OXYGEN COLLECTION FROM POLYHOUSE FARMING

P.Kaoushik, S.Pravin Mukkesh,
UG Scholar, Department of Electronics and Communication Engineering
pravinmukkesh@gmail.com, bhuvipartha26@gmail.com,

X.Mercilin Raajini
Associate Professor, Department of Electronics and Communication Engineering
Prince Shri Venkateshwara Padmavathy Engineering College
mercilinraajini.eee@psvpec.in

ABSTRACT

Coming future is expected to face a lot of difficulties for survival .One of the worst-case is the lack of oxygen to use. And the other area we are focusing is the polyhouse farming. The major problem faced here is, their farming was less effective due to the excessive heat inside the poly-house. Due to this, fungus formation takes place and loads to damage of crops. Therefore we are here to produce some solution for oxygen production as well as for the increased income for our farmers. Firstly, we eradicate the problem faced by the farmers in polyhouse farming: several sensors attached and automated to check on humidity, moisture and soil fertility. The sprinklers are automated by motors on the alarm of sensors. Then, during the half-growth of plants, most preferably bamboos; on the indication of gas sensor, the concentrator sucks up the gas inside the polyhouse and filters out oxygen and stores in tanks. The existing oxygen producing methods are not cost effective and involve lots of time and tedious processes. The most important part to be noted in our proposal is that, the oxygen is obtained directly from the natural sources. It takes advantage of the existing farming method without affecting the actual growth but tries to improve its situation with external sensors too.

Keywords: Polyhouse farming, Oxygen Production, Farming method, concentrator.

1. INTRODUCTION

During the Covid-19 period there is a demand for the oxygen cylinder, so we come out with the idea of helping the society, and moreover helping the farmer in the financial wise. There are several methods and ways to collect oxygen! Now we are coming up with another way to filter out the O2 from other gases present in air[1][13-18]. The plants are grown under controlled temperature thus there is less chances of crop loss or damage. You can grow crops throughout the year and will not have to wait for any particular season. There are less pests and insects in a Polyhouse. The project setup is the sensor we are going use in it, like the temperature sensor, moisture sensor, gas sensor and the concentrator which should placed in the correct respective position. So that there won't be any chance of missing place in an acre. The plant growth setup is having sprinkler irrigation for watering the crops by the moisture sensor indication, carbon-di-oxide supply in case there is insufficient of carbon-di-oxide for the crops/plants to inhale, and coolant (DC Fan) which is used to reduce the heat for plants during the day time. The sprinklers and co2 supply are automated by the motor; on indication of moisture sensor. The oxygen present inside the polyhouse is sucked in by the concentrator and it is converted into pure oxygen. Then the oxygen from the concentrator is transferred to the oxygen tanks fitted in the corners of the polyhouse. Now the oxygen tanks are ready for exports which will in turn increase the income of the farmers.

2. RELATED DOCUMENTS

N. Radha, R. Swathika, [8] "A Polyhouse Plant Monitoring and conditions Discovery using CNN" bandied about the oxygen position released by the shops and also impact of reduction in oxygen release from the shops due to colorful conditions. Automated factory complaint discovery ways used to cover temperature, intensity of light, soil humidity position been claimed and proved effectively also this would laterally suppress the onset and spread of conditions at early stage.

Alok Narkhede, Aman Ninave, et al., [2] "A Review on movable Ventilator with erected in Oxygen Generator" talked about the review the working of low cost and cheap ventilators and styles used to produce oxygen from the air for medical purposes. They're making different from the standard ventilator with some backup in it. Like if there's no backup in the case of an exigency similar as failure in the force of oxygen, low position of oxygen in the force, the pressure of air. But the system is expensive and it requires a high conservation.

Adnan Abid, Muhammad Shoaib Farooq, et al., [1] "Role of IOT Technology in Agriculture" bandied the use of the promising technology that's the internet of effects, which helps in working the problem with numerous innovative results to contemporize the husbandry sector. The primary ideal of this methodical study is the collection of all applicable exploration on IoT agrarian operations, detectors bias, communication protocols, and network types.

Kowsikesh Kasavajhula, Kumar Sai Sankar Javvaji, et al., [5] "Prototype Model of Polyhouse Farming Using Sensor and IoT Technology " bandied about the idea of adding the capitulate from the agrarian sphere by enforcing end- end result to control parameters similar as temperature, moisture, soil humidity, CO2, light intensity, downfall, tank position etc. This work is also concentrate on rain water harvesting. The data from the detectors was analyzed using pall garçon and subscriptions are transferred to the end druggies using GSM and Android app. It's observed that yield was increased with high quality and optimal resource application.

Shubhangi Bhosale, Dr.S.S.Sonavane, [19] "Automated monitoring and controlling of Polyhouse Environment" bandied about the idea in concentrating in the irrigation system for a controlled and covered as per soil humidity data. To maintain Polyhouse in a terrain through web technologies rather of any kind of mortal commerce. They've made it in a total robotization through soil humidity detector and it sends the data to the pall. They've idea of maintaining proper soil nutrient by checking the PH and EC, where the PH can be checked through the growing substrate measures the vacuity of micronutrient and EC covering swab attention in media[21-23].

Neelu Jain, Vikas Sharma, [17]"Polyhouse Cultivation Using Embedded System-A Review" said the uses of the automation system with the crucial parameters like temperature, humidity and water level necessary for the growth of plants can be maintained automatically. In this paper different techniques of Polyhouse Cultivation have been tried and compared with the previous one of it. The polyhouse cultivation is the thought process of combining the technology with the agriculture.

3. PROPOSED SYSTEM

The overall armature is shown in figure 1. As we can see the detector, where the detector are used and the sprinkler is placed as well as, the concentrator used in it. The sprinkler irrigation for soddening the crops by the humidity detector suggestion and the carbon- di- oxide force is used then in case when there's inadequate carbon- di- oxide during the process concentrator sucks the air which is trapped in the polyhouse. Also from the air smelled in the concentrator separates out the pure oxygen from that we get 90- 95 of pure oxygen. According to the analysis, some of the major problems faced are, less effective planting due to the inordinate heat inside the polyhouse and indecorous preservation. They're able to control the

heat, but aren't suitable to calculate the needed quantum of humidity demanded for this. Due to this, fungus conformation takes place and loads to damage of crops.

In addition, the polyhouse act as unrestricted area similar that no air can escape out temporarily, from time to time. The complete polyhouse is been automated for an effective civilization and also for the collection of oxygen. For the regular watering of shops, sprinkler irrigation system is used. To know the accurate changes of temperature and humidity inside the polyhouse, we make use of the detectors like humidity detector, moisture detectors, etc. Soil water content is the driving force for factory growth. When the water content in the soil is fairly high, the water in the factory will enter the body of the factory through the membrane of the root system, accompanied by a large number of inorganic nutrients in the soil. Humidity Detector is recommended to choose a soil detector with a pristine- sword inquiry, which can be fitted or buried in the soil for long- term monitoring without fussing about damaging the detector. The soil humidity detector is connected to a regulator. When it detects that the soil humidity is too low or too high, the monitoring platform labors a signal to the regulator to control the drip irrigation on or out. Carbon dioxide is one of the raw accoutrements for photosynthesis of green shops, and 95 of the dry weight of crops comes from photosynthesis. Thus, carbon dioxide has come an important factor affecting crop yields.

The hot house has been kept unrestricted for a long time, causing the air in the room to be fairly blocked and unfit to replenish carbon dioxide in time. The stoner needs to install it according to factors similar as the area of the greenhouse. However, druggies can install the outfit in the Centre of the hothouse, so that only one device can cover the overall terrain in the hothouse, if the hothouse area is fairly small. However, the stoner needs two or further bias to cover the entire hothouse, if the area of the hothouse is fairly large.
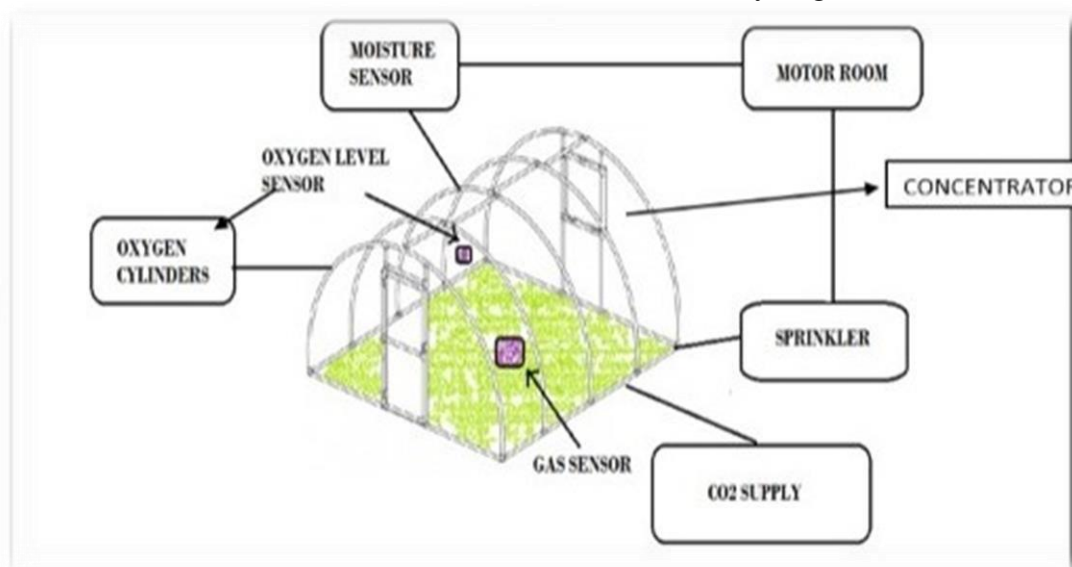

Figure 1. Overall architecture
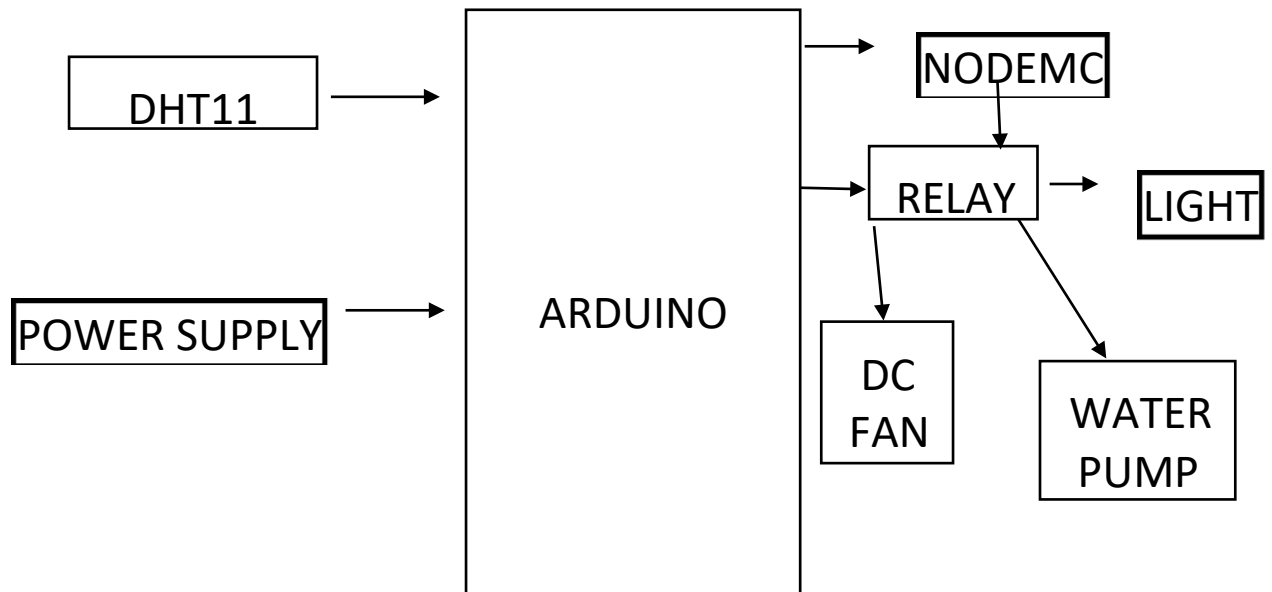
Figure 2. Structure of the Arduino UNO

In the figure 2 structure of the Arduino UNO we are using for the automation of the Polyhouse. The Temperature is used as the sensor for measuring the temperature. If the temperature is below the set point the light will be on for heating purpose. If the temperature is above the set point the DC fan will turn on which only work on the DC supply. The DTH11 is used as the humidity sensor which measures the humidity of the polyhouse. When the humidity is less than the set point the motor will be turned on. This will feed the water to the polyhouse through the pump. The LDR is used for the measurement of the light which is connected to the light. The readings of the sensors are stored in the IoT cloud through the Wi-Fi module which is connected to the Arduino.

The plants growing inside the polyhouse will release oxygen during the day and it will take in Carbon dioxide for photosynthesis[19-21]. Thus, the released oxygen will be stored safely inside the polyhouse unless, it is subjected to open doors. Thus, our idea is to trap this oxygen and store it in cylinders and make it an additional income to farmers. Oxygen cylinders will be fitted at the corners of the polyhouse. For the supply of additional carbon-di-oxide for effective usage, additional arrangements will be made by fitting the carbon-di-oxide tanks outside the polyhouse. The oxygen released by the plants contains 5 percent of nitrous oxide which is harmful for humans to breathe. For, this purpose we are using an Oxygen concentrator which is used for separating oxygen from other gases in the atmosphere. The figure 3 explains the working principle of concentrators. Thus, this oxygen concentrator will separate oxygen from harmful nitrous oxide and provides pure oxygen and this oxygen gets stored in the oxygen cylinders via a tube.

Thus, the air inside the polyhouse is sucked in by the concentrator and it works on the separation of oxygen from other atmospheric gases and produces pure oxygen and this pure oxygen is transferred to the oxygen cylinders via tube.
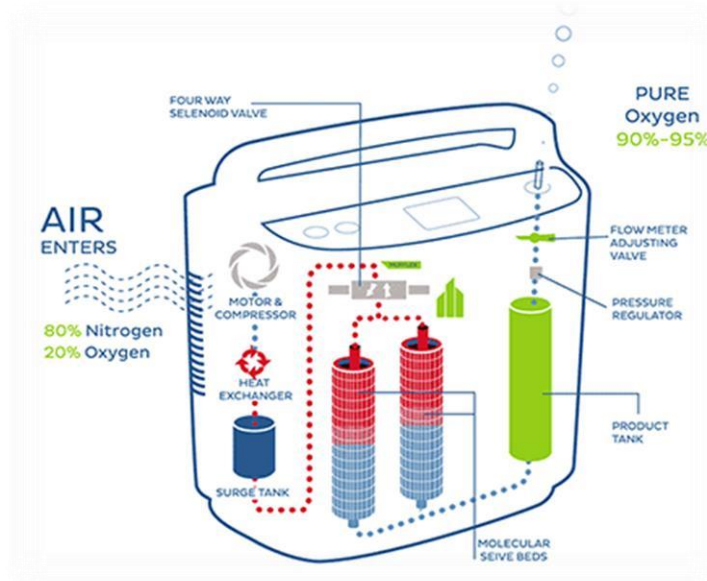
Figure 3. Work flow of the Concentrator

This oxygen cylinders are placed with a level sensor, so that it will detect the amount of oxygen that get stored in the particular cylinder. The figure 4.10 shows oxygen cylinder used by the human. Thus, eventually it will take 3-4 months for the oxygen cylinders, which are subjected to various market use.

4. RESULTS AND DISCUSSION

The polyhouse was fully automated and the temperature and moisture values are being continuously monitored. The Sensors are programmed in such a way that it will indicate farmers the various situations. The outputs of the programmed sensors are in graph form.

Figure 4 Temperature Values

The graph here shows the data of the temperature and humidity value which is measured in the polyhouse for the plants to be maintained in growing conditions. The figure 4 and 5 shows the temperature values and the humidity values respectively.

Figure 5 Humidity Values

The graph here presents the information of the soil moisture values which is maintained in the inside polyhouse to make sure the plants getting enough water for their growth. The figure 6 shows the soil moisture values.

In addition to this a motor pump is added inclusively and it is programmed in such a way that when the moisture value in soil goes below a certain rate, it will automatically assist the motor for effective irrigation. Along with this for controlling the temperatures inside the polyhouse a DC fan and AC lamp has been installed.

Figure 6 Soil Moisture Values

The figure 7 is the picture is the model polyhouse which is made for project in one square feet and made three rows and planted the crops.

Figure 7 Model Polyhouse in 1 Sq.\feet

After this, the concentrator sucks the gas inside the polyhouse and separates nitrous oxide and produces pure Oxygen. Thus, this pure oxygen is being transferred to the oxygen cylinder and gets stored and used for later purposes. The figure 8 is the output of the project as the oxygen coming out of bottle can be seen is as follows.

Figure 8 Oxygen collection from polyhouse

This is an approximate value which is referred from a survey by Mr. ROBERT RISTER, an author of healing without medication, has mentioned in his Journal, that an average plant exhales 5ml of oxygen per hour. Thus by calculation, 60ml of oxygen can be released per sq.m.

SIZE OF THE POLYHOUSE	NO.OF PLANTS	COLLECTION OF OXYGEN
One acre(having three rows)	10000-12000	50000-60000 ml
Model polyhouse(having three rows in 1 Sq.\Feet)	10-12	50-60 ml

5. CONCLUSION

The main outcome of this project is to improve the purity of the oxygen as well as the making the farmer to grow in the beneficiary way to boost their income. In this way the people in the world will be benefited in getting pure oxygen which improves their concentration, reduce the stress and get relief in better sleep. Also that the farmer getting increase the yield and improves the quality of crops and minimize climate for the crops by monitoring. By following the above methods both the farmers and people will achieve healthy environment. Hence the outcome welfare everyone.

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