**A UNIQUE HAND SANITIZER MACHINE.**

The world at large is in a covid 19 virus pandemic. The covid 19 pandemic has caused many deaths of people, declined economy and rendered many people across the world to become jobless.

A variety of methods have been employed to fight the pandemic globally which include, proper and regularly washing of the hands with soap and clean water or hand sanitizing with more 70% alcohol based sanitizer.

Regular washing of hands with clean water and soap has been a challenged especially to the poor countries or areas where there is acute water shortage. The world currently is facing water stress and water shortage.

Hand sanitizer on the other side is very expensive and many people cannot afford them. The alcohol in the current sanitizer is not reusable as it evaporates on air after using.

Due to this we have come with a unique hand sanitizing machine that is simple, easy to use, uses available local material, automatically prepares the sanitizing liquid and recycles the alcohols back into the system after a person has sanitized the hands.

#### The unique hand sanitizer machine consists of an ethanol processing unit, hot air spayer, heating coil, sanitizer sprayer, condenser, [Light Dependent Resistor LDR,green and red LED bulbs connecting wires ATMega328P Microcontroller,12V dc power supply and the frame.](https://www.electronics-notes.com/articles/electronic_components/resistors/light-dependent-resistor-ldr.php" \t "_blank)

200 ml of 40% glucose solution and 0.5g of yeast is put in the ethanol processing unit then tightly closed. The power is then switched on.

. At this unit glucose and yeast ere regulated at optimum temperatures of 32˚C-35˚C for 24 hours to produce ethanol through anaerobic respiration. After 24 hours the heating coils increases their temperature to 100˚C through time sensor. This causes the ethanol formed during the fermentation to evaporate when the temperature reaches 78˚C. The ethanol vapours are tapped into a condenser where they are converted into ethanol liquid. The ethanol is mixed with glycerin and hydrogen peroxide in the ratio of 8:2:1. This forms 70% alcohol sanitizer. The sanitizer then flows to a storage tank.

The machine again consist of sanitizer sprayer and hot air sprayer. When one places hands inside the machine it automatically spray the sanitizer on the hands for 30 minutes, afterwards hot air of temperature 40˚C is sprayed to dry the hands. When the red LED lightsturns green the person can remove the hands from the machine, as they are properly sanitized and dried. The hot air dries the hands and evaporate the ethanol from the hands into a second condenser. The condensed ethanol is tapped back into the storage ethanol tank to make another sanitizer. Through this the ethanol is being recycled and reused after every sanitizing exercise.

It is observed than 20ml of ethanol is produced from 100ml mixture of glucose and yeast.

It is also observed that 5 ml of ethanol is recycled for reuse after every a single sanitizing activity from one person.

In conclusion this machine will promote effective hand sanitize to reduce covid 19 virus transmission. The machine will also reduce dependence on water to wash hands as many places cannot access clean water.