Shell Charcoal

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Shell Charcoal is obtained by burning the shell of fully matured coconuts with a limited supply of air so that they do not burn away to ash but are only carbonized. The manufacture of shell charcoal from the coconut shell has become a very important economic and commercial activity. Furthermore, coconut shell charcoal, which was relatively minor product in the past, has now developed into a general commercial commodity due to its intrinsic value as a raw material for the manufacture of activated carbon. Coconut shell charcoal shall be of the following two types: Coconut shell charcoal – pieces and Coconut shell charcoal - granulated

Simple Mud Pits/ Brick Lined Pits

It is basically a simple process, consisting of burning the shells in a limited supply of air, so that the shells are only carbonized and not burnt to ash. The tricky part of this operation is to set the optimum conditions for carbonization to the correct degree. The charcoal manufactured by this method is of inferior quality, containing lot of impurities. Moreover emission of a lot of smoke and flue gases during the process causes atmospheric pollution.

Process (Drum Method)

M.S. Drum kiln is used for carbonization of shells. The drum consists of three sets of six 1" dia holes provided at its bottom, middle and upper layers and a lid. A detachable chimney is provided which is installed on the lid after closing the drum. The manufacture of charcoal requires optimum carbonization of raw shells in a limited supply of air so that there is neither unburnt shell nor ash due to complete combustion. The steel drum is filled with raw shells after placing temporarily a four inch diameter wooden pole in the centre of the drum. The wooden pole is then removed, leaving a hollow space in the centre which allows the flow of smoke during carbonization. To start carbonization, a piece of burning rag is dropped to the bottom of the drum through the hollow space in the centre. When the fire is well underway, the lid with the chimney is placed into position and the upper and the middle sets of holes are closed. Carbonization which starts at the bottom progresses as it goes up as well as radially from the hollow space. When carbonization is complete in a particular zone, a persistent glow can be seen in all the six holes of a set. When the bottom most set of holes indicate this situation, the middle set of holes is opened and the bottom set closed. The stoppage of air flowing into the bottom region avoids over-carbonization in that region. The progressive carbonization results in reduction in volume of contents and therefore more shells are added from the top. When the middle region is

carbonized well, the top set of holes is opened while the middle set is now closed. A further addition of raw shells is done to fill the volume reduction to maximise capacity for burning. When the top region is well carbonized, the top set of holes is also closed, resulting in complete stoppage of air inflow to the drum. The drum is then cooled for about eight hours after which the product is ready for discharge.

Gasifier Technology

It is a new technology adopted by many of the companies for the production of shell charcoal. In this method the coconut shells are dumped into a gasifier and heated at a temperature of 800°C or more than that. The heat generated during the production of shell charcoal is separated out with the help of a cyclone separator and is used for purposes wherever heat can be utilized which ultimately help the entrepreneur to earn more profit.

Granulated Charcoal

The charcoal prepared is then pulverized to form granules and the granules are then used for the processing of activated carbon.

Packaging and Marking

Unless otherwise specified, coconut shell charcoal shall be packed in sacks suitable for safe transportation. They shall be of uniform size containing 50kg of the material. Each container shall carry a tag/label clearly marked with all details.

Charcoal Briquettes

The shell charcoal powder is the waste product obtained during the processing of charcoal. The powder is binded with the help of binding materials and moulded in the form of briquettes using moulding machine.

Yield of the product

In India, the average output has been found to be 35 Kg of charcoal from 1000 whole shells or about 30,000 whole shells yield 1 tonne of charcoal.

Properties of Shell Charcoal

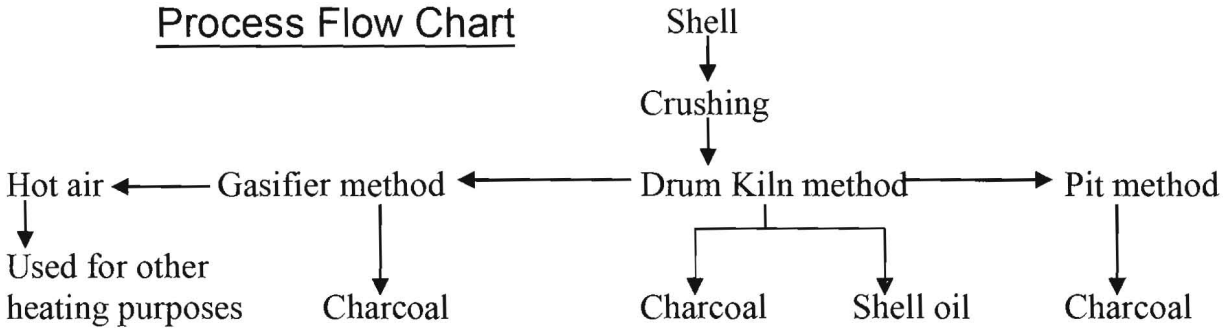
Good coconut shell charcoal is uniformly dark and snaps with a clean shining fracture and produces a metallic sound, when dropped on hard ground.

Underburnt shells do not give a metallic sound and a clean fracture, while the overburnt ones are friable and the surface of the fracture sounds dull when dropped and easily crumbles. Coconut shell charcoal contains the highest percentage of fixed carbons of all the lignaceous charcoals. The average composition of good charcoal is moisture 6.24%, volatile 5.46 %, ash 0.54% and fixed carbon 87.76%. The quality standards for shell charcoal as per Asian and Pacific Coconut Community (APCC) are as follows:

Moisture	Less than 10%
Ash	Not more than 2%
Volatile matter	Not more than 15%
Fixed carbon	Not more than 75%
Foreign matter	Not more than 0.5%
Colour	Black
Size	Not more than 5%, shall pass a 0.63 cm mesh sieve.

Uses of Shell Charcoal

The charcoal has a high adsorption capacity for gases and colouring matter and can therefore be used



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