HILCAN

Hazards of illicit indoor cannabis cultivation for the environment and intervention staff

SUMMARY

Illicit indoor cannabis cultivation in Belgium is a growing phenomenon, as indicated by a growing number of confiscated indoor cannabis plantations over the past few years. In 2003, only 35 indoor plantations were seized, whereas that number has grown to 466 in 2007 and to 1241 in 2015. Indoor cannabis cultivation entails a number of health, safety and environmental risks such as booby traps, unsafe electric wiring (leading to electrocution or fire), toxic atmosphere, toxic liquids in the growth rooms, assimilation lights emitting pernicious UV-radiation, molds on moist walls, allergic reactions to cannabis plants and structural damage to the buildings in which growth rooms are installed, leading to instability and/or collapse of structures.

Besides to growers and growth rooms employees, these risks pose a particular threat to intervention staff. In Belgium, local or federal police office staff is often the first to enter indoor cannabis plantation and are thereby acutely exposed to the aforementioned risks. Furthermore, Civil Protection, fire fighters, lab intervention teams and eventually dismantling firms are frequently involved in cannabis plantation seizures and are equally exposed to some of these health risks. Cannabis growth rooms are isolated as much as possible from the outside. However, it is possible that harmful substances can leak through the sewage system, by percolation into the soil or through the ventilation system. In those cases, also the direct environment of the growth rooms is threatened. Today, intervention staff is groping in the dark when assessing health and environmental risks of indoor cannabis plantations. As a result, there is no reliable information on the most appropriate personal protection equipment or safety procedures to be followed when entering and performing activities in indoor cannabis plantations.

The HILCAN project therefore has made a scientific assessment of the environmental and health hazards of indoor cannabis plantations by collecting field data and product and

material samples on seized cannabis plantations. In the period between 17 June and 3 December 2014, 43 Belgian indoor cannabis plantations were studied. Data was collected on the growth room installations and pesticide, growth promoting and/or other chemical substances containers. Samples were taken from i) the atmosphere (gas measurements by means of a MultiRAE™ portable gas monitor); ii) liquid substances as well as stagnant water; iii) cannabis plants; iv) carbon filter cloth; and v) molds. Air, plant and carbon filter cloth samples were toxicologically analyzed by LC-MS/MS. Mold samples were cultured in petri-dishes and subsequently morphologically identified.

In order to obtain a better idea on the real impact of the safety risks to which intervention staff is exposed when entering cannabis plantations, a survey was performed in which experienced irritation and/or allergy symptoms were asked and recorded. The survey (22 October – 15 November 2015) was distributed online to all local and federal Belgian police units, the Civil Protection and the social workplace wotepa (that performs the majority of dismantling of Belgian cannabis plantations).

Results show that the risks linked to inappropriate electric wiring (electrocution, fire) are considerable. In 44 % of plantations, electricity was tapped before it came to the meter and on a third of plantations, electrical heating systems were found. The real share of plantations that has tapped electricity before it came to the meter is probably higher because there was no data on electrical wiring in 35 % of the plantations studied. In 37 % of plantations, molds were found. In only 1 case, molds were found on flower buds and could be identified as *Aspergillus* sp. and *Penicillium* sp. The other molds were found on floors, ceilings, doors and the turbine that is used for air evacuation. In halve of the mold samples *Penicillium* sp. was identified, whereas in 30 % of samples that was *Aspergillus* sp. In two samples, *Fusarium* spp. were found and *Botrytis* sp. and *Trichoderma* sp. were found in one sample for each species. *Aspergillus* sp. is carcinogenic and inhalation of *Aspergillus* spores and/or mycelium can lead to aspergillosis (pulmonary infection).

Gas monitoring in the studied cannabis plantations did not reveal dangerous toxic substances. However, measurements had always been performed after plantations had first been visited by police officers so that a toxic atmosphere during this first visit possibly remained undetected.

Several chemical substances were found in the studied plantations: pH-regulators, different plant growth and flowering enhancing substances and (bio-)pesticides. pH-regulators included nitric, phosphoric and sulfuric acid and potassium hydroxide. The latter strong acids and bases can cause severe burns, promote fire and are pernicious when swallowed. A total of 23 different pesticides were found in labeled bottles: 11 bio-pesticides and 12 chemical pesticides.

Qualitative analysis of a total of 118 samples (72 samples of cannabis plants and 46 samples of carbon filter cloth) revealed 19 different pesticides. Pesticides were found on 64 % of cannabis plant samples and 65 % of carbon filter cloth samples. On 35 % of cannabis plant and 33 % carbon filter cloth samples, more than 1 pesticide was found.

In 7 out of 40 water samples (17.5 %) at least 1 pesticide was detected. Most frequently found pesticides were propiconazole, propamocarb, befinazate, tebufenpyrad, abamectin B1a, o-phenylphenol, chlormequat chloride and imidacloprid. In the carbon filter cloth samples, most frequently found pesticides were propamocarb, tebufenpyrad, beta-cyfluthrin, chlorfenvinphos and triadimenol. Pesticides found in water samples consisted of 11 insecticides, 6 fungicides and 2 acaricides. Although a bottle of parathion was found on 1 plantation, the latter substance could not be detected in the samples. The most frequently occurring pesticides in our samples have relatively low toxicity. However, swallowing or inhalation of these products can be very pernicious. Dermal contact with the detected pesticides can cause skin irritation and allergic reactions. Some of the identified pesticides do have a high toxicity. They include tebuconazole and myclobutanil that are very hamful to the unborn child; and abamectin, beta-cyfluthrin, chlorfenvinphos, chlorpyrifos dichlorvos, dioxathion, parathion and propoxur that are lethal when ingested at a high dose.

The survey of intervention staff (221 questionnaires were returned) revealed that 60 % of respondents had experienced at least one health symptom during or after having spent time in a cannabis plantation. Fifteen % of respondents even reported at least 3 different symptoms. Moreover, we found a significantly higher frequency of reports of skin and nose irritation from intervention staff that more frequently spent time in cannabis plantations.

We conclude that the hazards of (frequent) visits to indoor cannabis plantations are real: there is a considerable amount of health symptom reports by intervention staff and in the

majority of plantations pesticides (including some very toxic ones) were found. Based on the latter conclusions, a number of recommendations for safety procedures and personal protection equipment were formulated for i) all incidental interventions by police, medicinal staff, utility companies (for detection of disturbances or reparations of damaged electric grids); ii) fast sweeping by police; iii) registration activities by police investigators; iv) forensic wrapping by regional or central laboratories; and v) removal of liquid, chemical products, cannabis plants and lamps and growth installations by Civil Protection, private dismantling companies, communal services and/or fire fighters.