RESEARCH ARTICLE

AUTOMATION OF KADHA (MEDICINE) PREPARTION PROCESS IN AYURVEDA USING PLC.

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Manuscript Info	*Abstract*
	In a traditional KADHA (medicine) preparation, the entire process is done manually Such as boiling, filtering and mixing of medicinal herbs. The purpose of the study is to automate the entire process using PLC system. This work will reduce the time and manpower and continuous monitoring required in the manual process. Sensors such as level sensor and temperature sensor are used to provide the input to the system. The motors, lamps, and also the solenoid valve serve as the output. This paper is divided into 3 section 1) boiling unit 2) filtering unit 3) mixing unit . The mechanical part of the project consist of mechanical drawing, measuring, welding and fabricating process, while electrical part consist of electrical drawing, electrical wiring and programming.

Introduction:-
Automation is the need of the hour, in this fast moving world. The biggest benefit of automation is that it saves labor; however it is also use to improve quality, accuracy and precision. In medicine manufacturing factories mostly automation is done for better quality and large production of medicine. But the field of Ayurveda is still untouched by field of automation. Till now the medicines are prepared in traditional way and there is lot more scope for automation in this field.

The preparation of Ayurvedic medicine is very tedious job. Each medicine is prepared according to particular sutra (way of preparing). The medicine is effective only if all the conditions of the "sutra" is fulfilled. Till now the entire preparation process is manual and a person should always be present for its monitoring.

Considering all this drawbacks, the project tries to automate the medicine preparation process. It includes automation of three units :
1) Boiling unit
2) Filtering unit
3) Mixing unit

Boiling unit: In this unit, medicinal herb(x grams) along with water (16x liter) is taken in a vessel 1 and is boiled using a induction heating mechanism until 4x liters of decoction is left.

Filtering unit: the content of the vessel 1(decoction) is filtered in this unit
Mixing unit: In this unit, honey + oil + medicinal herbs + filtered content of vessel 1 in put in vessel 2 and mixed until a unified solution is formed.

The main and full purpose of this paper is to design automated KADHA(medicine) preparation machine. Another purpose is also to help Ayurvedic hospitals to switch from traditional medicine preparation method to fully automated system with better quality and precision using PLC. In particular, following objectives are formulated: a) to identify the technology that will automate the medicine preparation system b) to design a ladder diagram that will design the system This research is useful as the controls of the machine for a specific job, or a task are processed by

the computers. The computer can be programmed depending on the operator (human) decision to perform automatic or not. . The company shall benefit with the safe operating system, more efficient factory, faster response time, and few workers also on the actual production line . This paper is focused on automation of automated KADHA (medicine) preparation system. Sensors and motor control is used for the entire process. The control for the hardware is to be process by the programmable logic controller. It includes a ladder diagram for programmable logic controller and an actual prototype for the experimentation. The whole system executes the following processes: automation using the programmable logic controller or called as PLC, heating unit, filtering unit and mixing unit. This paper is organized as it follows: briefly presents the programmable logic controller (PLC) and the methodology used in this research paper. Secondly is devoted to the experimental results, which are carried out in order to verify the effectiveness of the proposed method by means of the PLC prototype.

Methodology:-

Fig. 1. illustrates the process of boiling, filtering and mixing system, which shall be automated using the programmable logic controller. This is a step by step process on which corresponds to the input and output peripherals that are needed in programming the ladder diagram. Included in the automation is the rotating of vessel 1, filtering of medicine, mixing and getting final product . The overall design is implemented using an experimental prototype.
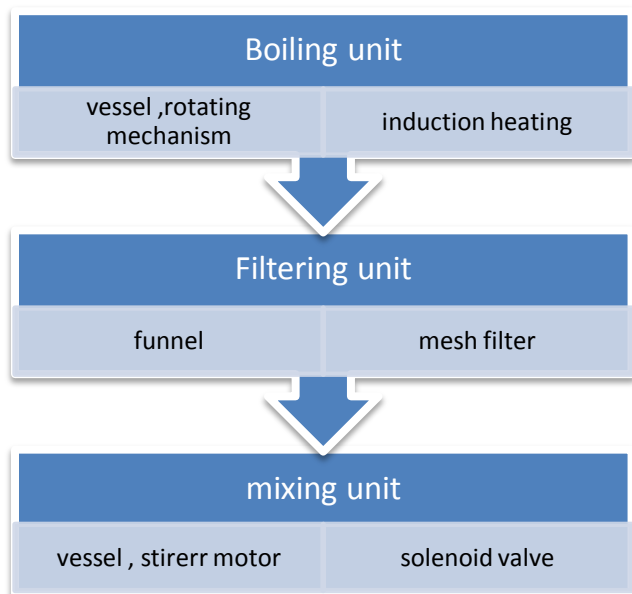

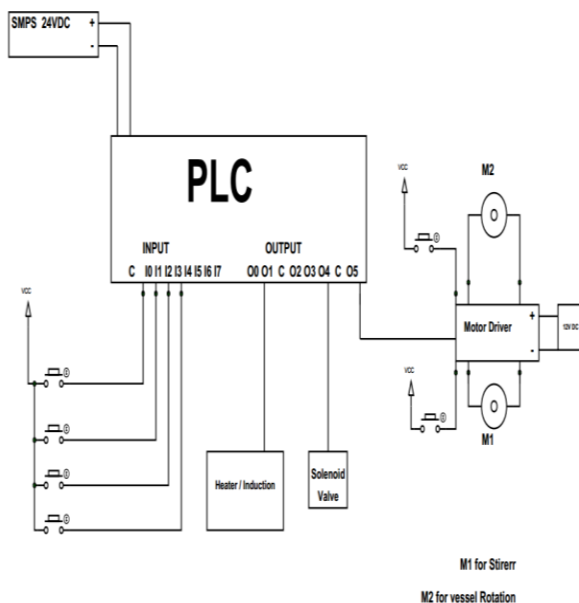Fig 1. Flow diagram structure of automated system

Fig. 2. Conceptual framework for automation using PLC.

Fig. 2. shows the general PLC block diagram used by the researchers to implement the automation of the system. From the manual operation, a programmable logic controller is used to convert the system into an automated process. Input components such as sensors and switches are used to indicate the condition corresponding to the hardware flow diagram of the PLC project design. The programmable logic controller interfaced the system and provided the ladder diagram for the design. Output components such as motors and indicator lamps are used to indicate the desired objective of the system. Also, Fig. 3 shows boiling unit where it has a vessel of capacity 1.5 liter, induction unit and rotating unit. The decoction left from boiling unit goes to the filtering unit which filters the above decoction which is shown in fig 4 and fig 5 shows mixing unit in which the oil + honey+ medicinal herbs + decoction is mixed using stirrer motor. Fig 6 Shows overall view of three units
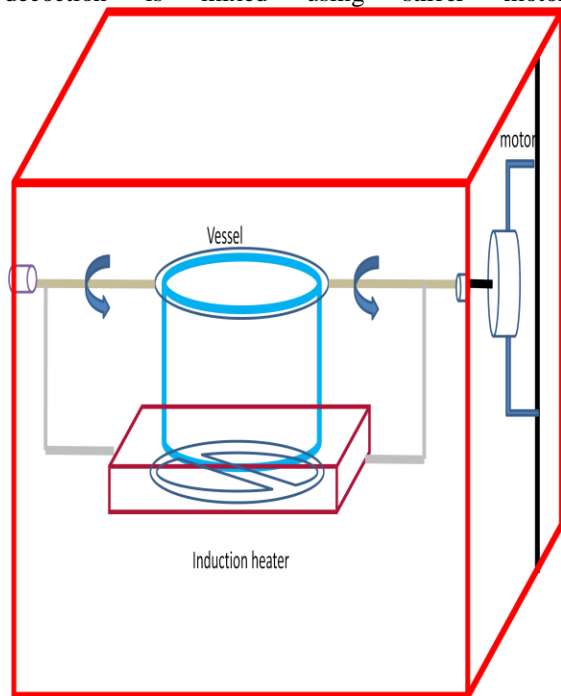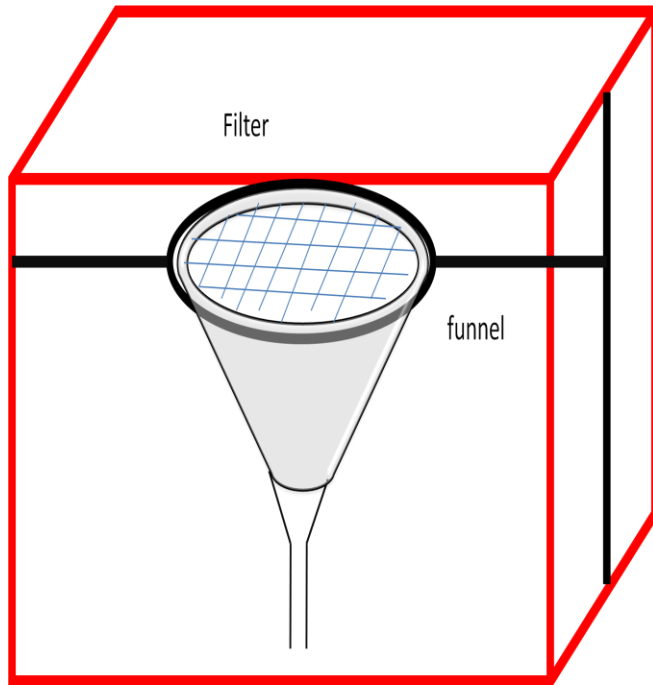

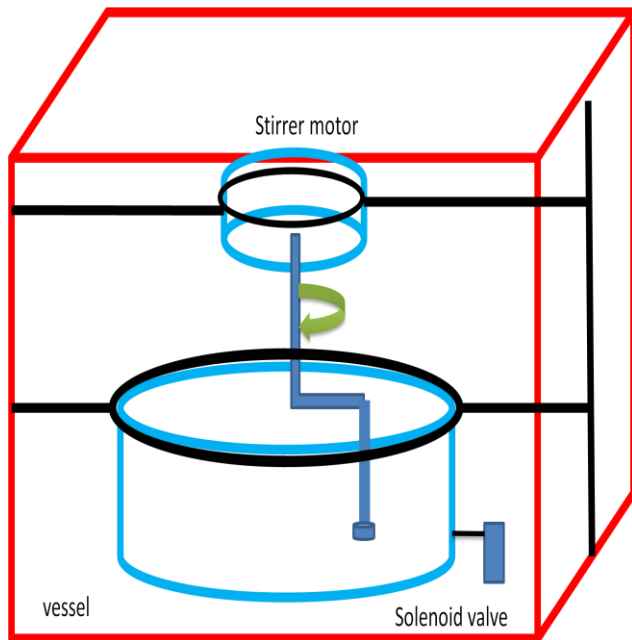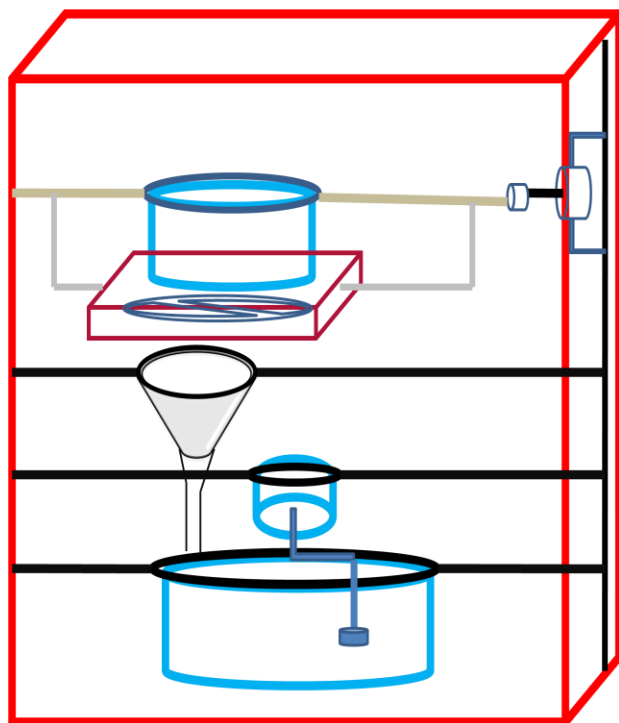Fig :3 Boiling unit

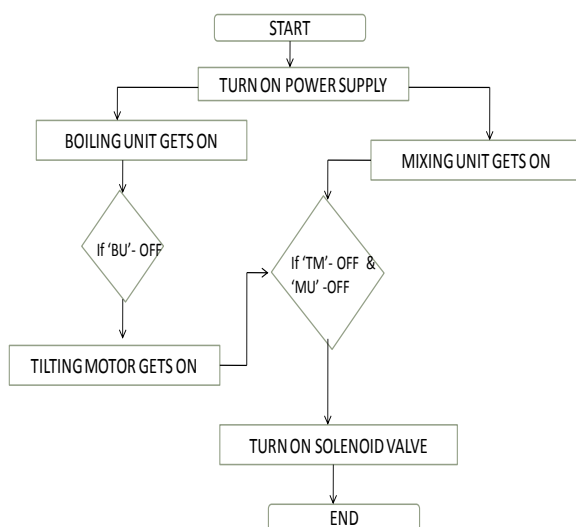Fig : 4 Filter unit

Fig :5 Mixing unit

Fig : 6 . Design project flow for boiling, filtering and mixing unit

Flow Chart:-

Flow chart shows the operation of the overall process

Step 1 : when we turn on the start switch, boiling unit and mixing unit starts

Step 2 : Put all the medicinal herbs and water in vessel 1(boiling unit) and oil + honey in vessel 2(mixing unit)

Step 3: After 40-50 min boiling unit stops and the decoction is left to cool for 10-15 min.

Step 4: when decoction is cooled the tilting unit starts in which tilting motor rotates and put all the decoction in

filtering unit and motor returns to its original position.

Step 5: filtering unit filters the decoction.

Step 6 : Now decoction from the filtering unit goes to the mixing unit and the whole mixture is again mixed using a stirrer motor until a unified solution is formed

Step 7 : In last step when both the boiling unit and mixing unit are off the solenoid valve opens and the entire mixture goes to the bottle. And thus final medicine is ready for use.

Fig : 7 Experimental Prototype

Conclusion:-

This paper shows that automation can be successfully done in the field of Ayurveda. This prototype has been successfully tested in one of the Ayurvedic hospitals thereby reducing manpower, increasing efficiency and accuracy in making Ayurvedic medicine.

Future scope:-
The above system can be built for more quantity of Kadha (medicine). Also most of The Ayurvedic Processes are manual and technologies like this will help to Automate those manual processes, Which will help the Ancient Knowledge of Ayurvedic to get more popular.

Acknowledgement:-

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