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# Quick Sprouting of Pulses using Newly Designed Sprouter

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**SUMMARY**

Sprouting is the practice of germinating seeds to be eaten raw or cooked. Sprouts can be germinated at home or produced industrially. The metabolic activity of resting seeds increases as soon as they are hydrated during soaking. Sprouting of grains is currently done using traditional method which includes overnight soaking of grains for minimum 8-10 h and then keeping overnight tightly covered in a cloth under ambient conditions for 24-72 h. The reduction of this time required in complete process is challengeable. To overcome this issue a newly designed sprouter is being used for sprouting of various pulses such as chickpea, moong etc. This article provides an understanding towards the development of sprouter with greater capacity as compared to traditional method.

## INTRODUCTION

Nowadays consumer lifestyle has shift towards "healthy living and healthier food" consequently demanding ready to eat products including sprouted seeds.The current era of speed and drastically advanced lifestyle food intake has become one of the major work being neglected and least preferred. This situation resulted in huge cases of protein deficiency and malnutrition. In the view of the above problems the current work aims to increase the protein content among the selected pulses with a focus on spouting of seedlings. The work can be of real use for those individuals who cannot afford to invest much on their diet. The proposed pulses can be substituted to the other nonnutritive foods that are much expensive. Based upon the above result the governments free food scheme for school students can be made more nutritive with minimum expenditure. Once the diet of the individual's is redesigned, this can be the first step to solve the nutritive problems faced today (Mumbarkar, 2013).Sprouting tends to increase nutrient levels in the grain, legume, vegetable, nut or seed being sprouted. Sprouts also contain lower levels of antinutrients, making it easier for your body to absorb all the nutrients they contain. To solve the nutritive problems faced today and in order to supply sprouts in such a higher demand sprouter needs to be developed.

### Design of sprouter:

Sprouter works simply on the natural process germination which occurs in every seeds. In the designed sprouter, the water in the form of thin spray is applied to the pulses placed on the perforated tray. Submersible pump of capacity 18 watt is used to pump the water to the top four laterals of 16 cm on which have holes of 1.08mm diameter. The water from the perforation falls into the tub place below inside the sprouter. The recycling of water helps to provide pulses the heat during the sprouting. The continuous spray of water smoothens the seed coat and less energy is required by the sprout to come out of seeds. The length of sprout obtained is about 3 cm at temperature range about 24˚ C-25˚ C and high relative humidity of about 92%. The developed sprouter is able to produce the sproutes within 9 h. Inner side of box is lined with the double layer transparent plastic sheet (HDPE) & black plastic sheet (LDPE) to protect wood from moisture condensation on the sides of wood box. Sprouter provides natural condition of relative humidity and temperature required by the pulses at the time of germination. Sprouter uses grain heat which is generated by the respiration of grain itself.

### Components of the sprouter:

### Tubes for spraying:

These are the plastic tubes with diameter 16 mm with hole diameter 1.08mm for spraying water. This drip tubes are called as laterals. The holes are made at distance of 1 cm each. The holes are manually made and are made such that the water is applied in the form of thin spray of water. Four laterals in cross pattern were used.

### Drip Tube:

Drip tubes of 16 mm diameter for conveying water to the top were used. This drip tube convey the water from the tub to the lateral. One end of the tube is connected to the pump in the tub and other to the laterals at top of sprouter.

**Pump (18Watt):**
Pump was used in system for recycling & pumping water. Submersible pump of capacity 18 watt was used to pump the water to the top four laterals of 16 cm diameter which have holes of 1.08mm diameter are made . The created pressure was required to create thin spray of water

**Water tub or storage tub:**
Metal tub of 55 cm x 55 cm was place at the bottom of the box to store water upto 12 liter capacity. It reduces the chances leakage since plastic was linned throughout. The water was stored in the tub and recycled through pump.

**Perforated tray:**
Trays with perforations of diameter 2 mm were used for holding pulses. The tray height was kept as 6cm from bottom except at front side were it was 3 cm. The dimension of tray were 48cm x 51cm.

**Plywood box:**
Outer main frame was made of plywood sheet of 3 cm thickness. A rectangular box (60 cm x 60 cm) plywood box with door at front side for easy operation was fabricated and coated with double layer plastic sheet for controlling inside atmosphere. All the structure is made of plywood because it can be easily coated and also it act as insulator for temperature (do not transfer the heat to the outside environment). Inner side of box is lined with the double layer transparent plastic sheet (HDPE) & black plastic sheet (LDPE) to protect wood from moisture condensation on the sides of wood box.

**Other components** such as grommet, fourway, elbow, joiner were used for connections of such as pump with drip tube, drip tube with the laterals, laterals with main tube.

**Traditional method of Sprouting pulses:**

Pulses to be sprouted
↓
Remove stones, debris, etc.
↓
Soak seeds (Generally 24 hrs. for chickpea)
↓
Drain seeds again rinse, drain (2-3 times)
↓
Keep tightly covered with a cotton cloth
↓
Sprouted seeds (48-72h)

**Advantages of newly designed sprouter over traditional method**

- Traditional method includes overnight soaking of grains for minimum 8-10 h and then keeping tightly covered in a cloth under proper conditions of temperature and RH for complete 24-48 h.
- The sprouter was able to produce the sproutes within 16 h and hence the time required in traditional method can be greatly reduced.
- Development of chickpea sprouter provide an easy and efficient way of sprouting of pulses such as chickpea.

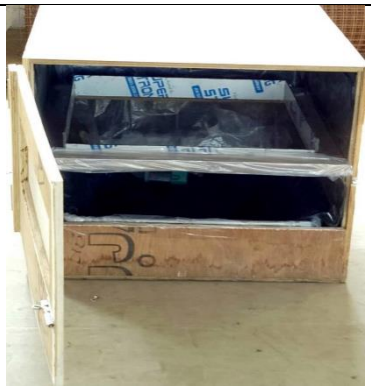

**Fig 1. Developed Pulses Sprouter**

**Fig 2. Sprouted grains by using sprouter**

**Results obtained from the newly developed sprouter:**

- Avg temperature and RH during sprouting inside the sprouter- 24.4˚C and 91.4%
- Total time required using sprouter-16 hrs
- Sprout length- maximum 3 cm
- Sprouting time was decreased from 48-72 h for traditional method to 16 h by using sprouter

## CONCLUSIONS

Development of chickpea sprouter provide an easy and efficient way of sprouting of pulses such as chickpea .The sprouts were grown in less time as compare to traditional method of sprouting. The sprouter provides essential temperature and relative humidity that are needed for breaking seed dormancy and making seed to grow into sprout. The length of sprout about 3cm was obtained if it was sprouted at medium temperature (about 24-25) and high relative humidity (of about 92%) condition.

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