# Automatic Glucose Water Dispenser Based on Solar Energy

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*Abstract*: -- This paper presents the description of automatic glucose water dispensing machine that will operate on solar energy. This machine works on coin detection technique and is designed for multiple coins. The machine will provide the standard quantity and also various quantities for various coins (customized). This machine is designed using the 89c51 microcontroller. It will be energy efficient machine as solar energy is used and will serve the purpose for providing energy drinks at different places like hospitals, commercial buildings, railway stations, bus stop, etc. it can prove to be of great use and user friendly.

*Index Terms* – CRU, keyboard, microcontroller, LCD, solenoid valve.

## I. INTRODUCTION

Now a days there are machines that operates on coin and dispense the water but our aim is to provide customization and dispense not only water but mixture of both water and glucose quantity (glucose and water).  In the era of modernization energy conservation has become the most important issue so by using renewable sources we can conserve the electricity. In this project we have used solar energy for the operation of the machine. The machine will dispense the glucose water when the user will enter the value of the quantity required and insert the correct coin in coin recognisation unit (CRU). If he coin is not detected by the CRU then there will not be any output from the machine.
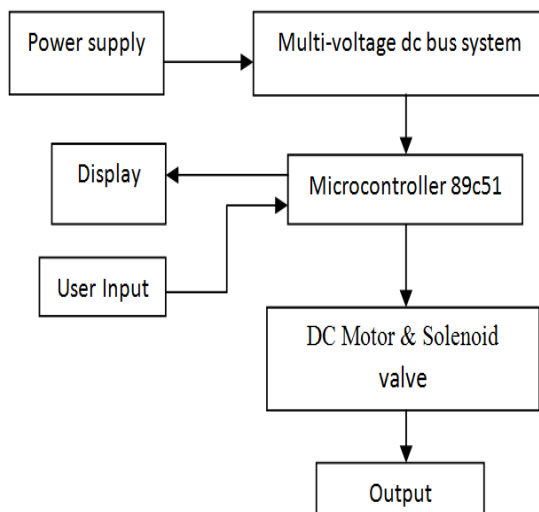
## II. BLOCK DIAGRAM



*Fig :- 1 Block Diagram*

## III. HARDWARE COMPONENTS:

The components that are used in this project are as below:
1. Power Supply
   - Solar Panel:
   - Transformer
   - Batteries
   - Rectifier
   - Regulated IC's
2. Multi-voltage DC bus system
3. Microcontroller 89c51
4. Display
5. User Input
   - Keyboard
   - Coin Recognition Unit (CRU)
6. DC Motor
7. Solenoid Valve
8. Output

### i. Solar Panel:
The solar panel absorbs sunlight and produces electricity which can be used for different purposes.
In our project we are using 12 volt solar panel to feed the required amount of supply for operation of the unit.

### ii. Transformer:
A transformer is an electrical device that transfers electrical energy between two or more circuits through electromagnetic induction. Electromagnetic induction produces an electromotive force within a conductor which is exposed to time varying magnetic fields.

### iii. Batteries:
Battery is a storing device which is used for storing the energy produced by solar. Two batteries are used and will be connected in series in order to obtain the required supply.

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The single battery is of 12 volt rating, when the two batteries of 12 v will be connected in series then it will give 24volt.

**iv. Rectifier:**

A bridge rectifier circuit having capacitor filter which provides AC to DC conversion with pulsated DC. Further two voltage regulators are connected i.e. LM 8712, LM 8705 for different voltage applications. This circuit mainly aims at conversion of power supply when auxiliary supply will be used.

**v. Regulated IC's:**

7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value. IC 7812 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value.

**vi. Micro-Controller 89c51:**

AT89c51 belongs to 8051 family. It is a 8-bit controller and has 40 pins. It consist of 4ports which are designated as P1,P2,P3,P0. This ports are of 8-bits and are bidirectional. It has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times.

**vii. Display:**

Liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. LCDs are available to display arbitrary images or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock.

**viii. Keyboard:**

Keyboard is a device which is used to enter the values of required quantity.

**ix. CRU:**

Coin Recognisation Unit is a device which is used to detect the coin as well as when the correct coin is detected, it passes the signal to controller. The command is given to the LCD and it displays "Coin Accepted".at the time when these condition is satisfied, then glucose water mixture will be dispensed out.

**x. DC Motor:**

DC Motor is used to rotate the screw feeder having rating as 12V, 5-6 rpm.

**xi. Solenoid Valve:**

A solenoid Valve which is an electro-mechanically operated valve, controlled by an electric current through a solenoid in the case of two port valve. The flow is switched ON or OFF as well as in the case of three port valve, the outflow toggles between the 2 outlet poles.

## IV. WORKING

This machine works on the principle of coin detection. The value entered through keyboard and the insertion of coin are the two inputs that are given to the microcontroller. when the user will enter the values according to the requirement through keyboard, this values will be displayed on LCD. Then the user will be asked to insert the coin i.e., a message will be displayed on LCD "plz insert coin". When the user will insert the coin in CRU, the coin will be detected by the CRU and will send signal to microcontroller. The microcontroller after receiving the signal from CRU will give command to the dc motor drive which will start the mixing of glucose and water. when the mixture will be ready then another message will be displayed on LCD i.e., "place the glass".

## V.CALCULATION TABLE

Note: 1 Glass of Water=150ml

| No of Glasses | Water in litres | Time Required | Energy Consumption |
|---|---|---|---|
| 1 | 0.15 | 5 sec | 0.066 Whr |
| 7 | 1 | 30 sec | 0.40 Whr |
| 70 | 10 | 5 min | 4 Whr |
| 245 | 35 | 20 min | 16.03 Whr |
| 735 | 105 | 1 hr | 48 Whr |
| 17880 | 2520 | 24 hr | 1.15 Kwhr |

## VI.APPLICATIONS

These Machine will be used in Hospitals, Bus-stands, Malls, Parks and also can be used for commercial purposes,etc.

## VII.ADVANTAGES

• Pollution free: Use of Plastic Bottles for water will be restricted.
• Save Water: waste of water will be less
• Low cost system: we can easily implement anywhere.
• Reliable
• Power supply: Required less power supply
User friendly

## VIII.CONCLUSION

Implementation of Gluco Sip water dispenser machine is having future scope and it is an ecofriendly machine. For ordinary person, this machine is easily accessible. This machine can be implemented everywhere especially in hospitals, stations and remote areas. Because of its compact design, the implementation of machine will require less space.

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