

UV Sani - Tech

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Abstract— In this Corona Pandemic, whenever we go to any public places like Airports, Hospitals, Theaters, Banks, Offices, Malls, Markets, sanitizing our hands is necessary. But most of us don't sanitize our routine accessories like Money, Smart phones, Watches, Masks which can also cause spreading of virus. So for this purpose we are introducing our project UV SANI-TECH. This project can be used at entrances of public places. We usually sanitize our hands before entering any public place so at the same time by placing our accessories in UV Box we can disinfect it in just 40 to 50 seconds.

Keywords: UV-C Light, Arduino, UV Germicidal

I. INTRODUCTION

Sanitization + UV Rays Technology = UV SANI-TECH
Ultraviolet Light between 200nm to 280nm wavelength in EM Spectrum known as Ultraviolet C (UV- C) Rays. UV-C Rays of wavelength 222nm are suitable enough to kill bacteria and viruses without harming human skin, eyes or tissues [1].

But we are using UV-C Tube Light of wavelength 254nm because 222nm UV-C Lights are not easily available on local/online market for casual use. 254nm UV-C Tube Lights are usually used in water filters. Not disinfecting our routine accessories when we are at public place may increase the spreading of virus.

Our objective is to disinfect accessories from all types of virus/bacteria using UV Rays in minimum time without any harm.

II. RECOGNITION OF PROJECT

We are making a UV box in which we can place our infected objects and these objects will be exposed to high intensity UV light for few seconds this will lead disinfection of that object [2].

We are using Arduino UNO for timer, Relay and Push buttons to control timer, to display time LCD is used, LEDs are used for indicators. Also our system has security precaution, when we close UV box door then only UV lights turn ON.

III. BLOCK DIAGRAM

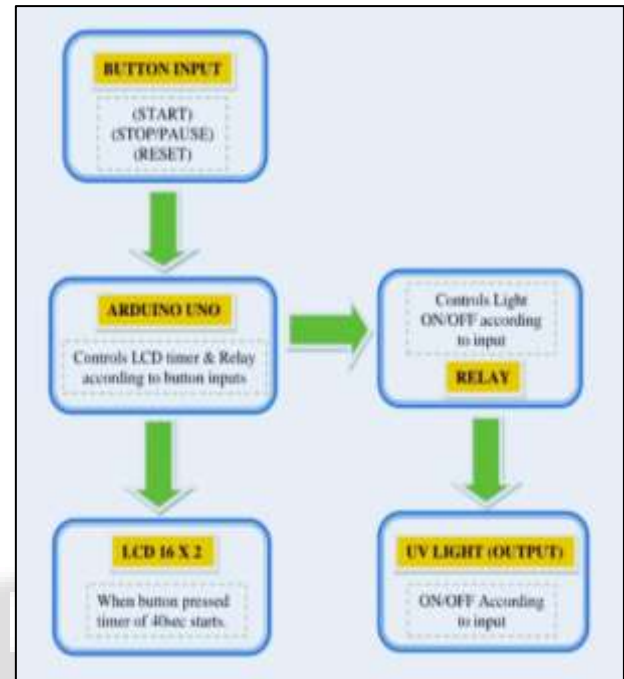


Fig. 1: Block Diagram of UV SANI –TECH

A. Block Diagram Description

In Fig.1 five blocks are shown, these blocks play important role in order to work project.

First block is Button Input. In this block three buttons are present START, STOP/PAUSE, RESET. These buttons use to give input start, stop/pause, reset to the UV Light and Timer.

Second block is Arduino UNO, it controls the timer and UV light according to button inputs. It sends instructions to the relay to ON and OFF. Arduino generates timer according to button inputs.

Third block is LCD display, it is used to display timer. It has default timer of 40 sec. When we press start button timer will start from 40 sec in descending order.

Fourth block is Relay it plays important role in turning ON and OFF the UV light. By pressing Start and Stop button relay turns ON and OFF the light.

Fifth block is UV light it turns ON and OFF according to Button input for specified time. After 40 seconds lights will turn OFF. If anyone open box door between sanitization process, then UV lights will turn OFF immediately. Lights will turn ON only when box door is closed.

IV. CIRCUIT DIAGRAM

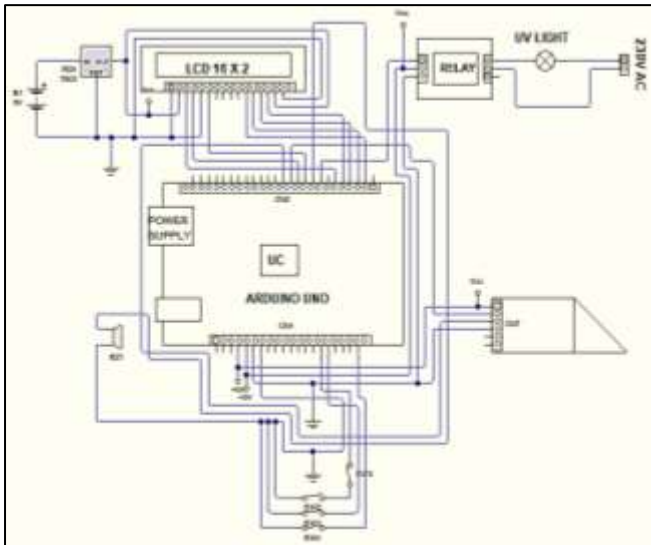


Fig. 2: Circuit Diagram of UV SANI-TECH

A. Circuit Diagram Description

Fig. 2 shows the circuit diagram of our project. Arduino, LCD display, Relay, Switch buttons, UV lights are the main components of our project.

Arduino acts as a timer generator and it provides the button input signal to the relay to turn ON and OFF the UV lights. LCD is connected to Arduino; it display the timer generated. Default timer is of 40sec, when timer runs off at same time lights will be OFF.

Relay is important as it switches to ON and OFF according to button input and controls UV light. Buttons provide input to Arduino to turn ON and OFF the lights. Buzzer is indicator of Timer end. UV lights will require AC 230v mains and Arduino required DC power of 5V.

Fingerprint Recognition scanner is added in project for safety/security purpose. It requires power of 5V from arduino. When we switch ON power supply then only by scanning a authenticated fingerprint we can use this project.

V. RESULT

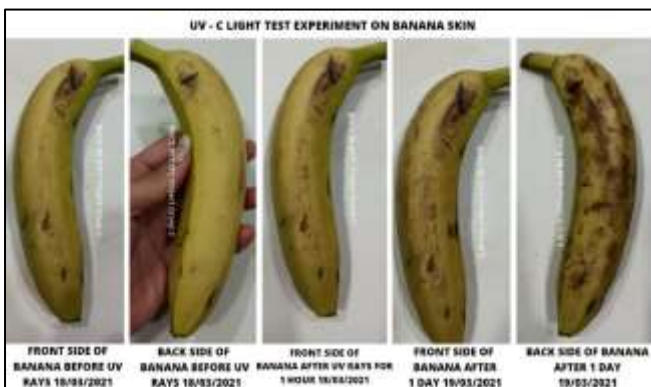


Fig. 3: Resulting Effect of UV Rays on Banana Skin in UV SANI-TECH BOX

A. Observation

Fig. 3 shows the results we get after putting banana in uv sani-tech box for 1 hour [3].

First image shows front side of the banana skin before uv rays.

Second image shows back side of the banana skin before uv rays.

Third image shows front side of banana skin after expose to uv rays for 1 hour. We don't see any difference but bacterias on banana skin are killed we can see that in next image.

In fourth image you can see after one day front side of banana is not that much black compare to back side of banana in Fifth image.

B. Result Explanation

We know that if we don't eat banana or keep it as it is for 1 day or more than 1 day then its skin turns black. This is because the germs and bacterias are actively present everywhere and so, on banana too. Germs are present on banana.

When we put banana in UV SANI-TECH it kills all the germs presnt on front side of banana skin. So it took 1 day for germs to spread/grow again on front side of banana. But on back side of banana, germs were not killed and already present. This is why back side of banana is more black compared to front side.

VI. ADVANTAGES

- UV-C Light rays can kill all types of germs/bacterias/viruses.
- In UV SANI-TECH you can clean accessory of any size & colour (bags/purse etc.) in minimum time.
- For safety reasons UV-C Light will turn ON only when box door is closed.
- Fingerprint Recognition is used in project for safety/security reasons.

VII. DISADVANTAGES

- The UV-C Light we are using in project have wavelength 254nm which is mostly used in water cleaning process; these lights are more effective in water.
- Direct exposition of human tissues, eyes, skin in UV-C light is harmful.

VIII. FUTURE SCOPE

Presently, We can use this project at public place entrances with precautions and safety instructions. We are using UV Rays of 254nm wavelength in project because these UV lights are available at markets with affordable price. But these UV rays of 254nm wavelength are harmful to human tissues, skin, and eyes so by taking precautions and alertness we are building this project.

In future upgradation we can use UV-C Light wavelength of 222nm which is not harmful to humans but it can effectively kill germs. So that we can use this project even for domestic purpose.

222nm wavelength UV Light is not easily available in local/online market for project use.

IX. CONCLUSION

We are pleasure to conclude our project on the topic “UV SANI-TECH”. The detail of this project has been made by members of our team sincerely with the inspiration of our tutors.

Through this project we have done disinfection of accessories using UV-C tube lights. For controlling counter of 40-50sec arduino, LCD, relay is used. Fingerprint scanner is used for security and safety purpose.

The result we are getting from that we can conclude our project is enough to kill germs present on objects/accessories in 40 to 50 sec and our UV-C rays tube lights are working fine.

REFERENCE

- [1] The Indian Express, “New research: Killing coronavirus with ultraviolet light, without harming people”, September 2020.
- [2] The Japan Times, “Tests show UVC lamps could light the way in coronavirus fight”, May 2020.
- [3] Stefano, “The Green Banana Test”, May 2020.

