

## Development of an integrated grating and slicing machine for starchy vegetables.

### ABSTRACT

Processed foods usually undergo one or several unit food processing operations before becoming the final products. Many food processing equipments were developed to perform more than one operation in food processing by providing practical purposes that further enhance their performance. However, conventional processes of grating and slicing that produce grated and sliced food products normally involved two units of independent operation machines. Therefore in this study, grating and slicing processes have been combined into a single operation through an integrated machine for simultaneous grating and slicing operations. The purpose of integrating both grating and slicing processes is to increase productivity through the reduction of cost, time and the number of unit operations, which are involved in the processing system of grating and slicing production. The machine's design specifications were identified to ensure that simultaneous grating and slicing operations in an integrated machine are capable to process the raw materials (starchy vegetables) simultaneously for grated and sliced outputs. A final machine design was generated by following a product development process as the research method. The design process steps starts from planning, concept development, detail design and machine fabrication, testing and refinement. The final design of the machine (at present) shows that it is suitable for use in industrial processing level which the output rate is powered at 750 W with variable speed of 0 – 180 rpm, grated and sliced production range of 750 – 1200 kg/h and 250– 400 kg/h, respectively. This newly designed machine is easy to setup, handle, store, clean, service and maintain. The design of an integrated grating and slicing machine will express a better understanding on the machine capability to reduce cost and energy for simultaneous grating and slicing processes with increased productivity.

**Keyword:** Grater; Integrated; Machine design; Slicer; Starchy vegetables