

# New forage plant prepares farmers for climate changes

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Sorghum, or durra, is an important forage crop in many countries, for example the USA, Africa, China and Australia.

The plant is grown instead of [corn](#) because it produces more biomass and better withstands long periods of drought.

However, when exposed to drought, the sorghum plant produces large amounts of dhurrin, which forms toxic cyanide, i.e. Prussic acid.

## Forced to discard crops

[Farmers](#) thus face a big [dilemma](#). During a period of drought when they most need food for their animals, they are often forced to discard their sorghum because they do not know how poisonous it is and how much the animals can eat without suffering from [cyanide poisoning](#).

In [Australia](#) alone, farmers lose hundreds of millions of dollars each year as a result:

"The fact that the sorghum plant produces large amounts of the natural cyanogenic glycoside dhurrin when exposed to drought is a serious problem for farmers in many parts of the world. Dhurrin breaks down to form toxic cyanide or Prussic acid when an animal eats the plant. So when there is a drought and most need for forage, the farmer can no longer use the crop and it goes to waste," says Professor of Plant

Biochemistry at the University of Copenhagen, Birger Lindberg Møller.

## **New, toxic-free sorghum strain is a breakthrough**

Recently, Birger Lindberg Møller and his research group have, in collaboration with, for example, Monash University in Australia, developed a sorghum plant which is unable to produce Prussic acid.

Instead of using genetic engineering, the researchers used plant breeding and advanced biochemical and molecular biological screening methods:

"This is a breakthrough which, globally, can be very important for agriculture, especially in warmer climates where climate change is expected to cause longer and more frequent periods of drought in future. Especially in Africa, where farmers cannot afford to buy new forage in periods of [drought](#), it is a huge step forwards that they will now be able to feed their [animals](#) with sorghum they can grow themselves," says Birger Lindberg Møller.

The University of Copenhagen and Monash University have submitted a patent application.

### **Facts about new non-toxic sorghum:**

Researchers from The University of Copenhagen, Monash University in Australia and the Australian plant breeding company Pacific Seeds have developed the new type of sorghum, or durra as it is also known, which does not produce the toxin dhurrin.

Using a population of tens of thousands of sorghum [plants](#) in an open field trial, the researchers analysed their way to finding individual sorghum plants which carried a mutation of just one of the genes

involved in producing dhurrin.

Some of these plants are completely unable to form dhurrin, while others only produce it a couple of weeks after the sorghum seed has germinated. Dhurrin is a bioactive natural substance belonging to the group of cyanogenic glycosides.

The researchers used effective biochemical and molecular screening methods developed at The University of Copenhagen.

In the plant, which is unable to form dhurrin, a single amino acid has been changed out of a total of 558 amino acids which make up the enzyme. This single change means that the enzyme is inactive. This plant is now used for the subsequent breeding work. Non-toxic strains of [sorghum](#) are expected to be on the market within a few years.

The research results have just been published in the highly esteemed *Plant Biotechnology Journal* Volume 10, pp. 54-66 (2012) as well as being used as the front page story.

Provided by University of Copenhagen

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