

Published online: 23 November 2006; | doi:10.1038/news061120-11

## Taking the acrylamide out of wheat

**Soils lacking sulphur may increase carcinogens in crops.**

**[Emma Marris](#)**

Not enough sulphur in the wheat can spell 'probable carcinogen' in the bun, according to new research.

Researchers first discovered traces of acrylamide, a chemical linked to cancer and other possible ill effects, in baked and fried goods in 2002, to universal dismay<sup>1</sup>. Since then, food scientists have spent untold hours trying to reduce the amounts of this chemical in foods. That's hard to do without losing the lovely flavour of baked goods: the compound is made by the reaction that forms the tasty golden brown crust on a loaf of bread.

A group led by Donald Mottram, professor of food biosciences at the University of Reading, UK, approached the problem not by looking at how acrylamide is produced in the cooking process, but how the precursors to the nasty chemical wind up in wheat in the first place.

They report in the *Journal of Agricultural and Food Chemistry* that wheat grown in fields deficient in sulphur have much higher concentrations of asparagines — an amino acid that, along with sugars, forms acrylamide during cooking<sup>2</sup>.

Sulphur deficiency in wheat fields is widespread around the globe: 23% of UK fields are said to be sulphur deficient. According to Mottram, making sure that crops have plenty of sulphur might go some way towards reducing acrylamide in foods. And it would do so without changing the flavour.

"The manufacturers of biscuits and cakes and breads and crisps — they have modified their processes wherever possible," says Mottram "But if we can get the levels of asparagine lower in plants, there won't be as much acrylamide there to start with."

### Protein loss

The team grew wheat in pots with identical conditions, bar the sulphur content. Those with a sulphur deficiency made wheat that, when milled and cooked, had 4.7 times the amount of acrylamide as the plants that could gorge on the element. Wheat in field trials showed an even more dramatic response. The sulphur-starved wheat made cooked products with 6.3 times as much acrylamide.

Nigel Halford, a co-author and crop scientist at Rothamsted Research in Harpenden, UK, says they think this is because the production of seed storage proteins decreases when a plant is stressed by sulphur deprivation. The nitrogen taken up by the plant then accumulates as asparagine instead.

Halford says other stresses on the plant, such as heat or nitrogen deficiency, may have a similar effect — they are keen to study this to find out.

Richard Stadler, of Nestlé in Orbe, Switzerland, is pleased that research on acrylamide has expanded past the kitchen. "This work will contribute significantly to a better understanding of the impact of agronomic factors — a major gap in our knowledge with regard to acrylamide mitigation," he says.

Visit our [newsblog](#) to read and post comments about this story.



Sulphur fertilizers on fields could make for healthier wheat.

Getty

[▲ Top](#)

### References

1. Tareke E., *et al. JAF*, **50** . 4998 - 5006 (2002).
2. Muttucumaru N., *et al. JAF*, doi:10.1021/jf0623081 (2006).

[▲ Top](#)

---

Story from news@nature.com:  
<http://news.nature.com/news/2006/061120/061120-11.html>



© 2006 Nature Publishing Group | [Privacy policy](#)