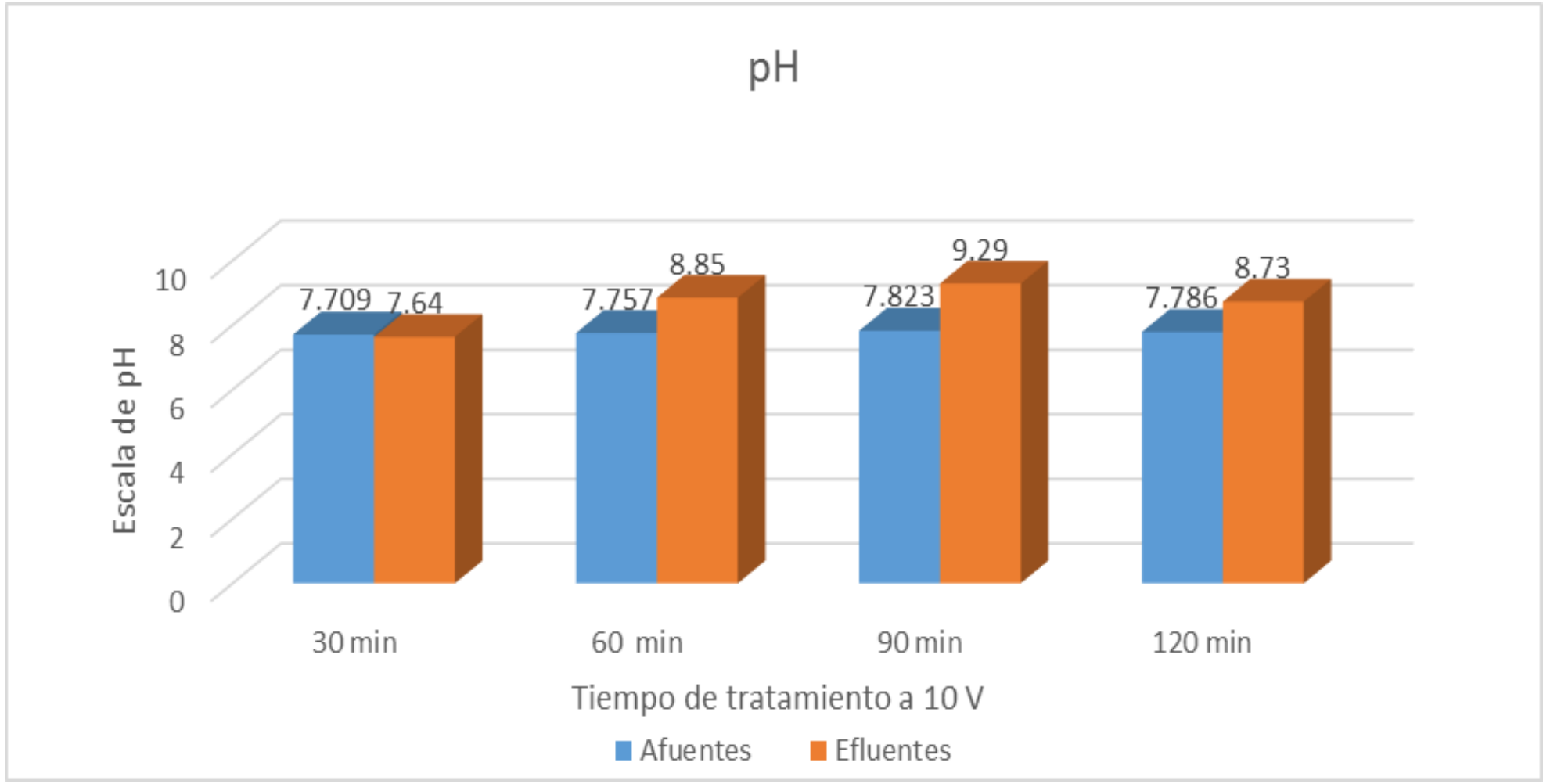
Results


TEMPERATURA, VOLTAJE Y CORRIENTE EN LA DESCARGA DE BATERIAS
VOLTAJE
TIEMPO
VOLTAJE
CORRIENTE
TEMPERATURA
40
35
30
25
20
15
10
5
0
-5
-10
00:00.0
08:00.0
16:00.0
24:00.0
32:00.0
34:00.0
36:00.0
38:00.0
40:00.0
42:00.0
44:00.0
46:00.0
48:00.0
50:00.0
52:00.0
54:00.0
56:00.0
58:00.0
00:00.0

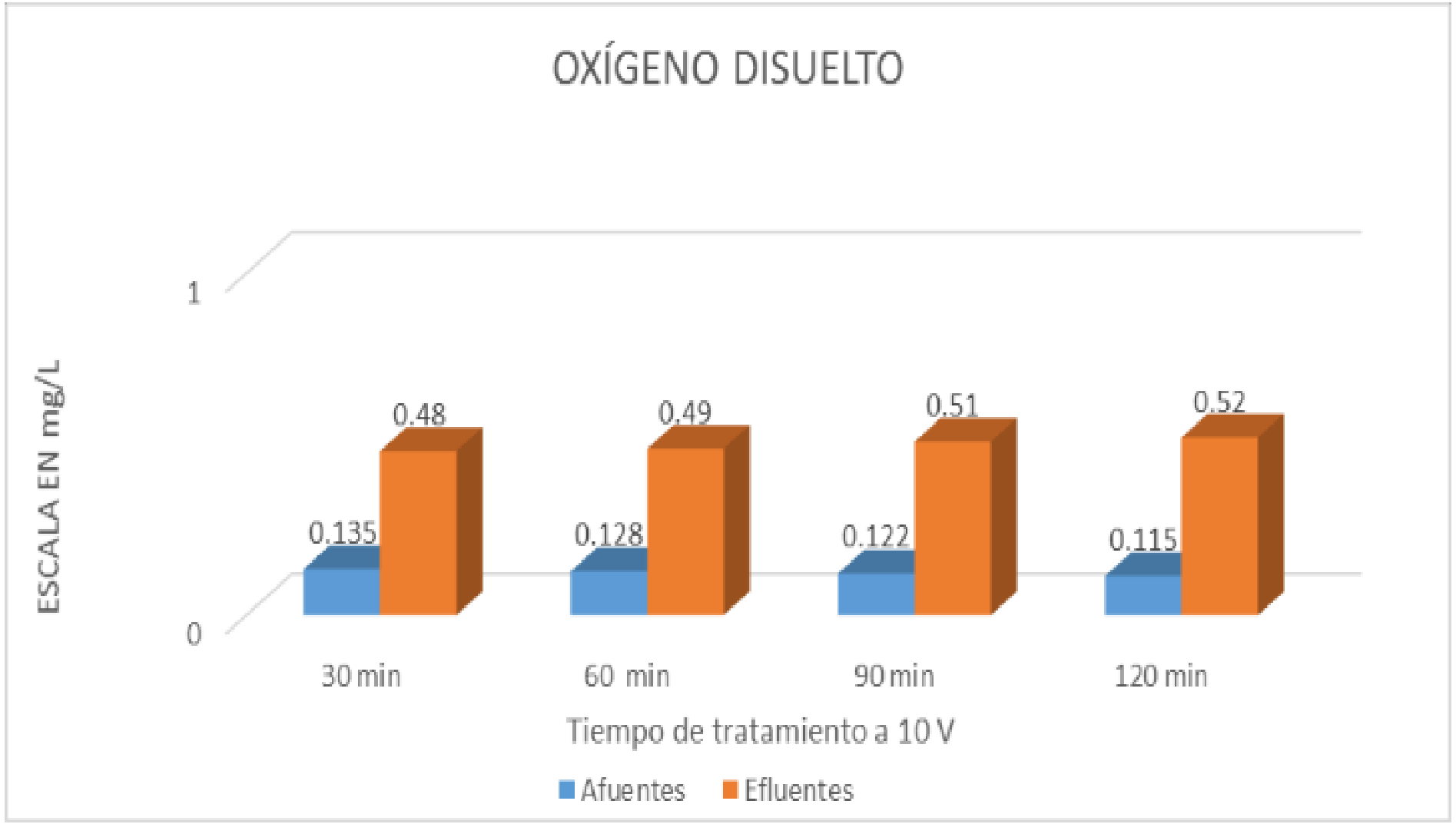
Comparación de mediciones de afluentes y efluentes de la Turbidez, aplicando 10 V



Comparación de mediciones de afluentes y efluentes de la variable pH, aplicando 10 V



Comparación de mediciones de afluentes y efluentes de la variable pH, aplicando 10 V



Conclusions

In this work, a photovoltaic solar power supply is presented for the application of an electrocoagulation module considering the use of commercial components with extended range characteristics, since it is planned to have a useful life and functionality. Using rechargeable batteries with the fast charging feature allows you to take advantage of the ability of these batteries to convert excess charge and recycle it when charged at a rate between 0.5 and 1.5C. There are other materials that make solar panels more efficient, but their cost is much higher and the improvement in energy collection does not represent a significant improvement.

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