

## **AUTOMATION OF TURMERIC PROCESSING SYSTEM FOR COOKING AND DRYING PURPOSE OF TURMERIC FINGERS**

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**ABSTRACT:** The common practices among turmeric growers for turmeric cooking are traditional methods, which involves cooking and drying. The basic principle is boiler is employed for cookery of turmeric in pressure vessel and then hot air is employed for drying of turmeric. In conventional method time required of this entire process is about 15 days, and it is less efficient. There is have to be compelled to develop style of boiler and pressure vessel and additionally appliance. Also some safety precautions are required to include. This paper reviews properties of turmeric and traditional technique of turmeric process and style analysis of boiler, pressure vessel, and dryer.

**KEYWORDS:** Microcontroller89s52, temperature sensor (PT100), Solenoid valves, Dryer section, Heater coil.

### **1.INTRODUCTION**

India is leading with ninetieth of turmeric production within the world with one,37,000 angular distance of space (www.indianspices.com).Being a spice cash crop, medicinally and industrially important, the area. under turmeric is increasing in Maharashtra with a production of 8220 tones of turmeric from 6644 ha of area June, 2008. To minimize processing time and hazardous associated with the conventional boiling plant; a steam based design is popular in the market from last 10 years All the farmers are invariably using steam based turmeric processing on rental basis. The present design has evolved over last few years but still there are gaps in the areas of fuel economy, labor efforts and convenience of operation. The present project work will target towards reducing these gaps with science and engineering principles

### **2. LITERATURE SURVEY**

1.The author names are Haozhe Gan , Erin Charters , Robert Driscoll and George Srzednicki his published the“ paper Effects of Drying and Blanching on the Retention of Bioactive Compounds in Ginger and Turmeric ”Ginger and turmeric, members of the monocot family family, are widely used for their pungent and aromatic flavour in foods and also their medicinal properties. Both crops are often grown by smallholders in mountain areas on rich former forest soils with no need for fertilizers and pesticides, fulfilling de facto the conditions of organic agriculture. They are consumed fresh or dried. Drying is usually performed while not taking into consideration the content of bioactive compounds within the dried product.2. India is one of the leading countries in production of raw turmeric and other sub products related to turmeric. 76 % of the world turmeric production is in India. The common practices among turmeric growers for turmeric cookery area unit ancient strategies, which involves cooking and drying. The basic principle is boiler is employed for cookery of turmeric in pressure vessel and at the moment hot air is employed for drying of turmeric.

### **3 HARDWARE INTERFACE**

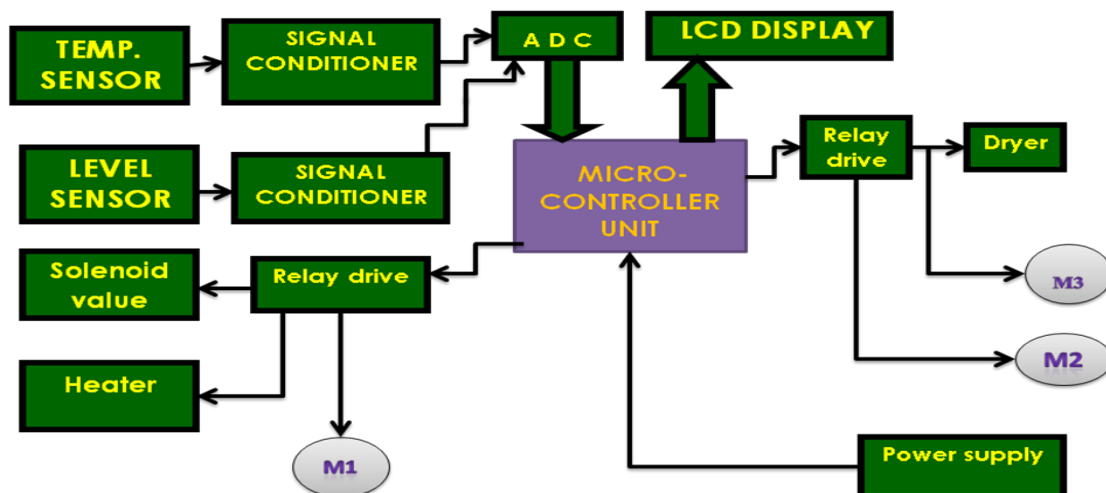


Figure 2: Block Diagram

#### 4 HARDWARE DISCRIPTION

**1. Microcontroller 89s52 :** The Microcontroller IC 89S52 has 256x8 bit internal RAM that is most vital feature for this application. Here eight to ten readings can be recorded in RAM after each half an hour to achieve data logging. The Timer/Counter application of 89S52 is used to count the pulses from proximity sensor. The interrupt pin INTR0 is used to switch into different setting modes. The serial channel is used to get interface with pc for data logger application. The AT89C52 provides the following standard features: 8Kbytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bit timer/counters, axis-vector two-level interrupt design, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89C52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, port, and interrupt system to continue functioning. The Power down Mode saves the RAM contents however freezes the generator, disabling all other chip functions until the next hardware reset.



**2. Temperature Sensor PT100 :** Platinum resistance thermometers (PRTs) offer excellent accuracy over a wide temperature range (from  $-200$  to  $300$  °C). The principle of operation is to live the resistance of a noble metal part. The most common kind (PT100) contains a resistance of one hundred ohms at zero °C and 138.4 ohms at one hundred °C. There are also PT1000 sensors that have a resistance of 1000 ohms at 0 °C.



**3. Display:** it is called as showcase of display cabinet. it shows the temperature range of boiled water and also display the level of 1111water. This is also called as 16\*2 LCD display because it contains sixteen columns and two lines.



**4. Water Heater:** an electric heating coil is an electric equipment which convert electric current to heat by use resistors which emits radiant energy. The principle of working heating coil is based on joules heating. electric resistor is a element inside a heater coil used for heating purpose. Nichrome wire is active element used inside the heating device for heating purpose heating coil heats the water the level up to the generation of steam.



**5. Solenoid valve:** Solenoid is an electromechanical valve, in which an electric current generates magnetic field and also regulate the flow of fluid in a valve. The characteristics of electric current uses magnetic field strength, type of fluid being controlled its characteristics and also regulation mechanism. Valve can also use two port design for flow regulation and also three or more ports design which switches the flow between port Solenoid valve commonly used to control fluidic element, which performs shutoff, dose, mixing and distributing fluids, which also offers reliability long life service and compact design.



### 5 SCHEMATIC DIAGRAM AND WORKING

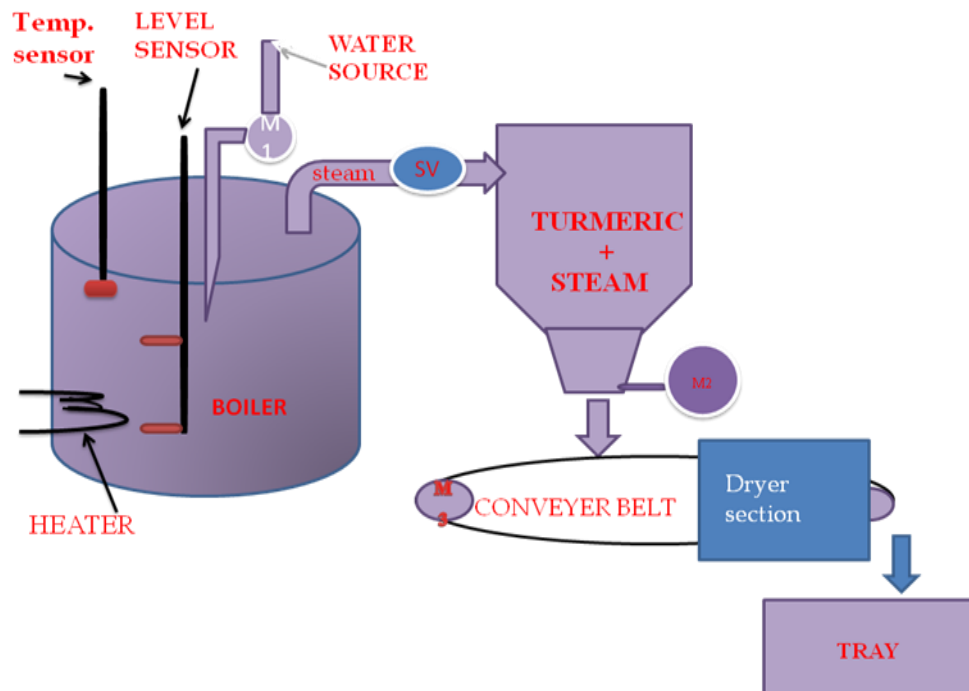


Figure 1: Schematic Diagram Of System

#### Working:-

Above system is fully automatic process. This includes mainly boiler and cooker sections. Boiler section includes mainly latest electronic controls, including water level, water temperature and electric heating, which are controlled by microcontroller.

Cooker section also operates automatically with the help of steam generated by boiler. Turmeric in cooker gets processed and it automatically poured on conveyor belt for easy caring. Conveyor belt also includes a section called dryer section. The section effectively helps in reducing the moisture of turmeric which in turn helps in reducing the period for drying the turmeric. The detailed working of the system as follows:

Initially when the system starts it will check for level of water in the tank if it is upto desired level the process will continue further, otherwise it will fill the tank by use of water motor upto specified level decided by copper red as a water level sensor. when the tank is full then automatically heating coil will start boiling of water which is kept inside the tank. PT100 will observe continuously temperature of water and will display on LCD with help of signal conditioning circuit and ADC. When sufficient steam is generated then solenoid valve will open and steam will pass towards the cooking container.

The turmeric fingers kept in this container will be cooked by us of this steam and after particular time duration The door of cooking will be opened automatically by DC motor and it the fingers will pour on conveyer belt. Conveyer belt also includes a section called dryer section. The section effectively helps in reducing the moisture of turmeric which in turn helps in reducing the period for drying the turmeric

## 6 HARDWARE SYSTEM



## 7 CONCLUSION AND FUTURE SCOPE

In traditional turmeric processing system the turmeric is cooked conventionally and this system is very Hazardous and polluted and it required long amount of manpower. For drying purpose the turmeric fingers are spread on ground in sunlight and it requires 25 to 30 and it is non-polluting system. The most important advantage of our system is less time duration is required for drying by using microcontroller, temperature sensor, solenoid valve, dryer section. This system is fully electric automatic system the day require of this system in conventional system which are 25 to 30 days in this system this can be reduced upto 7-10 days. We can use grinder machine to the system, Also we can use packaging machine, When all the components is added , it become a turmeric powder industry, by adding this we get turmeric powder To eliminate the electricity cost we can make the system which will work on solar energy by applying solar panel.

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