



Use of carbon footprint to assess CO₂ and N₂O emissions during the production of nitrogen fertilizers

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ABSTRACT

Fertiliser production makes a significant contribution to energy consumption and greenhouse gas emissions. The analysis of emission factors was carried out on a data set spanning from 2013 to 2015 for the whole chain of fertiliser production from raw materials up to the final products – ammonium nitrate, ammonium sulphate, urea in prilled form and liquid fertilisers based on them. The carbon footprint was calculated in compliance with the Standard ISO 14067:2013. The calculations were based on the gate-to-gate analysis. Analysis showed carbon footprint reduction after technological modifications – modernisation of a Benfield section, for example, absorption of gaseous CO₂ in propylene carbonite and potassium carbonite solutions, with the recovery of the pure CO₂, resulting in reduction of energy consumption from 35.3 to 33.3 GJ/Mg NH₃ – change of the N₂O decomposition catalysts, resulting in reduction of N₂O emission factor from 2 to 0.9 kg N₂O/Mg HNO₃. Life cycle assessment is a useful tool, which can be used in the decision-making process for factory modernisation and improvement the production processes.

Keywords: Fertiliser; Ammonia; Emission factor; Energy consumption; Greenhouse gases

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