

Summary from the reviewer of ECHA

The RIVM was asked to determine whether playing sports on synthetic turf pitches with an infill of rubber granulate is safe. In a similar way to ECHA, RIVM compared the results of the concentrations of substances found in rubber granules with the exposures generated from a number of different exposure scenarios developed for the purpose of the assessment. These elements were then compared to determine if there was a health risk for players. The key difference between ECHA and RIVM's methodology was that RIVM sampled 100 pitches to determine the concentrations and migration/evaporation of substances from the rubber granules. ECHA used results from the literature, including the data from the RIVM sampling.

The sampling methods used by RIVM were reported in Part A of the Scientific Background information. One hundred pitches were randomly selected from a list mainly provided by the Dutch Football Association (KNVB) and 6 samples taken from each field. From some fields additional samples were taken to be analysed by separate laboratories for quality checking and for separate migration/evaporation analysis. The sampling and measurement techniques are not all specified in relevant legislation or standards but the methods undertaken seem reasonable and the results reliable, given the checks carried out by TNO for PAHs and phthalates.

Some samples were taken from pitches using granules from rubber products other than tyres and these were not explicitly included in the assessment. On page 24 of the report it was stated that the concentrations of substances do not substantially differ from those from the samples with SBR rubber, except in the samples from two of the nine pitches where high levels of phthalates were found. However, it is not clear from the report why these were treated differently from other samples as the scope of the investigation was on rubber granules used in synthetic turf. As 9% of the fields had 'materials other than rubber granules from car tyres' this could mean up to 170 pitches in the Netherlands alone (given the reported 1900 pitches). The reasons for this exclusion could be better explained.

The method used by RIVM to select substances for further investigation is described in the report and is considered reasonable. However, it may have been useful to further identify substances in the screening tests that were not fully characterised. Nonetheless, ECHA acknowledges the time constraints for the RIVM investigation.

A number of substances (including PAHs, phthalates and benzothiazoles, phenols and metals) were selected for the hazard assessment. These were similar to the substances ECHA identified for further investigation, even though ECHA used a slightly different approach.

Similarly to ECHA, the RIVM used the BMDL10 derived by EFSA (2008)¹ as the point of departure for the PAHs. For the other substances, a DNEL (or other health based limit of non-threshold substances e.g. lead) was identified to take forward in the risk assessment. These DNELs/thresholds seem reasonable and are in line with those used in the ECHA report. Regarding the DNEL for cobalt, the RIVM report does not discuss if the conclusion of RAC that 5 soluble cobalt salts² have a non-threshold mode of action was considered. Depending on the species of cobalt present in rubber granules the conclusions of RAC may or may not be relevant.

In the RIVM report, 5 Exposure scenarios were prepared: children aged 6 or under; goalkeepers aged 7; children aged 11-18 and adults. ECHA developed similar Exposure Scenarios with some different boundaries related to age: children aged 3-6; children aged 6-11; goalkeepers aged 6-11; children aged 11-18; adult professionals and adult

¹ Polycyclic Aromatic Hydrocarbons in Food. Scientific Opinion of the Panel on Contaminants in the Food Chain Adopted on 9 June 2008: available at http://www.efsa.europa.eu/sites/default/files/scientific_output/files/main_documents/724.pdf.

² Establishing a reference dose response relationship for carcinogenicity of five cobalt salts. RAC. 2016. Available from: https://echa.europa.eu/documents/10162/13563/rac_agreement_cobalt_salt_en.pdf/43762b12-5e8f-457a-9858-f5a4737c2e00.

professional goalkeepers. In addition, ECHA developed an exposure scenario for workers installing or maintaining the pitches.

The parameters used in developing the exposure scenarios were very similar between the RIVM and ECHA reports. However, some parameters differed, for example the PM10 value used to estimate inhalation exposure (12 µg/m³ in the RIVM report vs 40 µg/m³ used in the ECHA report) and the direct ingestion values (0.05 g/event for children under 11 and 0.01 for adults in the ECHA report vs 0.2 g/event for children under 11 and 0.05 for adults in the RIVM report). The latter difference was significant as oral exposure is the biggest contributor to the risk. It is acknowledged that the lower amount of granules that ECHA assumed to be ingested by players is not based on concrete evidence. Overall, the Exposure Scenarios used in the RIVM report seem reasonable.

For the PAHs, the total excess risk calculated by RIVM for outfield players and goalkeepers was 9.42E-07 and 2.44E-06 respectively. ECHA calculated for goalkeepers a lifetime excess risk of 7.5E-07 and for outfield players 7.73E-07. These are very similar results. For the other substances in rubber granules that were assessed, RIVM calculated RCRs < 1 with the exception of exposure to lead of children under 7. The reasoning given why the lead exposure was not significant was plausibly explained and was related to the amount of granules ingested in reality and if the total amount released from the ingested granules was available for absorption.

One further point was that both reports did not consider in detail any risks from the synthetic turf itself (the artificial grass blades and backing) and whether substances may leach from the turf to the granules or give rise to direct exposure themselves.

Overall I found the report was of good scientific quality given the constraints placed on you.