



Fertilizers  
Europe

# Sulphur in food production

A forgotten nutrient  
with an essential role



Did you know?

## Sulphur

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Plays an important role in **photosynthesis** and carbohydrate production.

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As part of essential mustard oils, helps as a **natural protection** against pathogens and pests.

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Improves **quality** and taste of vegetables.

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Is vital to the **formation of amino acids, vitamins and enzymes** and thus for bread wheat.

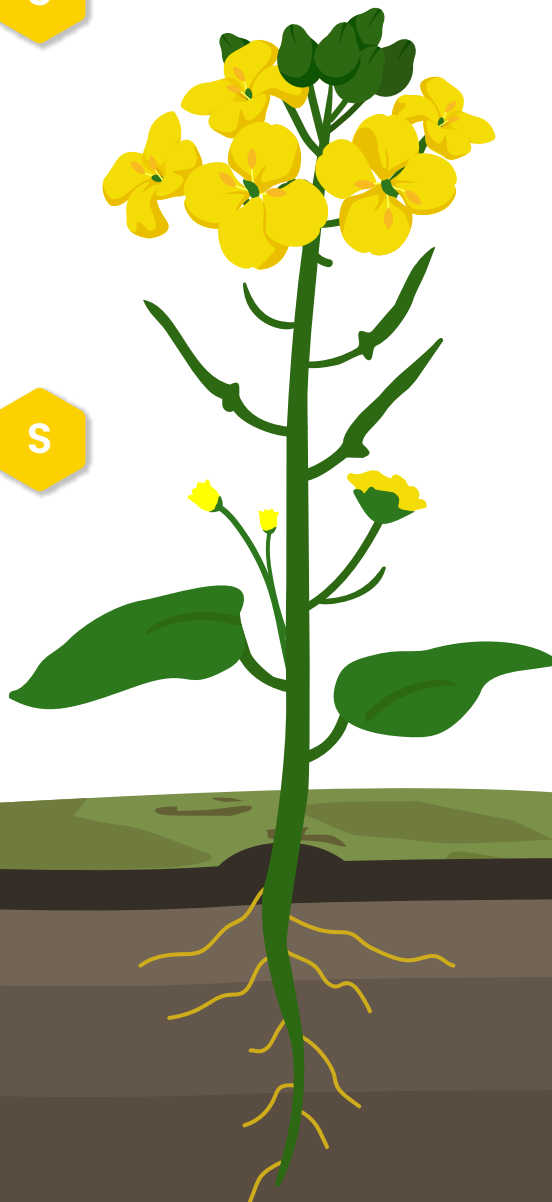
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Helps achieve more yields per kg of nitrogen applied, as it is a catalyst for **nitrogen uptake**.

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**Reduces leaching** of other nutrients to the environment.

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## Sulphur sources available to farmers

**Farmers cannot profitably grow food without sulphur.**

Today, mineral fertilizers containing sulphur are the main source of this nutrient in the soil, which is often added to straight nitrogen fertilizers such as ammonium nitrate or ammonium sulphate.

Until 1990s, deposition of sulphur dioxide emissions from industrial origins provided a sufficient and automatic supply of sulphur to the crops.

Environmental regulation has significantly reduced these emissions while higher yield and quality expectations have increased sulphur withdrawal from the field.

Livestock manure can provide sulphur along with other nutrients, but its content and balance with other nutrients is variable. Manure contains sulphur mainly as organic matter and therefore needs to be mineralized before it can be taken up by the crops. A recent study from ADAS found that only 5-10% of the sulphur in cattle manure was available to crops in the spring following an autumn application.

Commercially available sulphur containing mineral fertilizers can increase farmers' profitability. Trials in cereals and grassland frequently show between 4-7:1 return on investment through achieving higher yields.

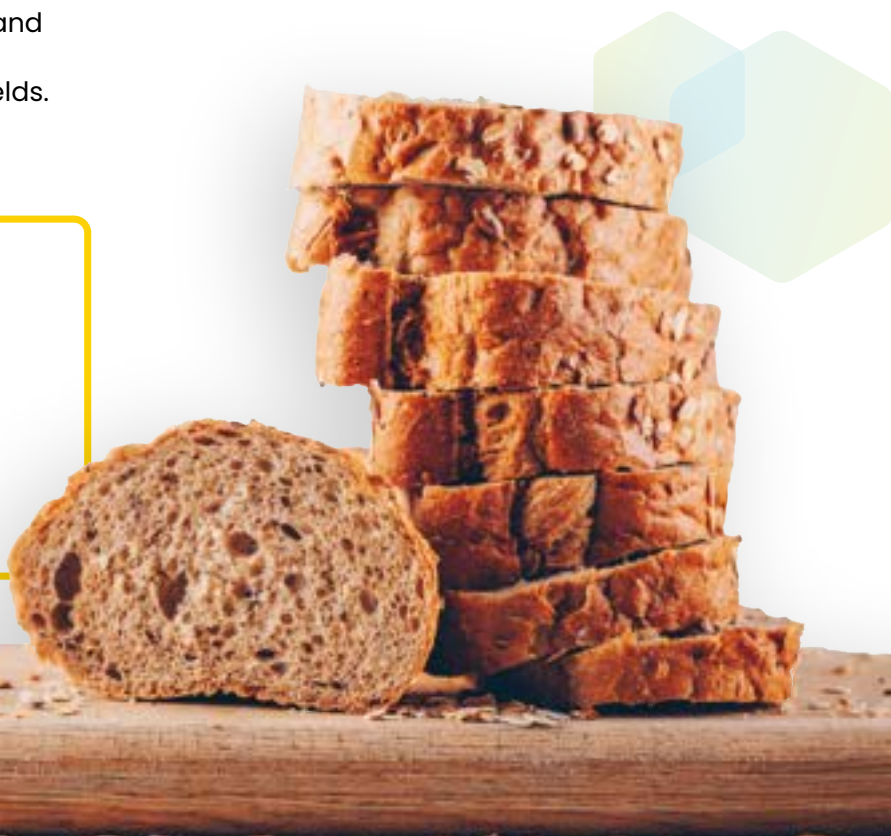
**Bread quality improves when the wheat crop is fed with sulphur.**


<sup>1</sup> Sulphur – Vital for Life, The Sulphur Institute, 2015

## Mineral fertilizers containing Sulphur have several advantages:

- Guaranteed content and availability
- Reaches plant roots quickly
- Application possible during an early stage and during intensive plant growth
- Suitable for combination with other fertilizers
- Good for both farm economics and the environment

**“Nitrogen, phosphorus and potassium are critical components of a well-fertilized crop. But to achieve yields and more nutritious foods, crops need sulphur” The Sulphur Institute, 2015.<sup>1</sup>**





## Balancing crop nutrition for healthy crop and fertile soils.

A good crop feeding strategy at farm level can be achieved with a balanced supply of the main nutrients needed. Balanced nutrition is essential to help crops reaching high yields and quality, moving towards a crop's maximum genetic potential.

Balanced plant nutrition is a vital element of sustainable crop and soil management.

When it comes to sulphur, crops are not equal. For some crops soil supply of sulphur can be sufficient, while severe losses in yield are to be expected for other plants without appropriate sulphur fertilization. As the crops regularly export sulphur from the soil reserves at each harvest, inputs of sulphur lower than removals during harvesting will unavoidably lead to a reduction in soil fertility. As atmospheric deposition of sulphur decreased over last 30 years, sulphur deficiencies are becoming an increasingly common problem faced by farmers.

The quality of gluten, a protein factor important for baking bread, improves when wheat is fertilized with a balanced input of nitrogen and sulphur. Nitrogen and sulphur are thus two sides of the same coin. Because of this close relationship, the N:S ratio is often used and generally found to be a more meaningful indicator of sulphur deficiency for most crops.

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