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Abstract: Pea (*Pisum sativum* L.) is a cool season vegetable and pulse crop of northern India. It is produced in large scale in India and requires proper post-harvest value addition due to its high perishability nature before it reaches to the market. The pea pods are generally harvested manually and then depodded by hand which is very labour-intensive and time-consuming. Some depodding machines are available but they are either of low capacity or very expensive. To address this, an attempt was made to develop the manually operated green pea depodder machine on small scale. The developed machine consisted of main frame, main shaft, block bearings, sieve frame, sieve, hammer pad assembly, rotor, roller and roller pins, gear mechanism assembly, hopper, trash guider and body cover. The main shaft, connected to rotor, was driven manually through handle, which rotated the tapered sieve frame in opposite direction through gear mechanism assembly. The roller mechanism was used to provide free rotation to the sieve frame. Depodding of pea pods was based on the principle of friction generated by rubbing action of hammer pads with the pea pods against the inner surface of the sieve frame which helped in separating pea seeds from pea pods. The engineering properties of 'Arkel' variety pea seeds and pea pods at 74.73 % and 81.84 % moisture content (w.b.), respectively, were also determined, for an efficient pea depodder machine development. The pea seed length, width, thickness, arithmetic mean diameter and geometric mean diameter were 10.09, 8.82, 8.33, 9.08 and 9.05 mm while the corresponding value for pea pod were 80.27, 12.79, 11.12, 34.728 and 22.52 mm, respectively. The pea seed to trash ratio was found to be 42:58. The sphericity, aspect ratio, surface area, unit weight, bulk density, true density and porosity of pea seeds were 89.7%, 87.36%, 257.33 mm², 0.35 g, 592 kg/m³, 1017 kg/m³ and 42.9%, respectively, and that for pea pods were 28.1%, 15.94%, 1593.21 mm², 6.89 g, 275 kg/m³, 981 kg/m³ and 71.97% , respectively. The thousand seed mass of pea seeds was observed to be 495 g. The angle of repose of pea seeds and pea pods were 26.61° and 34.19°, respectively. The static coefficient of friction of pea seed against galvanized iron, mild steel, wood and rubber were 0.289, 0.384, 0.491 and 0.540, respectively, and the corresponding values for pea pod were 0.378, 0.489, 0.582 and 0.628, respectively. Based on the performance evaluation analysis, depodding efficiency and damaged seeds percentage were found to be 86% and 4.68%, respectively. The capacity of the developed machine was observed to be 15 kg pod per hr.

Description: DEVELOPMENT OF A MANUALLY OPERATED GREEN PEA DEPODDER MACHINE

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