

# The Success Story of Agronomic Biofortification with Selenium in Finland

## Role of Government and Industry

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BIAC-IFA side-event 'fertilizing crops to improve human health'  
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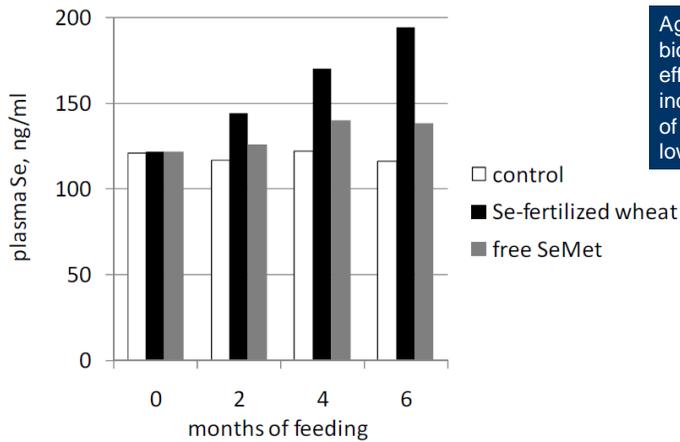


## Selenium (Se) in Brief

- Metabolic role
  - Essential constituent of ~25 selenoproteins
  - Most selenoproteins have antioxidant functions (e.g. glutathione peroxidase) → protection from cellular oxidative stress
- Protective effect
  - Epidemiological studies: Se status inversely associated with cancer risk
  - Experiments: Se treatment reduces cancer risk in animal models
- Selenium intake
  - Main sources: cereals, meat and fish
  - Wide variation; substantial numbers of people in most countries with sub-optimal Se status
  - Food Se content generally reflects local soil Se conditions



## Plasma Se Responses of Male Subjects Consuming Wheat Biscuits Prepared with Low-Se Wheat (Control), Se-Fertilized Wheat, or Added Free SeMet

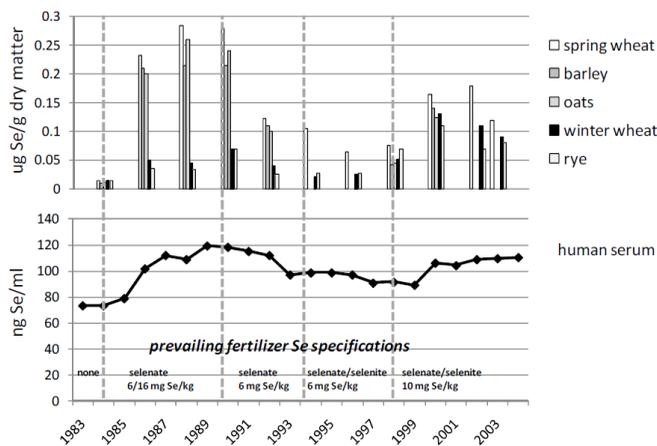


Agronomic biofortification is an effective option for increasing Se intake of populations with low Se levels

Source: Kirby et al, 2008



## Efficacy of Finish national Se-fertilization on Se contents of wheat and Se status of consumers



Target: Increase plasma Se levels of consumers to those associated with reduced cancer risks, i.e. ~120 ng/ml

The safe range of dietary Se intake is relatively narrow → careful monitoring required  
*The Food and Nutrition Board set in 2000 the upper intake limit for Se at 400 ug/d for adults*

After Alfthan, 2005 and Ekholm et al, 2005



## Role of Government and Industry

### ➔ Government

- Monitor the Se status and intake of its populations (and livestock)
- Set supplementation requirements to reach the target in deficient populations
- Establish incentives for promoting the use of fertilizers supplemented with Se where needed  
*(Se is not known to be essential to plants)*

### ➔ Industry

- Develop efficient Se fertilizer products (selenate)
- Supply Se-supplemented fertilizers to deficient areas identified by government

