Tamarind is one of the most extensively planted and highly valued tree in India and it is intimately associated with the common man. Tamarind is a delicacy in the producing countries and is used for various culinary purposes. It is consumed in fresh, dried and other processed forms. The ripe fruits are collected from tree grown in the farm and they are processed in households and sold in the village fairs. Time being of the production of tamarind satisfies demand at the village level, but there is increasing demand in the towns and cities.

In post harvest operations dehulling, defibring and deseeding are the major process before storage. The farmers usually carried these operations simultaneously by engaging the labourers. Simple tools like wooden mallet or hammer will be used to separate seed from pulp. Among the post harvest operations deseeding is considered to be important and it has to be done timely to prevent insect infestation. Almost all the post harvest operations are carried out by manually which is found labourious and time consuming besides it who depends on favourable weather conditions. There is no much study was conducted in developing post harvest machinery for tamarind especially to take care of seed expulsion. Hence, the present study was under taken.

A study was conducted in Karnataka state about the existing practices of tamarind seed expulsion was obtained by visiting tamarind growing areas and holding discussions with farmers with the help of well prepared questionnaire.

The study revealed that at present all the farmers (100%) are adopting traditional methods of seed expulsion and farmers perceived that they are using wooden mallet due to non-availability of improved machines (82%). Most of the farmers suggested (92%) to develop an efficient tamarind seed expeller with low cost and easy to operate.
Different age group labourers for both men and women were selected for conducting the post harvest operations. The results recorded that middle aged men labourers performed better in dehulling as compared to young and old aged labourers. Higher seed expulsion rate (23.44 and 25.30 min/kg) was found high by engaging middle aged men and women labourers (31-50 years) compared to other age groups. However, maximum mechanical damage (3.90 %) was noticed with young men labourers. Aged women and men labourers took more time for defibring of tamarind fruits.

The value of fruit length (9.32cm), breadth (2.17cm), thickness (1.25cm), volume (cm³), shell weight (3.55g), fruit weight: (20.30g) pulp weight (ll.888g), bulk density (250.70 kg/m³) and fibre weight (1.60g) were observed higher in curved fruits as compared with straight fruits.

The higher angle of repose was observed in curved fruits (46.50°) and lower in straight fruits (44.25°). The higher coefficient of static friction was noticed with rough surfaces as compared to smooth surfaces in all types of tamarind fruits.

The pulp from the straight fruits showed higher TSS (14.60 brix) and protein (3.13) contents whereas maximum tartaric acid (3.36) was observed in the pulp from curved fruits.

A power operated seed expeller was developed and fabricated for the study. This mainly consists of two different rollers, one with serrated surface and another with helical rings on the surface kept rotating in opposite direction moving inwards. A hopper is provided above the main assembly to facilitate feeding of fruits. The rollers are driven by 1/2 HP single phase motor by means of a V belt and step pulley arrangement. In addition, a handle is also provided for manual operation during power failure. The developed expeller performance was evaluated under
different moisture content of tamarind fruits, fruit shapes, roller clearance and shaft speed.

The operational parameters viz., moisture content (16.50 %) of tamarind fruit with shaft speed of 200 rpm and 4.50mm clearance between the rollers showed higher seed expulsion rate with less damage occurred on pulp and seed. While considering the shape of the fruit, higher seed expulsion rate found in straight fruits (23.34 kg/h) followed by curved fruits (22.83 kg/h) and mixed fruits (20.86 kg/h).

Further evaluation, the power operated expeller was compared with handle operated and traditional method of seed expulsion for different shape of fruits with different moisture contents. The results showed that higher seed expulsion rate found when the straight: fruits at 16.50 per cent moisture content: used in the traditional method (2.70 kg/h), handle operated machine (10.15 kg/h) and power operated machine (23.34 kg/h) with least pulp and seed damage. Hence, power operated seed expeller was found efficient: when compared with other methods of seed expulsion.

The cost economics of power operated seed expeller was determined by considering fixed and variable cost. For evaluation purpose, it was compared with handle operated machine and traditional method of seed expulsion. The results showed that cost of operation for seed expulsion by using power operated machine was Rs. 1.55/kg as compared to handle operated machine (Rs. 2.94/kg) and traditional method (7.38/kg).

At present the post harvest operations of tamarind fruit are highly expensive and the proposed power operated seed expeller will certainly come for farmers rescue in reducing the cost of operation, as well as in completing the operations timely.
In future, farmers may switch over in commercial production of tamarind due to the frequent failure of monsoon and increase in cost of cultivation. At that time power operated seed expulsion machine will play a major role in improving post harvest operations with minimum operational cost.

Future line of work

1. Design and development of combined low cost tamarind dehuller, defibering and deseeder machine.

2. More field trials are needed at farm level to make it a refined and acceptable process, which will also help in popularization of the technology.