WHITE PEPPER

White pepper is obtained by removing the outer skin, namely pericarp and outer portion of the mesocarp of the ripe or matured green berries or dried black pepper (*Piper nigrum* L.). The white pepper berries are light yellow greyish in colour; nearly globular in shape; around 5mm or less in diameter; smooth; striated with small protuberance at the base.

**Scope of White Pepper**

India is the 4th largest pepper producer in the world, production of 67,000 metric tons in 2008. Annual white pepper contribution in India is less than 250 metric tones against the world demand of more than 1,50,000 metric tones. Indonesia is the largest white pepper producing country, converts about 50% of its pepper to white. Malaysia and Brazil convert about 10% and 5% of their pepper to white respectively.

**CLEAN PRODUCTION OF WHITE PEPPER- A SUCCESSFUL BIOPROCESS**

The hard outer skin is loosened in 2 to 4 days using the general purpose “leach-bed anaerobic digestion” process developed by NIIST-CSIR. The in-situ microbial production of hydrolytic enzymes is responsible for the degradation of the skin.

**Current status**

There are chemical, biological and physical methods for the conversion of pepper into white pepper. Natural retting can be used to remove the skin, but requires long time (7-15 days) steeping the pepper in stagnant or running waters. Major limitations of this retting process include quality deterioration of the product.

During the process pectin, the intercellular cementing substance present in the pulpy upper mesocarpic area of pepper skin is degraded and breaks apart from the core. The pectin degradation is effected through release of pectinases by the bacteria grown in the anaerobic system. The best operational conditions for biological skin removal through the anaerobic process are in temperature between 30 to 37 C and neutral pH.

This pectin fermentation begins from the day one and completes on 2nd or 3rd in green pepper and 4th day in black pepper.

In the process of white pepper preparation volatile fatty acids (VFA) are generated from the degradation of pectin. This VFA is not accumulated in the system because of the growth of methanogens that convert the short chain fatty acids
into methane and thus removed simultaneously.

**Cleaning & Drying**

The loosened and partially degraded skin is removed with the help of a fruit pulping machine and water washing. The decorticated pepper is sun dried or in a hot air drier adjusted at 45°C to brings down the moisture content <15% (w/w) in pepper.

**Quality of the product**

The white pepper obtained from fermentative decortication of green pepper is brilliant creamy white, has no extraneous matters. The white pepper from black pepper also has better colour, less than 2 % light berries and no extraneous matter compared to commercial grade white pepper. The cleaning and removal of light berries from green and black pepper before the bioprocess could result in white pepper with uniform size and better quality.

**Advantages of the new process**

- Value addition to pepper
- Achieves good quality product
- Inexpensive
- Easy operation
- Higher earnings to farmers
- Means of higher export earnings
- Pollution free
- Value recovers from wastes

The process yields better quality white pepper and is operational at different scales, hitherto impossible. Plants using this process are operated at different places from 0.5 ton to 1.0 in Kerala and Karnataka.

No wastes and pollution

Solid wastes: Bio-manure

Biogas generation: 25,000 litre per tonne black pepper

Yield: 700 kg white pepper per tonne of black pepper

**Plant:**

**Major equipment**

1. Leaching tank
2. UASB reactor
3. Pulper cum cleaner
4. Dryer

**Capital investment 1 t white pepper/d**

Rs .1.5 crore

2009 price in India

Black pepper : Rs 130-150/kg
White pepper: Rs 240-250/kg

For more information:

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