CIRCOT Leaflet No. 19

Respirable Cotton Dust : A Health Hazard

Central Institute for Research on Cotton Technology, Mumbai

Introduction

Gin operators and textile mill workers employed in blowroom and other cotton processing areas exposed to respirable dust in the mill environment very often get fever with unique symptoms. This mill fever syndrome is popularly known as **Byssinosis**. The cotton dust in the atmosphere inhaled by the workers induces allergic reactions resulting in high fever which is akin to tuberculosis. The high concentration of some of the toxic inorganic elements present in the respirable fraction of the dust is reported to be one of the causal agents for this fever. The presence of Gram-negative bacteria, namely *Pantoea agglomerans* in significant numbers also induces allergic reactions. The lipopolysaccharides present in the cell walls of these bacteria are the main allergents as confirmed by the clinical tests.

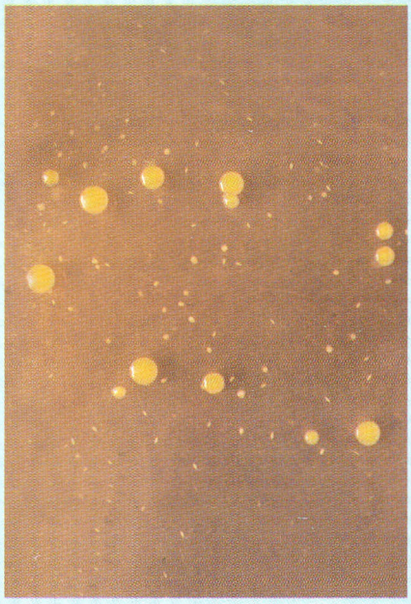
Dry bits of cotton leaves and bracts that harbour significant number of *P. agglomerans* get entangled with the seed cotton during picking. This bacterium continues to remain in the lint even after subsequent mechanical processing though in reduced numbers.

CIRCOT Findings

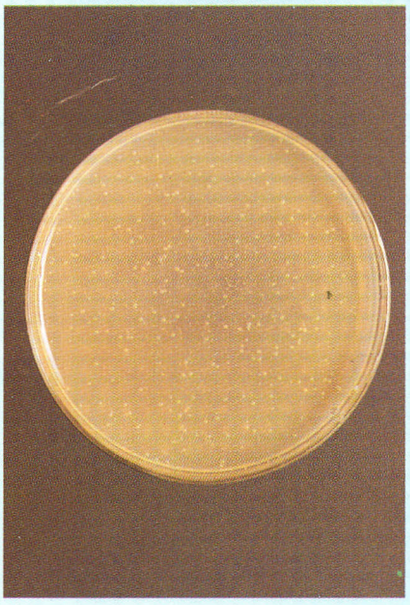
CIRCOT has established that even the cotton lint in the never-dried state in the developing boll harbours Gram-negative bacteria. It is also confirmed that the pollen grains which specifically harbour these bacteria contaminate the developing ovule during fertilisation and the lint thereafter.

One of the significant features discernible is that the four types of bacteria, all gram-negative in nature, have

B. Indica



P. agglomerans



Xanthomonas sp.

K. oxytoca

Cultural Characteristics of Gram-negative Bacteria

been recovered from the developing boll. They have been identified as *Pantoea agglomerans, Beijerinckia indica, Klebsiella oxytoca* and *Xanthomonas* sp. The bacterial count is very high in the early stages of boll development and decreases significantly on boll bursting. This clearly establishes that the bacterial load due to the presence of trash although can be minimised, their prevalance on the lint cannot be completely avoided.

Studies at CIRCOT have also established that the respirable fraction of cotton dust contains certain highly toxic inorganic elements such as Ni, Br, Cd, Ba, Si, Mn, Co, Zr, and moderately harmful ones such as S, K, Ca, Na and Fe though in different concentrations.

The Remedy

Preventing the entry of contaminants and reducing trash by clean picking by avoiding plant parts combined with proper storage and transportation would help in minimising the bacterial load on lint and also in reducing the concentration of toxic elements in respirable dust. As a safety measure, use of good quality face masks should be made mandatory for mill workers exposed to cotton dust.

For further details contact :

The Director
Central Institute for Research on Cotton Technology
Adenwala Road, Matunga, Mumbai 400 019

Tel. : 412 7273, 412 7276, 415 7238, 415 7239,
418 4274 & 418 4275
Fax : 022-413 0835
Gram : TECHSEARCH
E-mail : circot@bom.nic.in (or) circot@vsnl.com