



# AN OVERVIEW OF AUTOMATIC LEMONADE MACHINE

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## ABSTRACT

*Automation was the rage of the engineering world. From the review on the lemonade machine following drawbacks are seen such as high investment cost, the contamination, additional man power, environmental impact, time consumption caused my lemonade machine. The traditional method of lemonade machine requires jars, mixing arrangement, man power and more time. So we thought that to design automatic lemonade machine to overcome this problems. The thought the setup includes hopper, lemon squeezing mechanism, microcontroller for automation, motors.*

**Keywords:** Automation, Lemonade Machine, Contamination, Traditional Method, Microcontroller

## I INTRODUCTION

Lemonade is a flavored which is composed of treated water, sweetening agents like sugar, sucrose, citric acid, lemon juice, and preservatives. Lemonade is one of the soft drink is used by people of all ages in general and by the young generation in particular and extensively during summer to quench the thirst and the thirst and to refreshed just for some relief and relaxation. Then we decided to make 'Automatic Lemonade Machine'. This setup includes stepper motor, 12V motors, control valve, purifier valve, and lemon squeezing arrangement, hoppers, and PIC microcontroller with C programming language. This machine is capable to make the glasses of lemonade 200 per hour.

## II LITERATURE SURVEY

In [1] Blog from Internet that is "Profile on Production of Lemonade" described that two main contents

1.Technology 2.Engineering

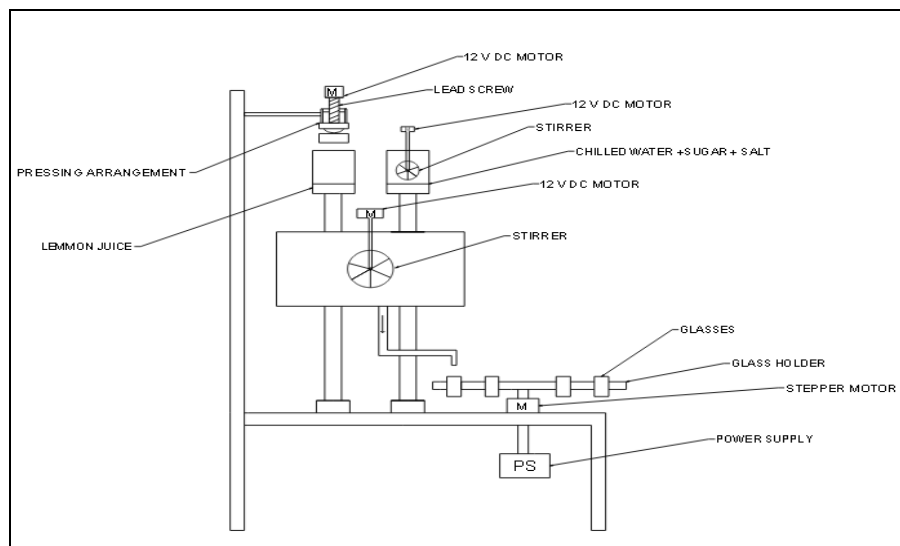
1. Technology: In this they describes about 'Production Process' And 'Environmental Impact'.

2.Engineering: the major plant machinery and equipment require include tank with agitator ,vessel for syrup ,filter, and storage tank for syrup, water and ingredients, pump with drive motor , Filling and sealing machine.

In [2] from the survey Of “Samarth Juice Centre”, RK, Panchavati, Nashik- 422003, Maharashtra have “Automatic Pineapple Juice Machine”. By the Reference of this machine we refer the contents of machine like Automation of Making and filling into glass.

### III CONSTRUCTION

- ▶ The MS square pipe of 1” is used to construct frame. Arc welding is used to join the pipes for making a frame.
- ▶ Aluminum plate of 1mm thickness is used to make a circular plate. The circular plate of 200mm radius is cut. In circular plate semicircles are cut having diameter same as that of diameter of glass.
- ▶ Three tanks are made of aluminum sheets :
  1. First tank i.e.; 150x150mm stores lemon liquid.
  2. Second tank i.e.; 225x225mm stores mixture of chilled water, sugar and salt
  3. Third tank i.e.; 300x300mm stores the mixture coming from first and second tank.
- Three types electric motor used:
  1. Three 12V DC motors are used to stir the solution which is stored in the tanks.
  2. One stepper motor is used to rotate the circular plate which is controlled by microcontroller.
  3. Three submersible pumps are used to control the flow of solution stored in the tank.



### IV WORKING PRINCIPLE OF MACHINE

To make the machine automatic we are taking help of automation. For automation we are using ‘PIC microcontroller’. We are using microcontroller to control the operation



1. Pressing the lemon.
2. Stirring the mixture of sugar, salt and chilled water.
3. Controlling the flow of lemon juice, above solution into the main tank.
4. Filling the glasses automatically.

## 4.1 Working

First the lemons are pressed by the means of pneumatically and control valve with the help of pneumatic cylinder. Then this juice of these lemons is mixed in the first hopper with the salty water by means of mixture arrangement which is driven by 12 volts motors. Now in second hopper the sugar is mixed with the chilled water with the mixture arrangement which is also driven by 12 volt motor. Then this contents in both the hoppers are allow to come into the third which is main hopper in which the all the required contents are mixed with the help of mixture arrangement. Now this lemonade is feed into the glasses which are operated by stepper motor. And then these glasses are served.

First the lemon is press in pressing mechanism. The lemon is press between the two dies of pressing mechanism. In lower die half lemon is kept, the upper die gradually press the lemon and liquid is extracted. The extracted liquid is filled in first tank.

The liquid is then supplied to the main tank.

- In second tank the mixture of chilled water, sugar, salt is stirred with the help of stirrer.
- The stirrer is driven by 12V DC motor. Then the mixture is supplied to the main tank.
- The liquid from the first tank is supplied to the main tank in right proportion by using microcontroller.
- The mixture of sugar, salt ,water is supplied to main tank by using submersible pump I right proportion in order to maintain taste.
- In main tank all mixture coming from both tanks is stirred and lemonade is prepared.
- The lemonade is then filled into glasses in right quantity. The quantity is decided by the microcontroller.
- The lemonade is only filled in glasses when the glass is detected for this purpose timing sensor is used.

## V ADVANTAGES

- ▶ Rate of production increases.
- ▶ Easy to operate.
- ▶ It can be manufactured with local resources.
- ▶ Easy to maintain and repair.
- ▶ Comparatively operation cost is less.
- ▶ Continuous operation is possible without stopping.
- ▶ Less time consuming.



- ▶ Low cost automation is used.
- ▶ We can use the machine on market basis.

## **VI APPLICATIONS**

- ▶ Medium scale shops.
- ▶ Big family parties.
- ▶ Family Functions.
- ▶ Marriage Ceremony.
- ▶ Reception Ceremony.
- ▶ Beverage industry.

## **VII FUTURE IMPROVEMENT**

- ▶ Automatic lemon cutter.
- ▶ Automatic glass feed mechanism.
- ▶ To make the machine portable and easy to transport we can make use of small engine and wheel.
- ▶ For the sitting arrangement we can provide flexible chair.

By a minute change in the pressing mechanism we can also use this machine for different fruit juice.

## **VIII CONCLUSION**

Thus the automatic lemonade machine thus proves to be a beneficial improvement for the new era. It has a wide scope of application in markets. The main advantage of the project is the lemon juice which is obtained is clean, pure and mostly beneficial for the human health as lemon has proved in all its vitamins and proteins. The machine has low cost automation and continuous operation is possible without any problem occurrence. At the end machine is proved to be a beneficial innovation for the society.

## **REFERENCES**

### **Samarth Juice Center Shop**

#### **Websites-**

- a) <http://www.google.com/>
- b) <http://www.engineersedge.com/>
- c) <http://www.efunda.com/>
- d) <http://www.mechanicalengineeringblog.com/>