



# Silencing the $\alpha$ -Gliadins in Wheat \*

Anne Folck<sup>1</sup>, Herbert Wieser<sup>2</sup>, Petra Knies<sup>1</sup>, Horst Lörz<sup>1</sup> and Dirk Becker<sup>1</sup>



<sup>1</sup>Institut für Allgemeine Botanik, Universität Hamburg, Ohnhorststraße 18, 22609 Hamburg, Germany  
folck@botanik.uni-hamburg.de, becker@botanik.uni-hamburg.de

<sup>2</sup>Deutsche Forschungsanstalt für Lebensmittelchemie, Lichtenbergstraße 4, 85748 Garching, Germany

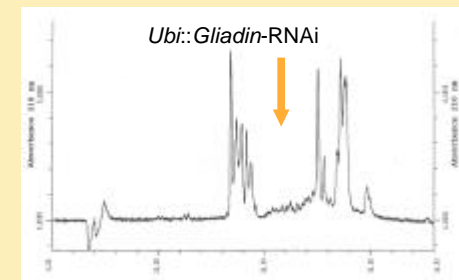
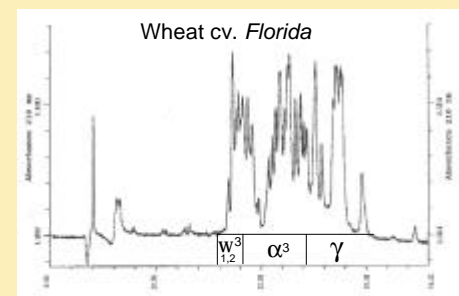
## Background

The wheat gliadins belong to the major seed storage proteins and determine the viscosity of dough from wheat flour [1]. The superior baking qualities of wheat are overshadowed by its potential to cause coeliac disease, an inflammatory condition of the gastrointestinal tract which is thought to be induced in susceptible patients most likely by the gliadin proteins [2]. These gliadins are divided into different subtypes ( $\alpha, \gamma, \omega$ ) each encoded by multiple genes [3][4].

The utilisation of a RNAi-silencing approach was chosen to investigate the potential of this technology to silence an entire gene family in hexaploid wheat. Such a wheat with a reduced  $\alpha$ -gliadin component can be part of the development of wheat variety usable in the production of gluten free food.

## Results

We cloned a conserved  $\alpha$ -gliadin sequence into a RNAi-construct. After transformation the regenerated wheat plants were tested for full length integration and copy number of the transgene by Southern Blot analysis. The transcription of the transgene was checked by RT-PCR. The endosperm storage proteins of positive tested plants are still being analysed by HPLC and SDS-PAGE.



HPLC chromatograms of ethanol extracts of endosperm proteins from wheat cv. Florida (wildtype) and a transgenic plant

<sup>3</sup> including secalines due to 1B/1R translocation in wheat cv. Florida



Construct *Ubi::Gliadin-RNAi* used for transformation

## Conclusions

For the first time the application of the RNAi-technology is shown to be successfully used for reducing the expression of a gene family in wheat opening the possibility for creating non coeliac toxic wheat.

## References

- [1] Wrigley and Bietz, 1988, *In Pomeranz* (ed.), *Wheat: Chemistry and Technology*, American Association of Cereal Chemists, Inc, St. Paul, MN, USA, 159.
- [2] Wieser, 1995, *Baillieres Clin. Gastroenterol.*, 9(2):191-207.
- [3] Anderson and Greene, 1997, *TAG*, 95:59-65
- [4] Gianibelli et al. 2001, *Cereal Chemistry*, online review

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