SEALING MACHINE

Function: Sealing of packets
Capacity: 400 packets/h
Salient features: Continuous sealing of spice powder packets. The equipment is provided with a mini band sealer for horizontal/vertical type sealing.

WHITE PEPPER PRODUCTION UNIT

White pepper is produced from fully matured freshly harvested green pepper or from black pepper. The freshly harvested green pepper spikes are despiked/ threshed using a pepper thresher and the berries are graded in a rotary grader. Berries of size 4.0 mm and above are used for white pepper production. The fresh berries are washed in the drum washer and introduced into the fermentation tank where the pepper is fermented, with daily change of water in the tank. After required days of fermentation, the fermented pepper is fed into the pulper-cum-washer for the removal of outer skin. The white pepper so obtained is washed and dried for a period of 2-3 days in the solar tunnel drier. The dried white pepper is cleaned, graded and packaged for commercial use.

GRADER FOR FRESH GREEN PEPPER

Function: Grading fresh green pepper to four grades
Capacity: 150 kg/h
Salient features: Rotary grader is provided with stainless steel sieves with perforations of 2.5, 4.5 and 6.5 mm diameter for grading fresh green pepper. The power required to operate the unit is 0.37 kW.

WASHER

Function: Washing in water
Capacity: 25 kg/batch
Salient features: The stainless steel washer drum is provided with a brushing unit and tilting arrangement for discharging washed produce. The power required to operate the unit is 0.37 kW.

FERMENTATION TANK

Function: Fermentation of pepper
Capacity: 250 kg/batch
Salient features: The stainless steel fermentation tank is provided with a perforated basket for holding fresh/dry pepper for white pepper production. The tank is provided with a circulatory steam coil for temperature regulation.

PULPER CUM WASHER

Function: Washing and removing the skin of fermented green/black pepper for white pepper production
Capacity: 200 kg/h
Salient features: The stainless steel pulper drum is provided with nylon brushes and paddles which facilitates the removal of outer skin of fermented pepper for white pepper production. The power required to operate the unit is 2.21 kW.

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SPICE PROCESSING FACILITY

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Spice Processing Facility at ICAR- Indian Institute of Spices Research, Peruvannamuzhi, Kozhikode, Kerala is setup with the objectives of encouraging research and entrepreneurship development in spice processing for product and process development. This facility is established to attract entrepreneurs in spice sector by developing integrated processing capabilities, hand holding entrepreneurs, providing training and technical guidance on quality maintenance as well as creating conducive environment for the growth of spices. The processing unit is equipped with state of the art facility for primary as well as secondary processing of spices. The facility has three units for cleaning and grading of black pepper, curry powder production and white pepper production.

BLACK PEPPER CLEANING CUM GRADING UNIT

Black pepper, the king of spices, is the whole dried fruit of the vine *Piper nigrum*. Black pepper is widely used as a condiment due to its characteristics aroma, pungency and biting taste. Two primary products of *P. nigrum* that are internationally traded are black pepper and white pepper. Fully matured green pepper spikes when one or two berries turn yellow are harvested, threshed and sun dried in open cemented yard to obtain dry black pepper. In this process, there are chances of dust, leaves, sticks and other foreign matters which may contaminate the spice. It is therefore necessary to clean black pepper before it is packaged and used for consumption. The pre cleaning equipments installed in the black pepper cleaning cum grading unit includes a black pepper cleaner cum grader, spiral separator and a metal detector. Once the black pepper is cleaned, it is graded according to size and then packaged in clean sunny bags.

CLEANER CUM GRADER

Function: Removal of dust and stones from black pepper and grading them according to size
Capacity: 200 kg/h
Salient features: It consists of a bucket elevator to lift black pepper, aspirator to suck dust, a vibratory shaker to remove stones and a grader to grade black pepper. The power required to operate the unit is 2.21 kW.

SPIRAL SEPARATOR

Function: Separation of sticks and dry leaves from black pepper
Capacity: 200 kg/h
Salient features: The unit separates black pepper from impurities like stick and dry leaves using gravity and centrifugal force. The unit consists of a bucket elevator to lift black pepper to the feed hopper. The power required to operate the unit is 0.37 kW.

METAL DETECTOR

Function: Removal of metallic impurities from black pepper
Capacity: 300 kg/h
Salient features: The unit is capable of detecting ferrous, non ferrous and stainless steel contaminants from black pepper. The contaminants are diverted by pneumatic valve powered by air compressor. The power required to operate the unit is 1.47 kW.

GRADER

Function: Grading of black/white pepper according to size
Capacity: 100 kg/h
Salient features: The unit is provided with rectangular stainless steel sieves with perforations of 3 mm, 4 mm, 5 mm and 6 mm for grading black/white pepper. The power required to operate the unit is 0.74 kW.

CURRY POWDER PRODUCTION UNIT

The curry powder production unit is equipped with facilities for powdering and packaging spices or spice blends. The spices brought to the unit are first checked for its moisture content and if the moisture content was found above 10 per cent, the spices are dried in the solar tunnel drier. The rotary drier can also be used for drying spices. Once the spices are dried, they are roasted in the drum roaster before powdering for flavour enhancement. The spices are then crushed in the plate crusher or finely powdered in the micro pulverizer as per the requirement. The powdered spices are sieved in the vibro sifter and is filled in packets and sealed. In case of curry powder production, different spices are blended in the required ratio and powdered. The powder is sieved and put into the blender for the production of homogeneous spice mix. The curry powder is then weighed automatically and filled in packets and sealed.

SOLAR TUNNEL DRIER

Function: Drying of spices
Capacity: 500 kg/batch
Salient features: The drying yard of size 12 x 4 m and centre height of 2.5 m is provided with arches made of galvanized iron pipes which are covered with UV stabilized polyfilm. The unit is provided with biomass furnace as backup and can be used even during rainy season. The electrical equipments provided inside the drier like exhaust fans, controller etc. are operated by solar powered system consisting of photovoltaic cells, inverter, batteries etc.

ROTARY DRIER

Function: Drying of spices
Capacity: 50-100 kg/batch
Salient features: Horizontal rotary drier is provided with LPG firing system for drying spices. The power required to operate the unit is 0.37 kW and LPG requirement is 1.75 kg/h.

ROASTER

Function: Roasting of spices before powdering
Capacity: 25-50 kg/batch
Salient features: The unit is provided with a stainless steel drum and operated using LPG firing system for roasting spices. The power required to operate the unit is 0.37 kW and LPG requirement is 1.05 kg/h.

CURRY POWDER PRODUCTION UNIT

PLATE CRUSHER

Function: Crushing of spices
Capacity: 100 kg/h
Salient features: The unit used for crushing spices between 800-1000 microns. The power required to operate the unit is 5.51 kW.

MICRO PULVERISER

Function: Fine grinding of spices
Capacity: 100 kg/h
Salient features: The unit consists of a hammer mill, blower and an air lock valve for powdering of spices to 800 microns or below. The power required to operate the unit is 15.1 kW.

SIFTER

Function: Sieving of spice powders
Capacity: 50 kg/h
Salient features: The unit is a double deck model provided with a circular stainless steel sieves. The power required to operate the unit is 0.37 kW.

BLENDER

Function: Homogeneous mixing of spice powders
Capacity: 50 kg/batch
Salient features: The unit consists of a stainless steel vessel provided with ribbon blender to mix spice powders homogeneously. The power required to operate the unit is 0.74 kW.

FILLING MACHINE

Function: Continuous filling of packets with spice powder
Capacity: 200 kg/h
Salient features: The unit consists of a cup type dozer for automatic measuring and filling of spice powder into packets (50-100 g). The power required to operate the unit is 0.74 kW.