



Challenge for agricultural industry for growing global demand foods and energy crops

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DESCRIPTION

Urea is one of the most popular nitrogen fertilizers worldwide. It has a very high nitrogen content of 46% and very high bioavailability. However, compared with other fertilizers, it is characterized by a large soil contact loss. NH_3 emissions per kilogram of urea converted to nitrogen are 159-168 g, depending on soil pH and climatic conditions. This undesired release of ammonia is an economic problem that leads to reduced crop yields due to nitrogen loss and long term negative environmental impacts of agricultural expansion. At the same time, the growing world population and the need to meet global food demand have led to a steady increase in the production of fertilizers, including urea.

The need to reduce ammonia emissions and associated nitrogen losses from fertilizers introduced into soil, especially urea based formulations, has led to the implementation of the National Emission Limits (NEC) directive of the European parliament and of the council (EU).

A reduction in ammonia emissions associated with urea fertilizer application was recently achieved through the use of soil nitrogen conversion inhibitors.

In addition, urease inhibitors should possess suitable physicochemical properties to be applicable for both production and application under specific conditions. Commercial mixtures containing urease inhibitors currently available on the EU market are suitable for different application forms, simultaneous application with fertilizers in the field or coating of granules by the manufacturer. Accurate dosing may not be guaranteed if the customer uses separate

fertilizers and inhibitors. Current requirements for this technology assume an average 70% reduction in ammonia emissions for solid urea.

Ammonia and other gas emissions from agricultural production can be further reduced by changing the structure of crop production, one of the agricultural dilemmas are raw materials for the production of biofuels. Dynamically increasing production of energy crops (as feedstock for biofuels) is characterized by high fertilizer demand leading to associated ammonia emissions, and biofuel production with high pesticide use. It is touted as a solution to mitigating the negative effects of fossil fuels on fuels production environment. The expansion of biofuels could lead to increased production of biofuel agricultural feedstocks and indirectly lead to changes in land use structure. Agriculture is strongly linked to the conditions of the industries that provide the resources, as well as the ability to process agricultural products; despite the changing framework conditions affecting agricultural productivity in different regions of the world should ensure food production in the long run. This has to be achieved with care to protect the natural environment and to ensure adequate quantities of food and feed products.

Challenges to the market of agricultural products

Agriculture and other areas of human activity related to food production must adapt to climate change while meeting the future nutritional needs of a growing population. The world's population is projected to reach approximately 9.1 billion by 2050. Developing countries are experiencing significant population growth. Around 70% of the

world's population is expected to live in cities, accelerating urbanization. To feed the growing urban population, food production will need to increase significantly. Annual production of cereals and meat should increase to about 3 billion tons and 470 million tons, respectively. As living standards rise, the calorie value of the food consumed will increase by 30% compared to 2015 levels. Moreover, with the expected expansion of agriculture by 2050, in 2010 he will have to convert 593 million areas to arable land in relation to the agricultural area in use. Climate change is one of the threats to long term food security. One outstanding issue is the need to reduce greenhouse gas emissions from agriculture from levels projected in 2050 to the levels needed to keep global warming below 2°C. Ongoing climate change will force the cultivation of heat tolerant crops and impose other constraints on agriculture. Increased temperature and effects on soil moisture have been shown to be the main environmental drivers of ammonia emissions.

Fertilizer consumption and demand: Rising demand for agricultural products and a growing world population have driven global fertilizer production for years.

Biofuel production: One of the most important areas of agriculture is the cultivation of bioenergy crops to produce biofuels, biodiesel, HVO and ethanol. Biofuels are serious competitors for food crops and an indirect source of ammonia emissions associated with high fertilizer demand. They occupy agricultural land that can be used for food production. Due to the heavy use of fertilizers and pesticides, the cultivation of energy crops has a negative impact on the environment and biodiversity. New calculations show that the production of common biofuels, such as rapeseed biodiesel and corn bioethanol, could contribute as much to global warming as energy generation from fossil fuels, depending on the amount of nitrogen used. Plants with low demand have a more positive impact on climate change.