

Wheat and other cereal flour dusts

No. 2017/10

Executive summary

Health Council of the Netherlands



At the request of the Minister of Social Affairs and Employment, the Dutch expert Committee on Occupational Exposure Safety (DECOS), one of the permanent Committees of the Health Council, has updated its recommendation on occupational exposure to wheat flour dust and the risk of sensitisation. Previously, the Health Council derived a health-based recommended occupational exposure limit of 0.12 milligram (mg) inhalable wheat flour dust per cubic metre (m³) air (8-h mean for a working day). In the current report, the Health Council adjusts its advisory value to 0.2 mg inhalable wheat flour dust per m³ air.

Wheat flour dust: health risks for bakers

Exposure to flour dust from wheat and the related cereal grains rye, barley and oats (hereafter referred to as wheat flour dust) can lead to diseases, including:

- asthma;
- inflammation of the nasal mucous membrane;
- inflammation of the conjunctiva.

These can be the result of an allergic reaction. In particular, the health effects concern people who work in bakeries and the flour processing industry.

Recommendation based on 1% extra risk of sensitisation

A chemical-induced allergic reaction is preceded by sensitisation: the situation at which the immune system is triggered, but no (significant) complaints have yet occurred. For recommendations on allergens, including wheat flour dust, the Health Council applies the principle that not only the allergic complaints, but also the sensitisation should be prevented. For inhalatory allergens, it is generally not possible to derive a concentration below which no sensitisation occurs. In those cases, the Health Council calculates the concentration at which the extra risk of sensitisation by occupational exposure is *limited* to 1%.

In the general population – independently from occupational exposure – 2 out of 100 people (2%) are sensitised for wheat flour dust. An

extra risk of 1% means that in a workplace where people are exposed to wheat flour dust not 2, but 3 out of 100 people are sensitised. For allergens, this ‘1% extra’ is the starting point for the Dutch OEL-system.

New calculation based on additional information

In the previous advice of the Health Council, the Committee has used a study in Dutch bakery workers and the risk of sensitisation to wheat flour dust. On the basis of this study an advisory value was derived of 0.12 mg per m³ air, corresponding with a 1% extra risk of sensitisation. Since then, two new studies have been published that can be used to derive an advisory value. One study was done in bakery workers in South Africa, the other in Dutch bakery workers – similar to the study used for the previous recommendation.

On basis of the study in South-African bakery workers, the Committee calculates an exposure level of 0.04 mg/m³, corresponding to an extra risk of 1%. This suggests that at lower exposure



levels South-African bakery workers are already at a certain risk.

The Committee considers it likely that the differences in sensitisation risk between Dutch and South-African bakery workers is the result of a relatively large number of people predisposed to allergies (atopy) in the South-African population. The Committee also notes that working conditions in South-Africa differ from those in the Netherlands. The Committee therefore considers the study in South-African bakery workers not representative for the Dutch workers and concludes that the most reliable estimation of sensitisation risk can be made on basis of the studies in Dutch bakery workers.

Based on the two Dutch studies, the Committee derives an advisory value of 0.2 mg inhalable wheat flour dust per m³ air. This concentration is higher than the previous recommendation (0.12 mg/m³). The difference can be explained by the fact that the Committee has combined new data and data used previously, which increases the reliability of the estimation.

Recommendation to the minister

For occupational exposure to wheat flour dust, the Committee derives a health-based recommended exposure level of 0,2 mg inhalable dust per m³ air, as a mean concentration over a 8-h working day. At this concentration, workers have a 1% extra risk of wheat flour dust sensitisation compared to the general population.



The Health Council of the Netherlands, established in 1902, is an independent scientific advisory body. Its remit is “to advise the government and Parliament on the current level of knowledge with respect to public health issues and health (services) research...” (Section 22, Health Act).

The Health Council receives most requests for advice from the Ministers of Health, Welfare and Sport, Infrastructure and the Environment, Social Affairs and Employment, and Economic Affairs. The Council can publish advisory reports on its own initiative. It usually does this in order to ask attention for developments or trends that are thought to be relevant to government policy.

Most Health Council reports are prepared by multidisciplinary committees of Dutch or, sometimes, foreign experts, appointed in a personal capacity. The reports are available to the public.

This report can be downloaded from www.healthcouncil.nl.

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