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Research Paper :

Design and development of power operated wet type dehuller for green gram and black gram

PRAMOD S. MAHALLE, **NARENDRA H.TAYADE,** JAGDISH S.NIKHADE AND V.B. KALMEGH

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See end of the article for authors' affiliations

Correspondence to:
NARENDRA H. TAYADE
Department of Agricultural Engineering, Krishi Vigyan Kendra, Sakoli, BHANDARA (M.S.) INDIA

ABSTRACT

A small unit of power operated wet type dehuller was developed incorporating rough dehulling surface for removal of hulls of soaked green gram and black gram. The soaked green gram and black gram for 1st, 2nd, 3rd, 4th and 5th hours was dehulled at three different revolutions as 40, 60 and 80 of dehuller. The power-operated dehuller achieves higher dehulling efficiency for five-hour soaking period with minimum losses. The study shows 94 per cent dehulling efficiency for black gram while 97 per cent dehulling efficiency for green gram during five hour of soaking period at 40, 60 and 80 rpm, while the dehulling capacity of wet type dehuller was found to be 8 kg/hr.

Key words : Green gram, Black gram, Dehuller, RPM, Dehulling efficiency, Dehulling capacity

Green gram (*Vigna radiata*) and black gram (*Vigna mungo*) are the pulses commonly called as mungbean and urdbean, respectively. These are one of the major food legumes grown and consumed extensively in India. Pulses being nutritionally vital and are an important constitute of diet for a very large number of peoples in the world especially in India where majority of peoples are vegetarian. Apart from a being a relatively cheaper source of dietary protein, it is also an important source of calories, certain essential aminoacids, minerals and vitamins. The per capita availability of pulses in India is currently estimated as 24 g/day as moderately recommended intake 42 g/day.

Post harvest scenario of pulse shows that 75 per cent of production was milled as dehusked split *i.e. dal*. Majority of pulses was consumed in India as splits. Milling of pulse reduces fiber content, palatability improves appearance, texture and cooking quality of pulse. Traditionally green gram and black gram dal is dehulled manually after soaking in water (Kurlein, 1987). Water soaking for varying periods, imparts adequate loosening of hulls. It was considered as most difficult to dehulled gram due to fine seed coat attached to gummy layer between hull and cotyledon. Several methods are adopted for dehulling of gram, which may be classified as wet type and dry type (Patil, 1991). In wet type method, loosing of hull is done in first step and then removal of hull with suitable dehuller. So study is planned to develop a power operated wet type dehuller and to evaluate the effect of RPM and soaking period on dehulling efficiency and broken percentage.

METHODOLOGY

Design considerations:

Apart from tedious dehulling operation, an introduction of power operated dehuller in rural areas. The dehuller should dehulled soaked gram easily without clogging. To achieve this requirement a dehuller with different type (*i.e.* rough surface of coconut rope wounded on roller and hair roller nylon brush) were developed. The nylon hairbrush as dehulling surface was taken for study.

The dehuller should be simple in design and construction, easy in operation and to maintain easily without any highly trained person. It should also be reasonably cheap, durable and fabricated with locally available materials and affordable price. It should be possible to modify dehuller in future.

Construction detail of power operated wet type dehuller:

Construction detail of power operated wet type dehuller shown in Fig. 1. The main parts of dehuller consist of a drum (casing) made from PVC pipe of diameter 50 mm and length of 345 mm fixed to wooden shaft of dehulling surface. A dehulling surface made from nylon spikes fixed on wooden shaft of diameter 30 mm (nylon roller diameter was 25 mm) and length of 395 mm. The clearance between inner surface of a drum and outer of dehulling surface was 3 to 5 mm sufficient to cause dehulling by abrasion. The slope was also given to the dehulling drum for movement of dehulled gram with continuous flowing water supplied from overhead tank.

The dehulling drum is fixed to the supporting frame