

## Lung diseases caused by the inhalation of dusts and fibres from cotton, flax, hemp, jute, sisal and bagasse

### Definition of causal agent

Respirable fraction of dust from cotton (bracts, leaves, stems), flax (stems), hemp, jute sisal and bagasse.

#### *Main occupational uses and sources of exposure:*

Work exposing workers to the inhalation of dusts and vegetable textile fibres: e. g. beating, carding, drawing, combing, spinning, winding and twisting (cotton, flax, hemp, jute, sisal) and sugar cane processing (bagasse).

Inhalation of dusts and fibres of cotton, flax, hemp, jute and sisal produce a clinical picture similar to byssinosis, whereas bagasse produces a different entity, bagassosis, which is a form of extrinsic allergic alveolitis. See Annex I entry nr. 304.01 on *Extrinsic allergic alveolitis*.

### Health effects

#### 1. Local effect

##### Irritant effects

These organic dusts cause irritation to the mucous membranes.

See section on *Occupationally caused irritation of the skin and mucous membranes* in Annex I entry nr. 202.

#### 2. Systemic effects

##### Byssinosis

Byssinosis is generic name applied to airway disease among workers occupationally exposed to agents mentioned above. The mechanisms of and the etiologic agents causing byssinosis remain obscure. The most probable cause is endotoxin of bacteria living on the textile fibres.

Recently new terminology has been introduced dividing byssinosis into 'acute' and 'chronic' forms.

##### Occupational asthma

Sometimes exposure to dust from cotton, flax, hemp, jute and sisal may cause occupational allergic asthma.

See Annex I entry nr. 304.06 on *Allergic asthmas caused by the inhalation of substances consistently recognised as causing allergies and inherent to the type of work*.

##### Bagassosis

Exposure to mouldy sugarcane may cause extrinsic allergic alveolitis.

See Annex I entry nr. 304.01 on *Extrinsic allergic alveolitis*.

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## □ Acute byssinosis

These set in during the first day of exposure after an induction period of several hours. The effects include shivering, tightness of the chest, dyspnoea, fever and malaise. The symptoms disappear after one or two days. If re-exposure occurs after a period of non exposure, they reappear. There are few objective signs: bronchi may be present on auscultation. Reduced pulmonary function occurs in the acute stage. There are no specific spirometric, radiological or serological signs.

### *Exposure criteria:*

*Minimum intensity of exposure:* Occupational exposure confirmed, if possible assessed, by:

- anamnesis and study of working conditions providing evidence of exposure to these vegetable dusts,
- and, if available:
  - workplace air monitoring: guide value: atmospheric concentration above 0.2 mg/m<sup>3</sup> (total dusts).

*Minimum duration of exposure:* Several hours. Five hours exposure to a dust level of 0.5 mg/m<sup>3</sup>. (according to GB threshold limit value)

*Maximum latent period:* 48 hours.

## □ Chronic effects

### **Chronic byssinosis**

Obstructive airway disease with late onset of moderate to severe dyspnoea, tightness of the chest, gradually increasing during the working week and over a period of years. Shivering and malaise, as described under acute effects, gradually decreases as the years pass.

Objective signs: reduction of the Forced Expiratory Volume in 1 second (FEV<sub>1</sub>). Severe cases display a decrease in Forced Vital Capacity (FVC).

Usually there are no radiological signs.

### *Exposure criteria:*

Bagasse: see document on extrinsic allergic alveolitis

*Minimum intensity of exposure:*

Occupational exposure confirmed, if possible assessed, by:

- anamnesis and study of working conditions providing evidence of prolonged or repeated exposure to these vegetable dusts,
- and, if available:
  - workplace air monitoring: guide values:  
atmospheric concentration above 1.5 mg/m<sup>3</sup> (total dusts),  
symptoms may occur at lower dust concentration as if actual exposure has occurred for more than 20 years,
- Byssinosis: may be complicated by chronic bronchitis and emphysema. Other factors such as smoking should be taken into account.

*Minimum duration of exposure:* 10 years exposure to a dust level of 1.5 mg/m<sup>3</sup>.

Maximum latent period: Five years.

**Diagnostic criteria:**

**Table 1. Grading system for byssinosis according to WHO**

Classification	Symptoms
<b>Grade 0</b>	No symptoms
<b>Byssinosis</b>	Chest tightness and/or shortness of breath on most of first days back at work
Grade B1	
Grade B2	Chest tightness and/or shortness of breath on the first <b>and</b> other days of the working week
<b>Respiratory tract irritation</b>	
Grade RTI 1	Cough associated with dust exposure
Grade RTI 2	Persistent phlegm (i.e., on most days during 3 months of the year) initiated or exacerbated by dust exposure
Grade RTI 3	Persistent phlegm initiated or made worse by dust exposure either with exacerbations of chest illness or persisting for 2 years or more
<b>Lung function</b>	
<b>Acute changes</b>	
No effect	A consistent <sup>a</sup> decline in FEV <sub>1</sub> of less than 5% or an increase in FEV <sub>1</sub> , during the work shift
Mild effect	A consistent <sup>a</sup> decline of between 5 and 10% in FEV <sub>1</sub> , during the work shift
Moderate effect	A consistent <sup>a</sup> decline of between 10 and 20% in FEV <sub>1</sub> during the work shift
Severe effect	A decline of 20% or more in FEV <sub>1</sub> during the work shift
<b>Chronic changes</b>	
No effect	FEV <sub>1</sub> <sup>b</sup> 80% of predicted value <sup>c</sup>
Mild to moderate effect	FEV <sub>1</sub> , 60-79% of predicted value <sup>c</sup>
Severe effect	FEV <sub>1</sub> <sup>b</sup> less than 60% of predicted value <sup>c</sup>

<sup>a</sup>A decline occurring in at Least three consecutive tests made after an absence from dust exposure of 2 days or more.

<sup>b</sup>Predicted values should be based on data obtained from local populations or similar ethnic and social class groups.

<sup>c</sup>By a preshift test after an absence from dust exposure of 2 days or more.