B-01: Inhibition of growth of toxigenic *Aspergillus parasiticus* in desiccated coconut by coconut shell smoke

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In curing of copra, the coconut kernels are dried directly in kilns using coconut shells as fuel. The smoke curing of copra is reported to reduce fungal contamination and aflatoxin production in addition to drying. The possible effect of coconut shell smoke on growth of toxigenic *Aspergillus parasiticus* NRRL 2999 and the production of aflatoxin in desiccated coconut and on synthetic media, were examined with a view to understand the role of smoke.

Coconut shell smoke-liquid was prepared by aspirating the smoke produced during controlled burning of coconut shells in a pilot kiln to water at 10°C. Smoke produced during first and second 45 min durations were collected separately.

Sterilized desiccated coconut (20 g) in conical flasks were moistened to 10 - 50% using different concentrations of smoke-liquid. The flasks were incubated static at (25 ± 2)°C for 7 days and were shaken twice daily. The fungal growth in the flasks were observed and the experiment terminated by steaming the cultures for 10 min. The aflatoxin concentrations in the cultures were estimated by extraction into aqueous acetone and thin layer chromatographic assay.

Desiccated coconut exposed to coconut shell smoke for 15 and 25 min in a pilot kiln was moistened to 10 - 50% and the growth of *Aspergillus parasiticus* and toxin production were observed as in the above experiments.

Coconut agar medium (500 g of desiccated coconut and 30g of agar in 1 l of water/smoke-liquid) was prepared using undiluted and diluted liquid smoke in the ratio of 3:1, 1:1, 1:3 and distilled water as controls. The smoke-liquid for this experiment was prepared by aspirating smoke for 3 h.

The *Aspergillus parasiticus* was streaked on the petri plates containing above media and the growth of fungus and violet-blue fluorescence under uv light at 365 nm in the reverse of plates were observed daily during incubation for 7 days.

The different concentrations of smoke-liquid used to moisten the desiccated coconut did not cause differences in fungal growth or duration for sporulation. All cultures sporulated on the fourth day of incubation. Aflatoxin concentrations of 76, 63, 85, 76, 59 and 76 μg/g were observed with different smoke-liquid and moisture concentrations, indicating no significant effect on aflatoxin production.

Aflatoxin concentrations of 129, 127, 123, 123 and 176 μg/g were observed in coconut agar media prepared using distilled water, smoke-liquid diluted to 3:1, 1:1, 1:3 and undiluted liquid smoke respectively. Growth pattern of the fungus did not show any difference in the synthetic media prepared using different concentrations of smoked liquid or water.

Violet-blue fluorescence was detected after 3 days under UV light at 365 nm in all media tested.

In experiments using smoked desiccated coconut, delayed growth of *Aspergllus parasiticus* was observed with increased exposure of desiccated coconut to smoke. The sporulation of the fungus occurred on the 4th day in the controls, on the 5th day in desiccated coconut smoked for 15 min and on the 7th day in desiccated coconut smoked for 25 min.

Smoke curing of desiccated coconut delayed fungal growth and sporulation whereas addition of liquid smoke did not affect fungal growth and aflatoxin production. The inhibition may probably be due to constituents in smoke which are not water soluble, but deposited on surface of desiccated coconut particles.