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APPLICATION OF PINCENTS OF SPINAL LEAF (CHLOROPHYLLE) AS A NATURAL DIE FOR PAINT SENSITIVE SUN ELEMENT (DSSC)

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ABSTRACT

This study examines the history of the creation of dye sensitized solar cells (DSSC) and the principle of their action. The materials from which these solar cells are made and the technology for manufacturing layers in them are given. Processes of generation of electric charge, potential and electric current in DSSC are investigated.

KEYWORDS: *Dye Sensitized Solar Cells (DSSC), Photo Electrode, Counter Electrode, Photo Anode, Electrolyte, Gel Polymer Electrolyte, Highly Sensitive Dye To Light.*

INTRODUCTION

Dye plays a key role in the development of DSSC's high performance. The dye must meet the following requirements, such as strong absorption in the visible light spectrum, proper attachment of the chemical group to be bonded to the semiconductor, and the ability to inject electrons into the semiconductor surface [1] DSSC previously used a ruthenium (II) polypyridine complex as a sensor for semiconductors, but the high cost and complexity included metal and contamination. Another method is to create a solar cell by scattering the natural flowers of fruits, plants and leaves (DSSC). Natural dyes play an important role in collecting sunlight and converting solar energy into electricity [2-3]. Some fruits, plants, flowers and leaves were of different colors and contain many pigments that can be easily extracted and then used as

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sensitizers, while most green plants contain many pigments. Chlorophyll, which helps absorb photons from sunlight, and anthocyanins (red-purple) that color fruits and plants, absorb light in the 520–550 nm wavelength range [4, 5], tannins, and carotene. Chlorophyll can absorb red, blue and magenta light and take on color by reflecting green waves. Strong absorption peaks in the visible region at 420 nm and 660 nm, which can be used as natural sensitivity in the visible range [6]. The chemical composition is close to hemoglobin. The biological property of chlorophyll is that it absorbs light energy and converts it into chemical energy of organic matter.

2. MATERIALS AND METHODS

2.1 Technology of preparation of natural dye.Dye of Chlorophyll

5g of spinach is crushing using mortar into small size. 10 ml of ethanol is added into the spinach and is placed into the ultrasonic cleaner for 15 minutes with the frequency of 37 Hz using Degas mode for extracting chlorophyll process. After that, enter the solvents into a centrifuge machine for 25 minutes with 2500 rpm. All process has shown in Fig. 1

FIGURE1: Optical images of the extracted dyes ,xlorofil.

2.2 Measurement method.

The efficiency of highly sensitive solar cell dyes depends on the optical properties of the dye, and it has been found that the light absorption efficiency of dyes depends on the type of dye. To do this, using a Mettlertoledo (UV5Bio) spectrophotometer, we investigated the dependence of the efficiency of light absorption by dyes on the wavelength of incident light using light beams with a wavelength of 350-1000 nm. was found.

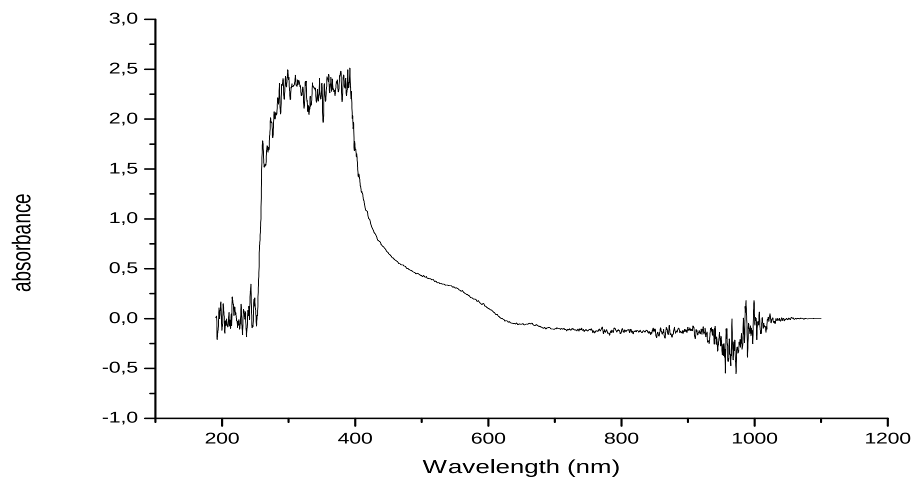

FIGURA. 2 shows the UV-Vis absorption spectra of spinach extracted with ethanol (S-Etha).

From Figure 2, the absorption S-Etha can be seen at 410nm, wavelength. The peak of S-Etha assimilation depends on the presence of chlorophyll pigment. Spinach has been found to be rich in chlorophyll, as all green plants contain chlorophyll, which in the process of photosynthesis acquires glucose under the influence of light visible from ordinary organic molecules (water and carbon dioxide). High absorption peak when extracting spinach with ethanol in the assimilation range of 600-700 nm and peak at 410 nm with ethanol shown in Figure 4 below. The band range, which is the photon energy of TiO_2, is related to the wavelength range absorbed, and the network range decreases with increasing assimilation wavelength [7].

CONCLUSION

The natural dye extracts are, generally, a mixture of several pigments. Therefore, the possible reason for the observed differences in sensitization actions of dyes is their varied abilities towards adsorption onto the semiconductor surface. The impact of the different rates of electron transfer from the dye molecule to the conduction band of semiconductor electrode (energy levels alignments) is also reflected. Sometimes, a complication such as dye aggregation on semiconductor film produces absorptive that results in either the non electron injection or the steric hindrance preventing the dye molecules from effectively arraying on the semiconductor film. This leads to the weaker binding and greater resistance, resulting in the low output of cells. Addition of appropriate additives for improving Voc without causing dye degradation might result in further enhancement of the cell performances. Hence, though photocurrent densities, photo voltages, and

IPCE obtained with these dyes are somewhat low, they are quite useful for their no toxicity, greater availability, and very low cost of production opening up a perspective of feasibility for inexpensive and environmentally friendly dye cells.

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