Original Article

Monitoring Textile Waste Water Treatment Using Natural Resources

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Abstract

The wastewater outlet from the textile industry is a dangerous threat to Erode and other nearby districts and causes environmental and health-related problems in human beings. To resolve this issue through the water purification process by chemical dyeing absorption and dissolved solvent absorption with softening properties. Most of the wastewater is released underground or in the river arises major form of water pollution. Here, to reduce the harmfulness of the waste water out from the industry, an attempt is made through natural resources like drum stick seeds and Canna Indica plants are used to improve the TDS and pH properties of releasing wastewater. The result shows the abrupt TDS reduction in the value of outlet water.

Keywords: Natural Resources, Dissolved Salts, Water Pump.

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Introduction

The main purpose of the textile industry is to maufacture cloth with naturally available raw materials. Most textile industries use cotton and wood pulp as major raw materials. In many textile industries, water is not recycled and they are directly sent to the river causes environmental and health-related problems. To stop this, wastewater from the textile industry is purified with naturally available resources before dumping. Initially, the textile industry uses naturally available things for the dyeing process later on it turns into a synthetic process. To make 1kg of cotton nearly two hundred litres of water is employed in the synthetic process of dyeing and printing process. The steps followed in the textile industry are despising, mercerization, bleaching, neutralization, dyeing, printing, and finally finishing as yarns. The yarns are weaved into the cloths and after that, it undergoes several wet processes like singeing and scouring. Dyeing is an important process in the textile industry for applying colour to the cloth and finally finishing process will be done.

Existing Method

Currently, electro coagulation process is used to purify the waste water. Coagulation used to remove unwanted consistent which are more difficult by filtration process. Many countries suffer from water shortage, recycle the waste water and use it again for several purposes including drinking purposes. The main contaminant factor in the outlet water level of textile industry to be monitored are Total Dissolved Solids, pH value, Biotic Oxygen Demand, Chemical Oxygen Demand, Dissolved Salts, organic components etc.

Literature Review

Cloth assiduity is one of Asia's most potential artificial sectors, with significant volumes of low-skilled labour available in China, India, and Bangladesh. Because cloth assiduity is a diverse industry with a complex artificial chain in terms of raw materials, procedures, goods, and apparel. The cloth last protects textile goods from bleaching, dyeing, printing, and stiffening during the colourful manufacturing phases (fibre, yarn, fabric, knits, finished particulars). These units are employed in the production of colourful chemicals and enormous amounts of water, and they also produce a high volume of backwaters, which can lead to colourful environmental concerns if not properly treated [1]. Textile colouring processes involve numerous wet treatments and finishing techniques for clothing accessories, and consuming a lot of freshwater sources leads to

environmental pollution [2]. It is examined the way to decrease the total smear in wastewater fed to a high-rate anaerobic digester. Several coagulants, flocculants, and sulphuric acid are used for pH analysis to determine the rate of grease and COD disposals [3]. Recent Technology for the Biological action in Textile industry were reviewed through the discharge of coloured wastewater. Various Chemicals and static auxiliaries are present in backwaters from textile production, dyeing, and finishing operations. Colourful compounds used in various stages for soothing, seizing, and softening lead to materials such as biocides, and dirty repellents found in wastewater [4,11].

Ozone treatment and advanced oxidation process for textile wastewater treatment process revealed better results. [5,8,9]. Sawdust used as adsorbent to absorb contamination in outlet textile wastewater had a maximum of 37 percent junking of Total Balanced Solid, whereas Chemical Oxygen Demand had a minimum discarding of 9. The study found that treated sewage had lower values for all criteria than untreated effluent treatment with sawdust [6,7,10].

PROPOSED METHOD

The proposed design of the hardware prototype model shown in Fig. 1 helps to purify the textile wastewater using natural resources such as drumstick seeds and the canna indica plant. The block consists of ESP32, UV light, carbon and sediment filter, water pump, TDS and PH sensors, and LCD. pH value in inlet and outlet of textile industry processed water monitored through pH sensor, Total dissolved solids measured using ESP32 microcontroller, UV LED for microorganism purification, water pump and relays for necessary functioning. The monitored values of TDS, and pH displayed in the LCD using IoT platform.

Water Pump: Sumergible pumps in general are designed to be completely submerged in the water. Submersible pumps are placed within the force of water that requires pumping out the waste water outlet for purification processing.

TDS Sensor: The Total Dissolved Solids (TDS) levels in water are used to determine water quality. The conductivity of a result is measured by TDS cadence. The conductivity of water is increased by dissolved ionised solids like minerals and mariners. As a result, a high conductivity reading implies a high TDS level.

PH Sensor: It is used to determine the pH range of water between the electrodes for alkaline or acid nature. For the acidic nature of water, the pH value goes below seven and for the alkaline nature, the pH value goes above seven.

Relay: A relay is an electro-mechanical operating switch activated through low voltage energizing the relay coil and thereby controlling the electrical breaking or contacting connections for high power switching applications

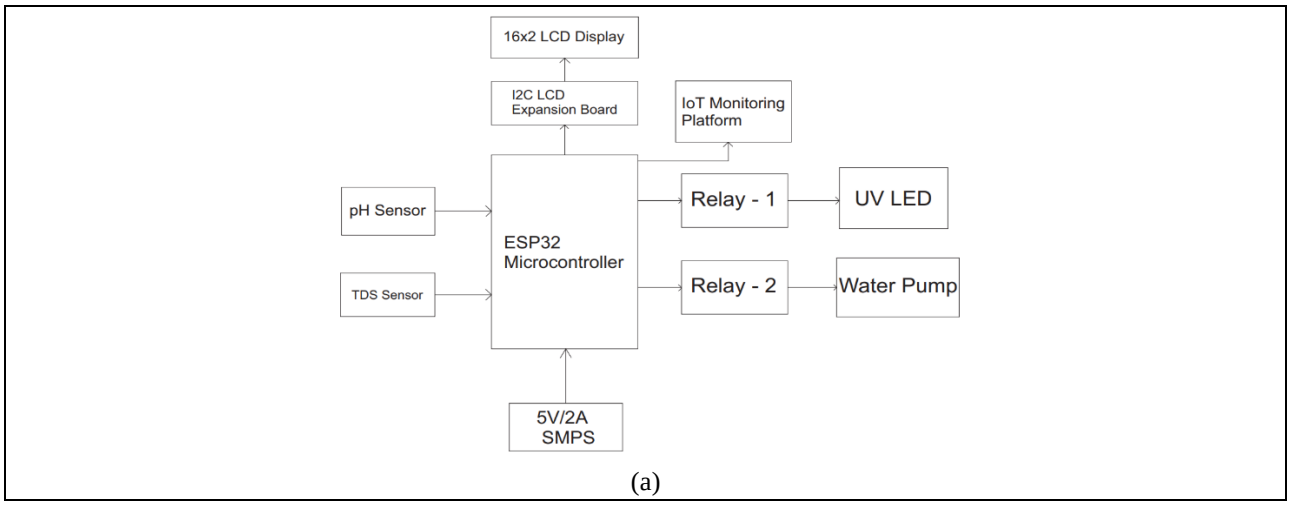
16X2 LCD: It aids in the display of the message's uptake and processing. The user can send an intake message using a keypad attached to the LCD. The keypad is used to start and make halt operations.

Sediment Filter: It is used to remove wreckage and rust from eroded pipes present in wastewater through precipitate would decelerate the watercolour.

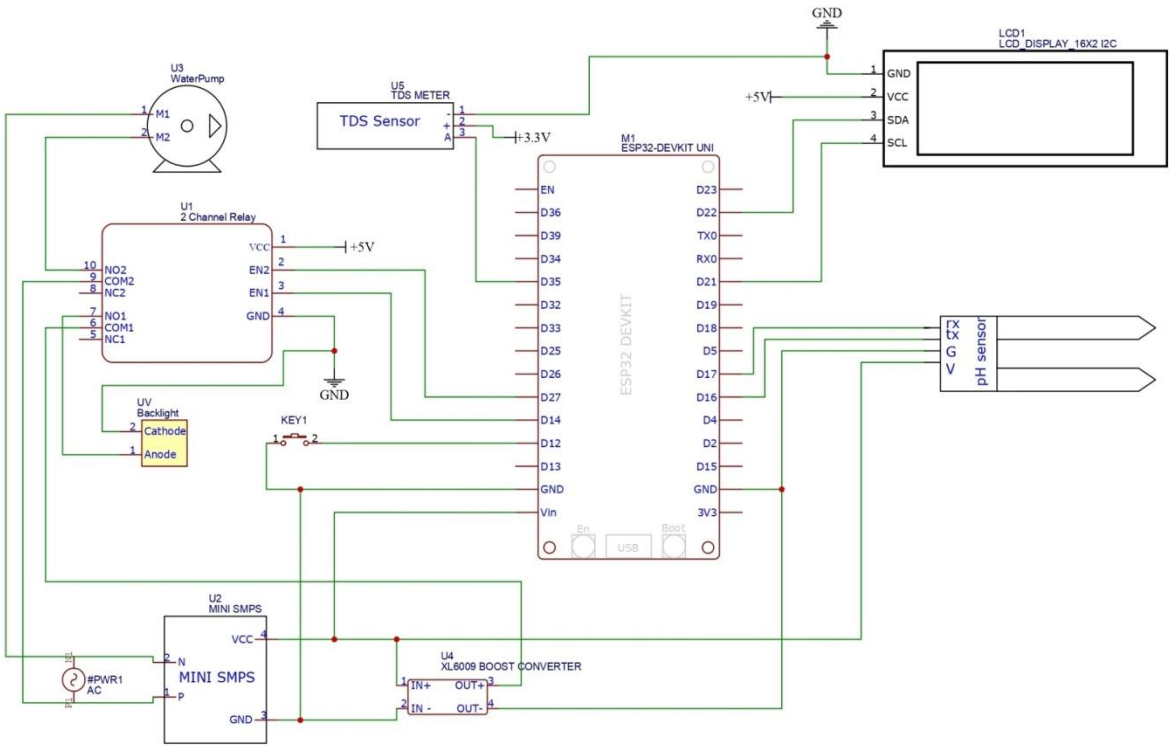
The textile waste water is monitored by using an IOT portal named blynk. The input and output of PH and TDS range of textile wastewater are monitored in IoT as shown in Fig. 2 and tabulated in table 1.

Table 1: Sample Test Report of Textile Wastewater

Sample no	Input values		Output values	
	PH value	TDS value	PH value	TDS value
1.	11.5	760	9.6	230
2.	11.8	800	10.4	410
3.	12.3	900	8.6	320
4.	12.5	940	9.3	360
5.	13.2	960	10.2	280

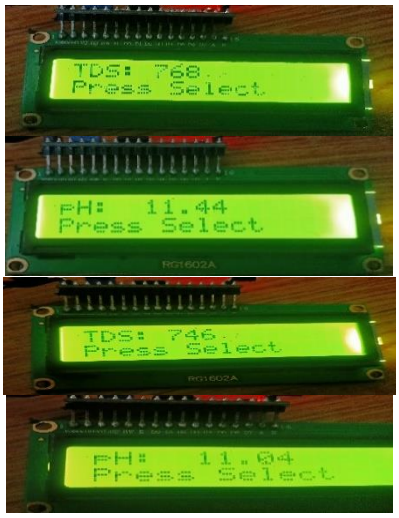


(a)



(b)

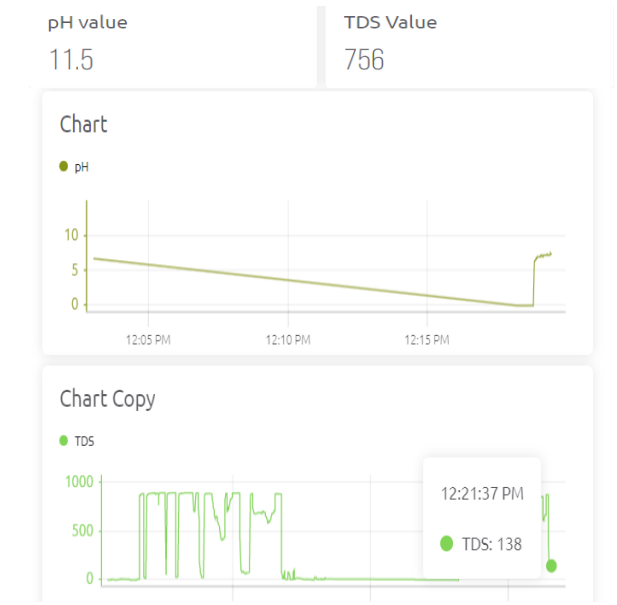
Fig 1 a. Block Diagram b. Circuit Diagram of Textile Waste Water Treatment



Input

(a)

Output



(b)

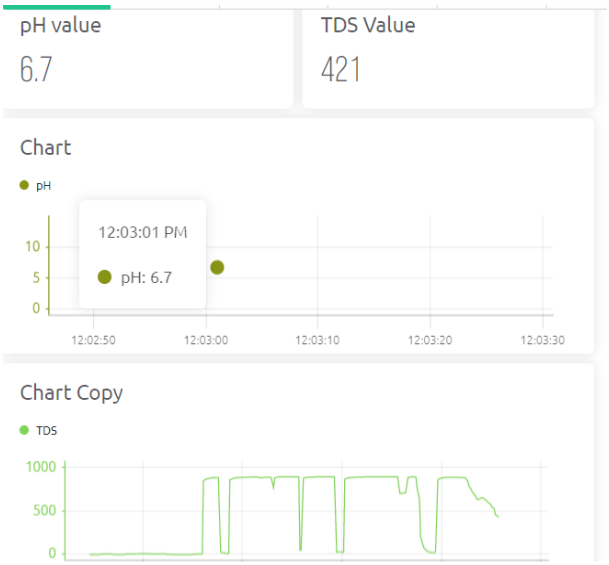


Fig 2 a. Hardware Model b. IoT Data Monitor of Textile Waste Water Treatment

CONCLUSION

The textile wastewater is thrown into rivers and lands, polluting them. TDS and PH range of textile outlet wastewater are monitored in the designed hardware prototype using natural resources to recycle wastewater. Moringa seeds can cleanse water with measured TDS and PH values displayed in the Blynk portal. After measuring the input and output values, the textile wastewater filtration process begins, and filtration is better than unfiltered sources.

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