

# Antibacterial and Antifungal Activity of Crude Coconut Shell Oil

Coconut (*Cocos nucifera*) is a palm tree growing in the tropics. The nut contains white meat and sweet water which has anti-bacterial, antifungal, anti-viral anti-inflammatory, antioxidant activities. Antimicrobial activity of the water extract of coconut husk has already been demonstrated. However, studies regarding the polyphenol content of the coconut fruit wall are limited. Coconut shell can be grinded into powder and used as a filter for synthetic resins. It is also used as activated carbon and charcoal. Oil derived from coconut shells have been shown to have antimicrobial and anti-fungal activity.

Traditionally coconut shell oil has been used for the treatment of skin infections. It has been used for antitumor, antihelminthic, antimicrobial, anti-inflammatory antiseptic and antioxidant activity. A project was conducted by Sodha R., Gaonkar S, Kolte S. and Padmanabha P of Department of Chemistry, Kishinchand Chellaram College, Churchgate, Mumbai to extract oil from the coconut shell, purify it and test it for anti-bacterial and anti-fungal activity. The shell oil was first extracted by modified method then it was subjected to sequential solvent extraction with petroleum ether, chloroform and methanol. The anti-bacterial and anti-fungal activity was checked by ditch plate and agar cup diffusion method. The microbial activity was found to be more active in Petroleum Ether extract, hence an attempt was made to separate the components present in it by Flash Column Chromatography. The

monitoring was done with TLC, and pure components were further studied for identification of Functional groups present in it using FTIR.

Coconut shells from south Mumbai were collected. They were cleaned and sun dried. Then the cleaned shells were polished with paper to make the surface of the shells smooth. Further the shells were ground manually to make small pieces which were used in extraction of the crude coconut oil. Petroleum ether, Chloroform and Methanol were used as solvents in the extraction and chromatographic procedures.

About 250gms of ground shells were heated in the earthen pot for a span of 3hrs giving a yield of 25cc of oil. The oil was fractionalized using the solvents. A 0.74m long silica column was used for separation of the extracts obtained by solvent extraction. 5.5gms of silica gel was taken and activated in hot air oven. Organic spotting was done for samples obtained from column chromatography to detect the presence of elements like nitrogen, chlorine, sulphur or any other halogens. The samples were further subjected to IR Spectroscopy and Gas Chromatography Mass Spectroscopy which has indicated the probable function group and molecular weight.

The samples were tested for their anti bacterial and antifungal activity. Petroleum ether extract is effective on *S. aureus* which is responsible for skin infections. It also gave satisfactory result for *E. coli* which is a part of normal intestinal flora though the shell oil gave comparatively lesser inhibition. Hence it can be concluded that the anti-bacterial and anti-fungal activity is shown collectively by several components of the fractionated coconut shell extract.

We can use the petroleum ether extract of the crude coconut shell extract as an alternative. Further tests need to be done to separate and purify the compound that is responsible for the inhibitory effect.

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