

# Baljväxternas förträfflighet!



Exempel på produkter och  
användningsområden och hälsomässiga fördelar

**Fabulous legumes** - products, applications, health benefits

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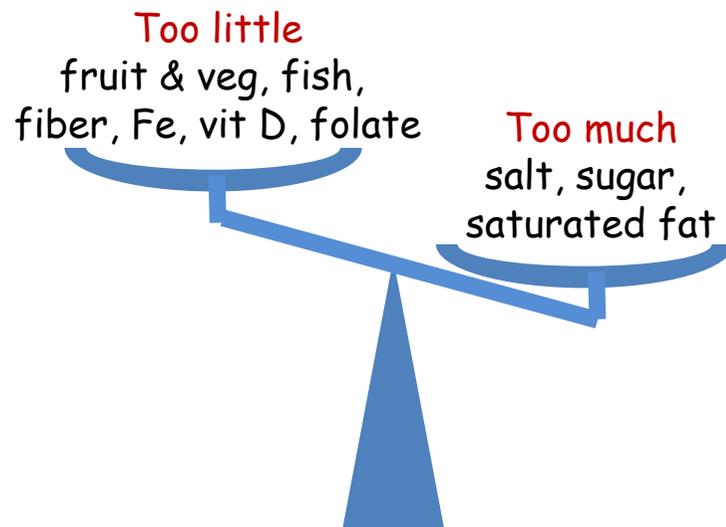
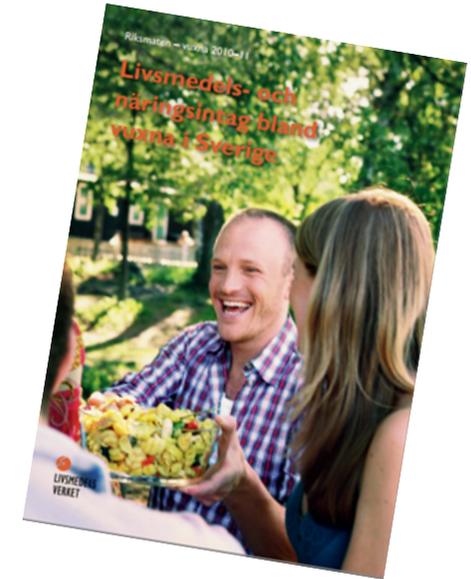
# Contents

- Introduction
  - definition, bioactive compounds
- Legumes & health, antinutritional compounds
- Processing, raw material & ingredients
- Novel legume foods



# Dietary habits

Swedish dietary survey Riksmaten 2010-11



## Vegetable INTAKE

edible portion 176 g/d

Lowest men & women 18-30 y

Vegetables 82%

Legumes 7%

Root vegetables 12%

[www.livsmedelsverket.se/globalassets/matvanor-halsa-miljo/kostrad-matvanor/matvaneundersokningar/riksmaten\\_2010\\_20111.pdf](http://www.livsmedelsverket.se/globalassets/matvanor-halsa-miljo/kostrad-matvanor/matvaneundersokningar/riksmaten_2010_20111.pdf)



# Forntidens ärtsoppa Ölands bruna bönor



En beskrivning av våra svenska bönsorter

Produkten utgörs av torra frön av bruna bönor (*Phaseolus vulgaris* L.) av de sorter som specificeras nedan (Anonym, 1995; Statens växtsortsnämnd, 1980; 2005; Lundin & Axelsson, 1972).

**Bruna bönor - cv. Bonita**

Sorträttningshavare Kalmar-Ölands Trädgårdsprodukter, box 93, 386 22 Färjestaden, Sverige. Sorträttskyddad 1:e juli 1964 (Anon., 2005). Introducerad på marknaden 1965 (Alvelid, 1969)

**Bruna bönor - cv. Karin**

Sorträttningshavare Kalmar-Ölands Trädgårdsprodukter, box 93, 386 22 Färjestaden, Sverige. Sorträttskyddad 19:e december 1995 (Anon., 2005). Introducerad på marknaden 1996. Förädlare: Sigfrid Johansson, Ölands-Skogsby, Färjestaden.



Bruna bönor & fläsk

<http://www.brunabonor.se/0/0/se/17/>



EU 1151/2012, artikel 5.2



# Legumes are...



## Pulses / Legume grains

- Borlotti beans
- White beans
- Black beans
- Kidney beans
- Faba/broad beans
- Yellow peas
- Chickpeas
- Lentils

## Vegetables

- Fresh beans
- Fresh peas

## Oil seeds

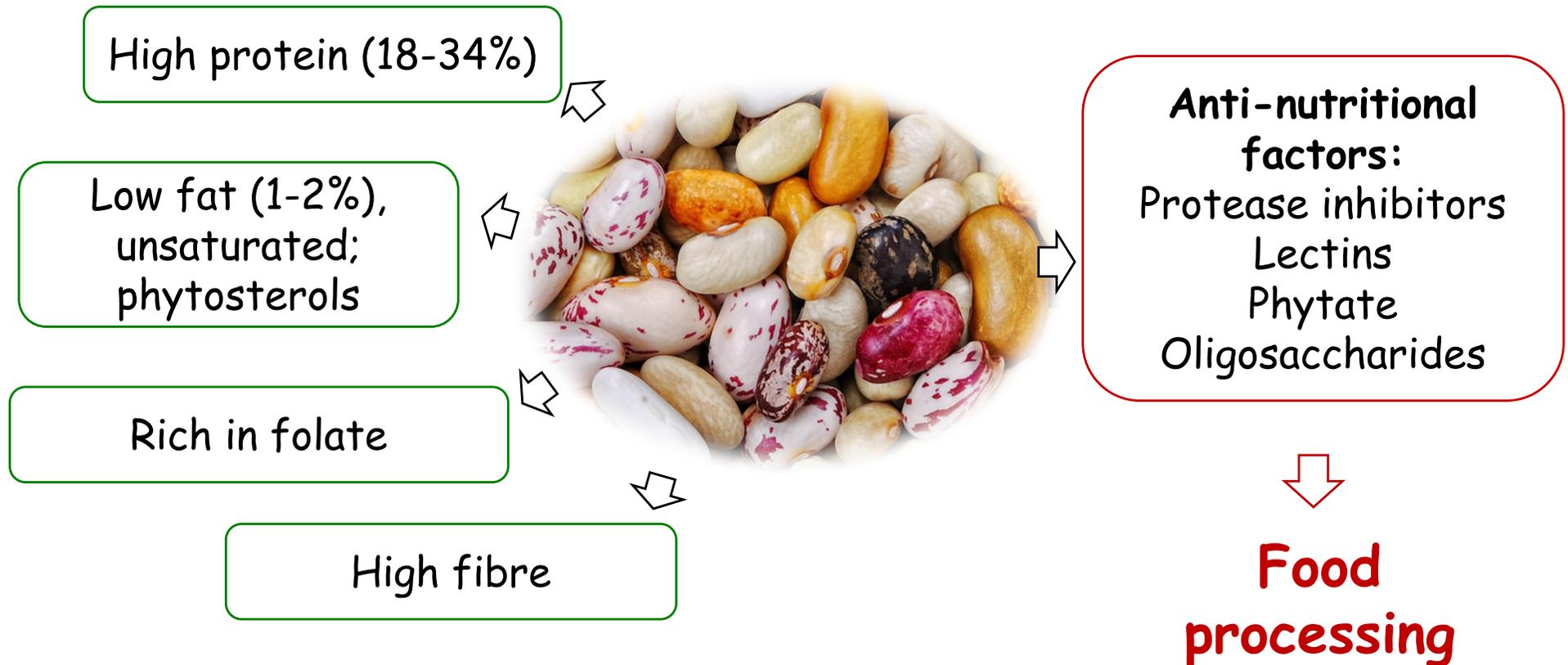
- Soybeans
- Peanuts

## Livestock forage

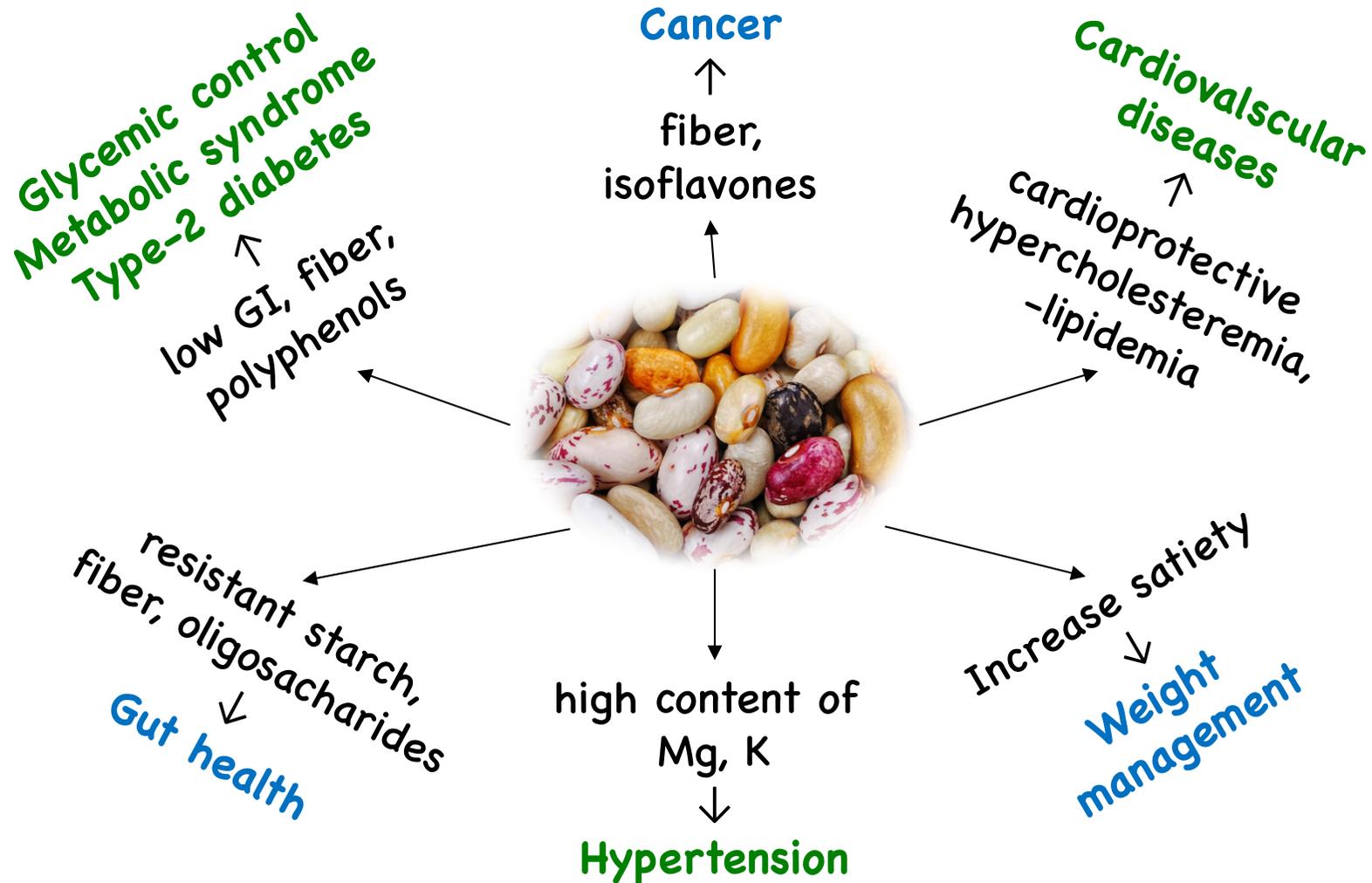
- Alfalfa
- Clover



# Bioactive compounds



# Legumes & health



Green: Strong evidence. Blue: Inconsistent or insufficient data



# Anti-nutritional compounds ... or vice versa ?



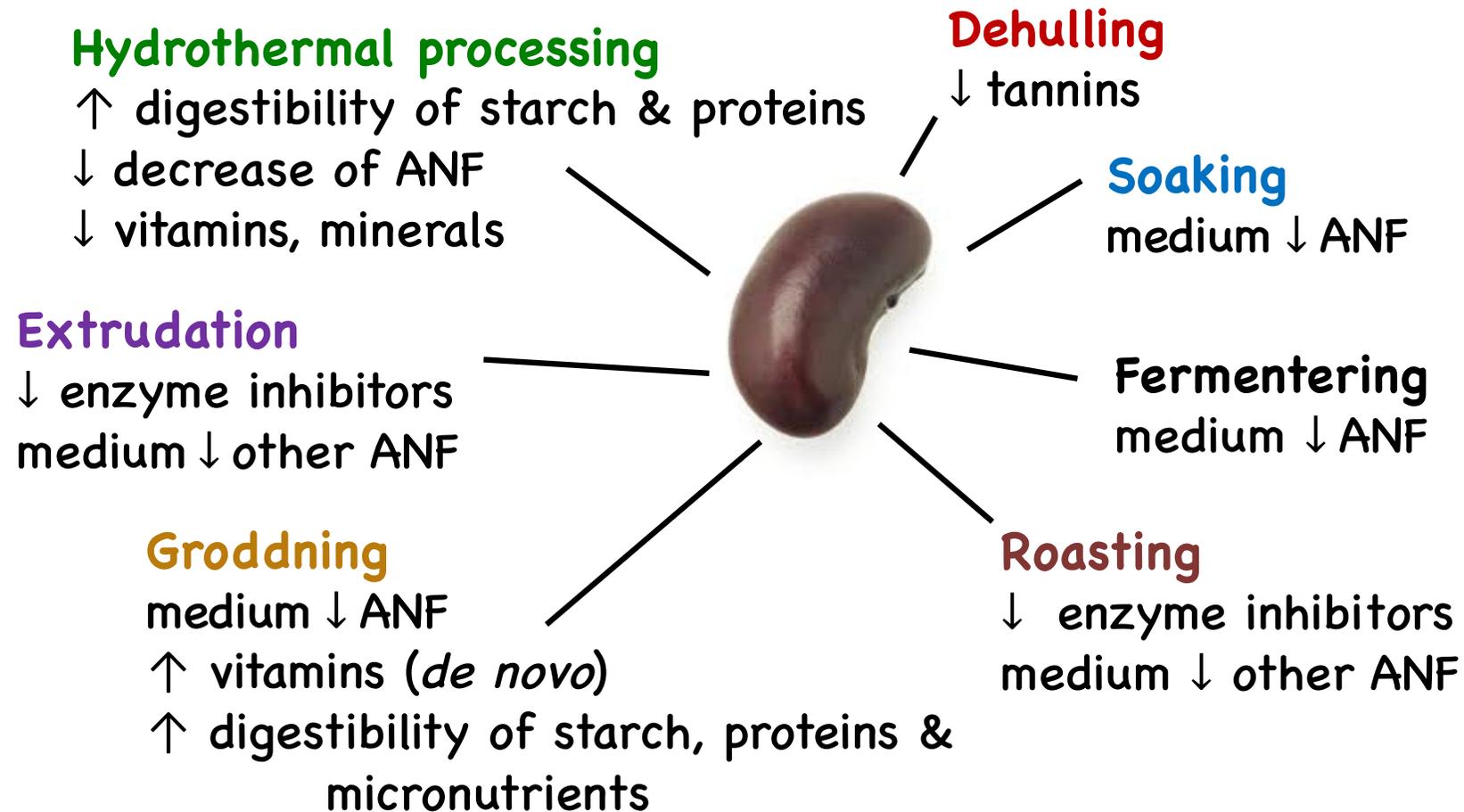
Lectins (Hemagglutinins)	Interfere with macronutrient absorption and cause blood agglutination	Reduce blood sugar response and body weight control
Vicine and convicine*	Blood hemolysis	
Phenolic compounds	Form tannin-protein complexes and inhibit digestive enzymes	Antioxidant and anti-inflammatory activity
Saponins	Blood hemolysis	Reduce blood cholesterol
Phytates and oxalates	Reduce mineral bioavailability by forming insoluble complexes	Anticarcinogenic activity - colon cancer
Enzyme inhibitors	Interfere with protein and carbohydrate digestion	Anti-inflammatory; lower insulin & blood glucose response
Oligosaccharides	Generate gas (flatulence)	Enhance the growth of gut microbes, reduce risk of intestinal cancer

\*in faba beans, favism = critical for patients with genetic enzyme deficiency



# Effects of food processing

Usually: enhancement of nutritional status, required



# Raw materials

## Family Fabaceae

### Peas

#### Genus

- **Pisum**  
Pisum sativum

### Lentils

#### Genus

- **Lens**  
Lens culinaris

### Beans

#### Genus

- **Phaseolus** Phaseolus vulgaris
- **Vicia** Vicia faba
- **Vigna** Vigna mungo, Vigna radiata
- **Cicer** Cicer arietinum
- **Glycine** Glycine max



# Legume ingredients

## Whole kernels & flour

- Batters
- Bakery products (bread, cake, cookies)
- Condiments
- Noodles and pasta
- Yoghurt
- Extruded snacks
- Germinated ingredients

## Protein Isolate

- Beverages
- Baked products
- Vegetarian foods (extruded vegetable protein)
- Cereals, snack foods
- Meat applications (extender)

## Starch

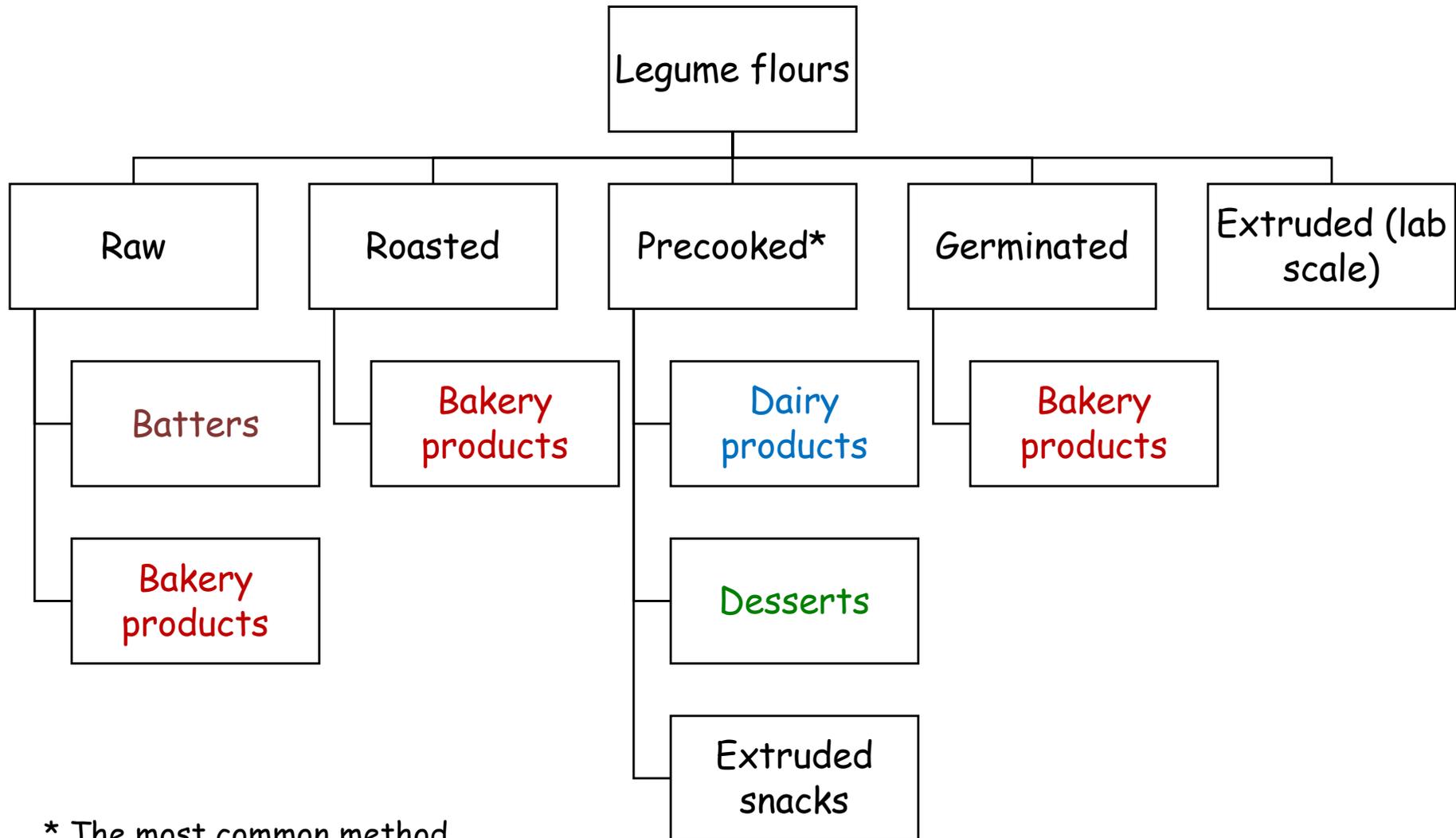
- Beverages
- Extruded products
- Cereals
- Noodles

## Fiber

- Baked goods, cereals
- Extruded products
- Beverages



# Legume flours & products



\* The most common method



# Traditional food processing in Egypt

Faba beans



soaking

boiling



Foul-stew

germination  
& boiling

Nabet soup

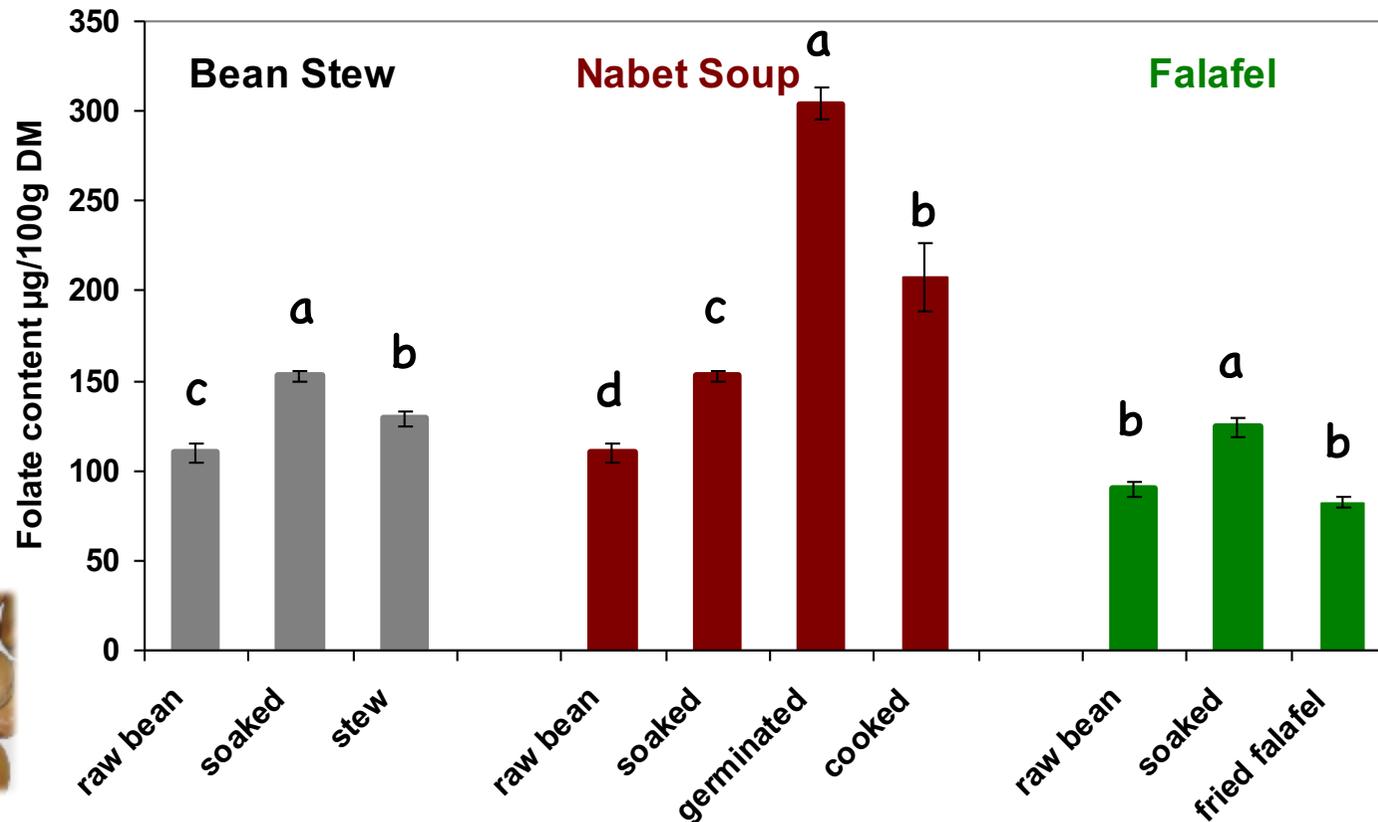
boiling, spices & onion  
frying



Falafel



# Folate content in traditional Egyptian faba bean foods

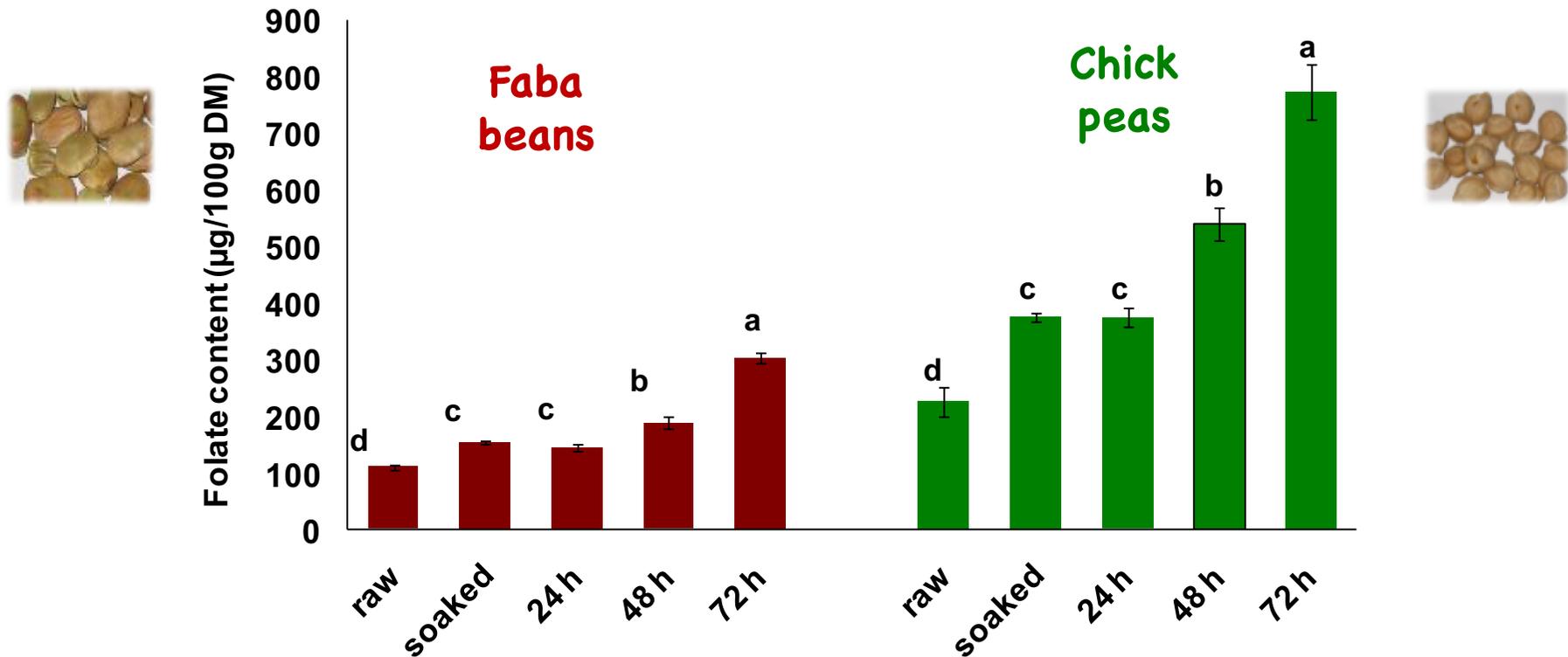


Folate content ( $\mu\text{g}/100\text{ g}$  dry matter) in Egyptian faba bean foods.

Staples are means from duplicate trials and duplicate analyses ( $n=4$ ); different superscripts within the same group of columns represent significant differences ( $p<0.05$ ). The Nabet soup fluid contained  $20 \pm 3 \mu\text{g}/100\text{g}$  folate. Hefni et al (2015) FSN, doi: 10.1002/fsn3.192



# *De novo* synthesis of folate – germination



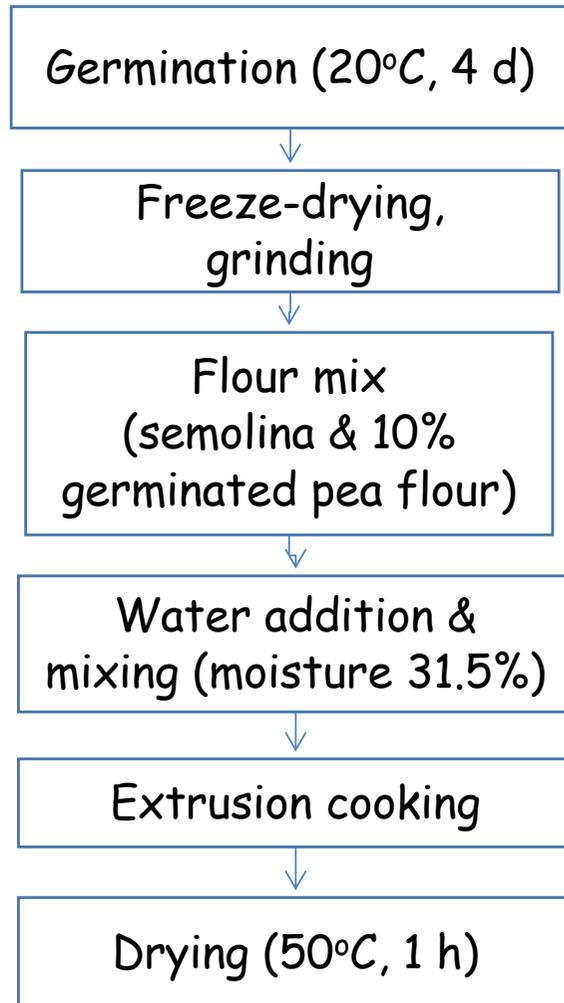
Increased folate content (µg/100g DM ± SD) after germination (72 h – 25 °C).

Soaking 12 h – 25 °C, germination 12–60 h – 25 °C. Means (n=4) from duplicate trials & duplicate analysis; different letters represent significant differences (p<0,05).

Hefni & Witthöft (2014) LWT



# Germinated legume flour pasta



**Pigeon peas**  
(*Cajanus cajan*)

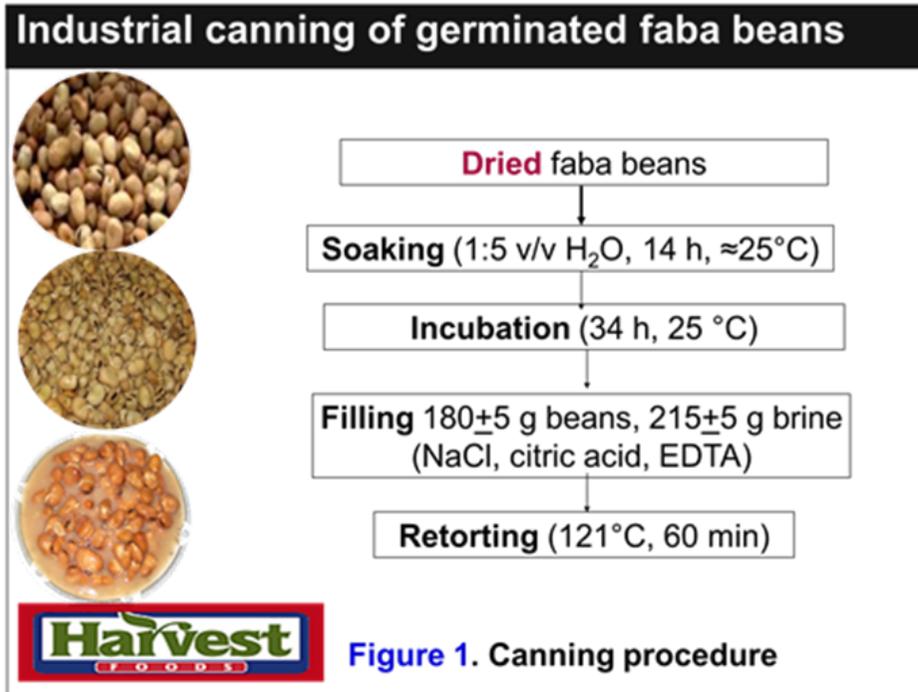
## Legume pasta vs semolina pasta

### Increased

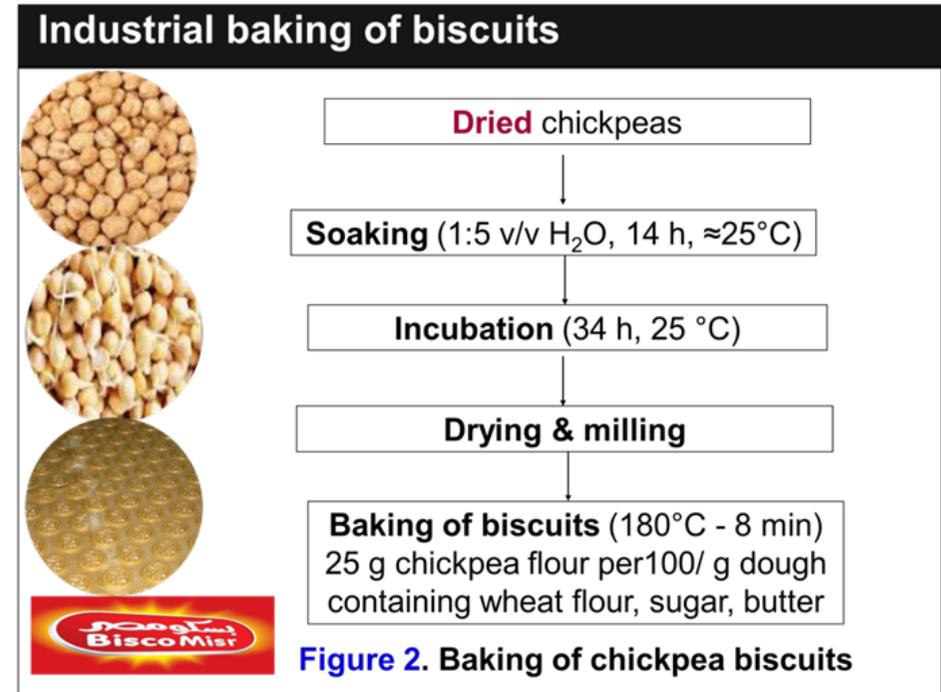
- ✓ protein
- ✓ resistant starch
- ✓ dietary fibre
- ✓ minerals (Fe, Mg, K, Ca)
- ✓ vitamins (E)



# Novel legume foods



A portion of 200 g canned germinated fowl provides 75  $\mu\text{g}$  folate (FW) (50% higher than traditional fowl).

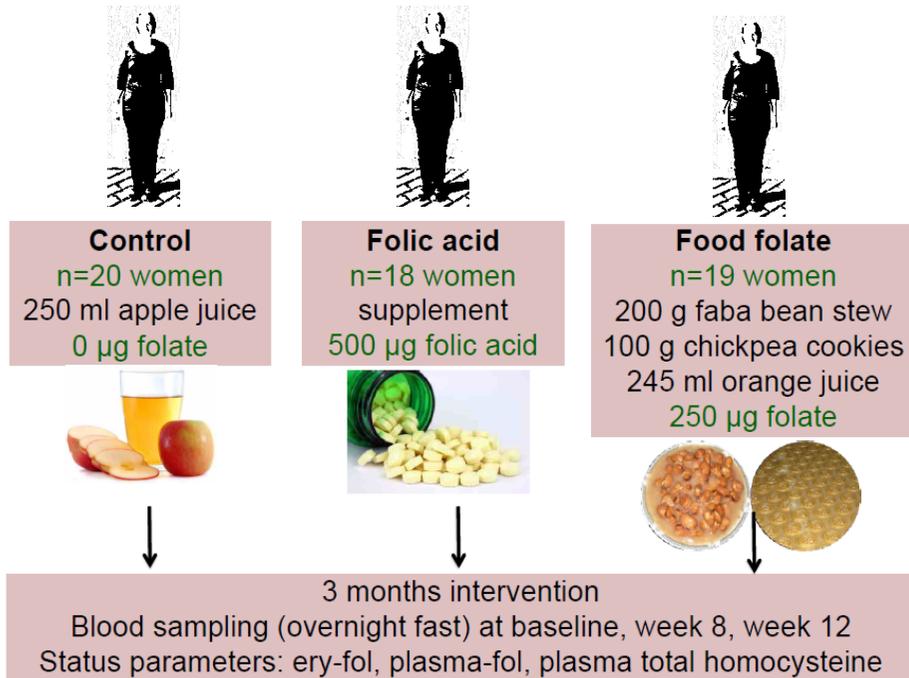


A portion of 100 g biscuits provides 85  $\mu\text{g}$  folate (FW) (compared to 15  $\mu\text{g}/100\text{ g}$  in traditional biscuits).

Hefni et al (2015) Food Sci Nutr

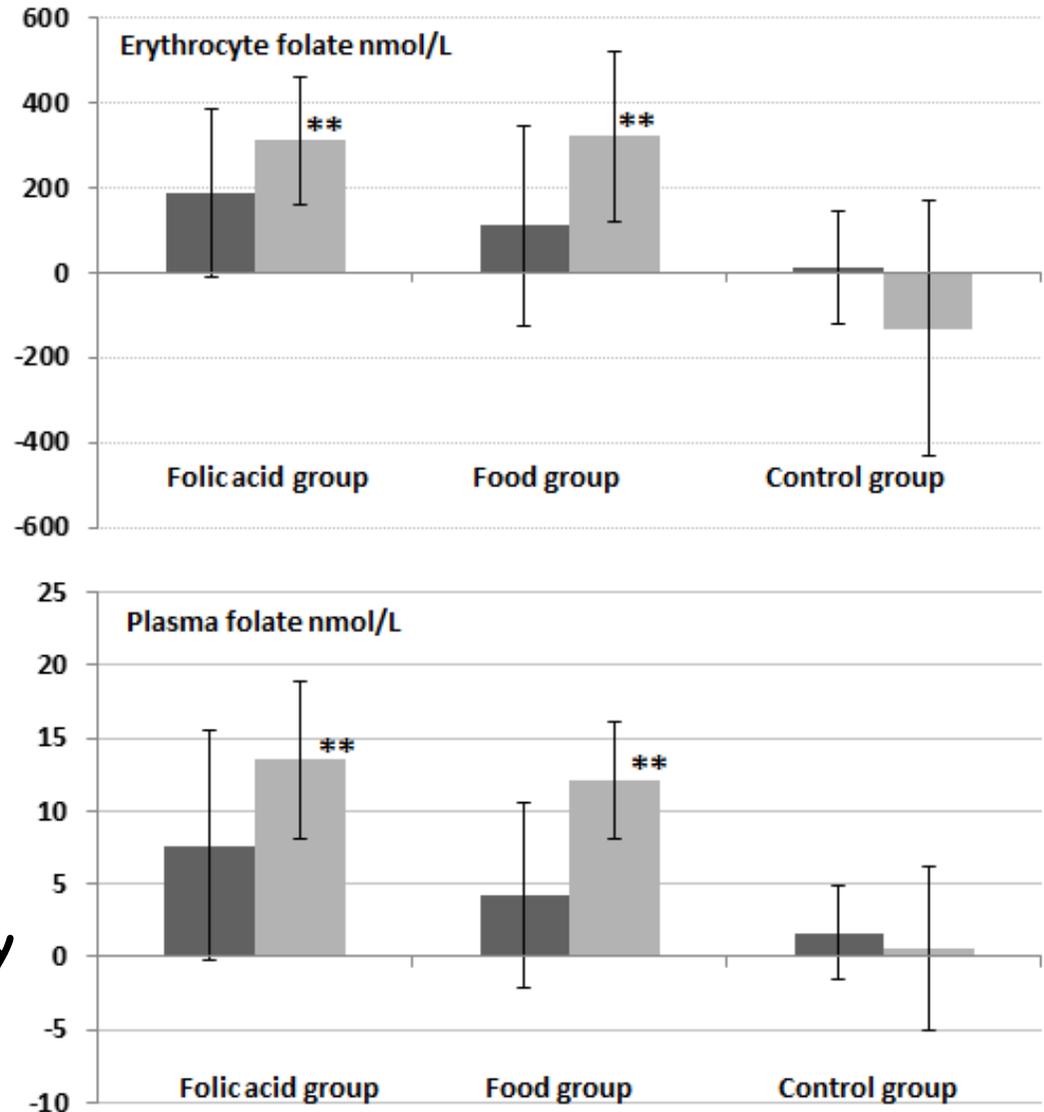


# Legume foods & health



**Improved folate status !**  
**8 w:** ↑ pl-fol, ↑ ery-fol  
**12 w:** ↑ pl-fol, ↑ ery-fol, ↓ pl-Hcy

Hefni et al (2016) FNS DOI: 10.4236/fns.2016.714122



Absolute changes from baseline to 8 wk (dark bars) and 12 wk (light bars) in erythrocyte and plasma folate (means ± SD)



# Thank you for your attention!



Innovative legume-based foods and drinks  
for enhanced resource use efficiency in food systems

Formas (Dn 942-2016-38)

