SelenoKey

Selenium yeast

Why supplying selenium in animal nutrition?

- Selenium is an essential trace mineral necessary for several **functional proteins**

- Main function in the body:

  Part of ***Glutathione peroxidase*** **(GPx)**, a selenium-containing enzyme that quenches oxygen free radicals and thus protects cellular contents from oxidation (-> reduced oxidative stress -> **improved immune response** and **meat quality**)

  Selenium is involved in **thyroid hormone metabolism**
  (thyroid hormones are essential to proper development and differentiation of all cells in the body -> **growth factor**)

Deficiency of selenium

All species

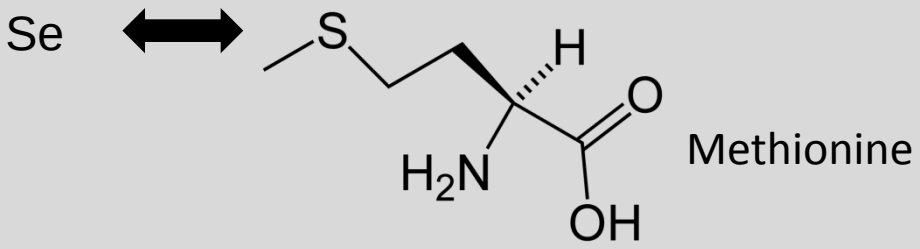
- Reduced growth rates
- Impaired immune response
- Fertility problems
- Muscular dystrophy

Poultry		**Dairy cattle**
• Thin feathering • Lower hatchability • Higher mortality • Reduced egg production • High drip loss of meat		• Retained placenta • Mastitis • Cystic ovaries • Impaired livability of calves

What is SelenoKey ?

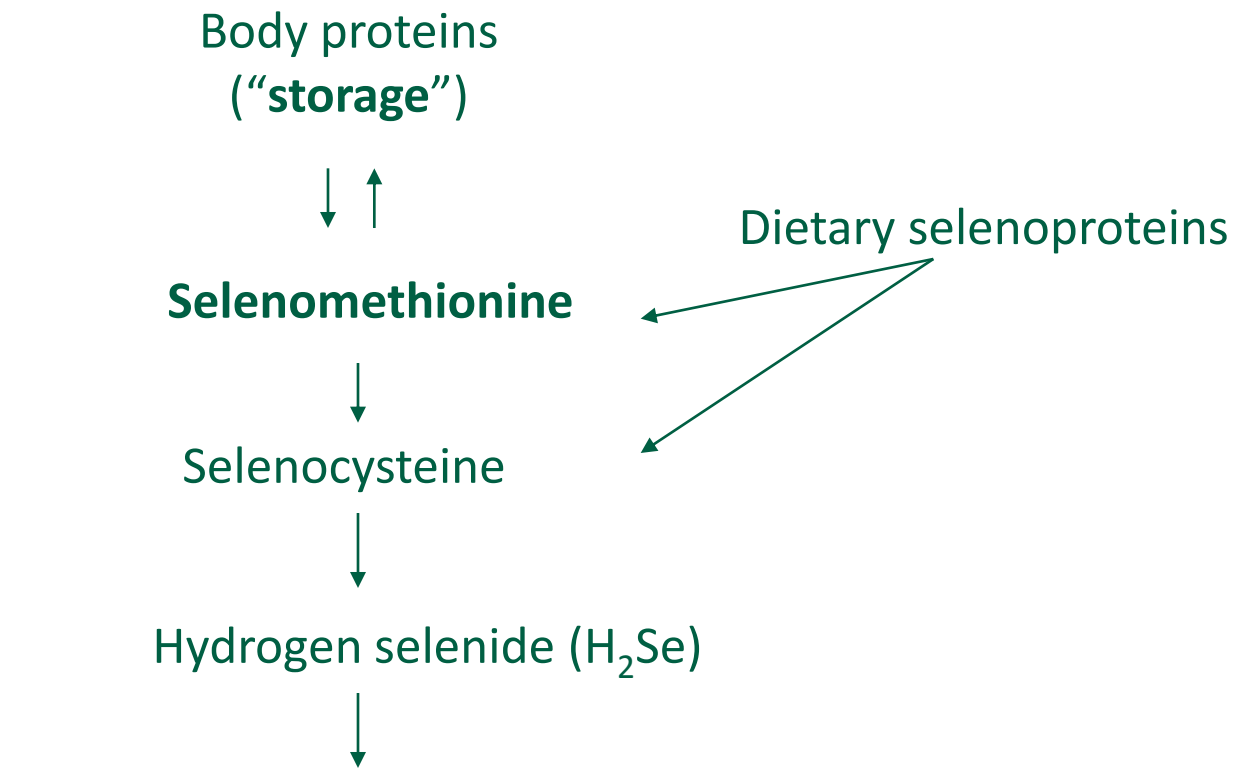
SelenoKey is a selenium enriched yeast (*Saccharomyces cerevisiae*) primarily containing selenomethionine

Selenomethionine:
Replacement of sulfur by selenium in methionine:



Methionine

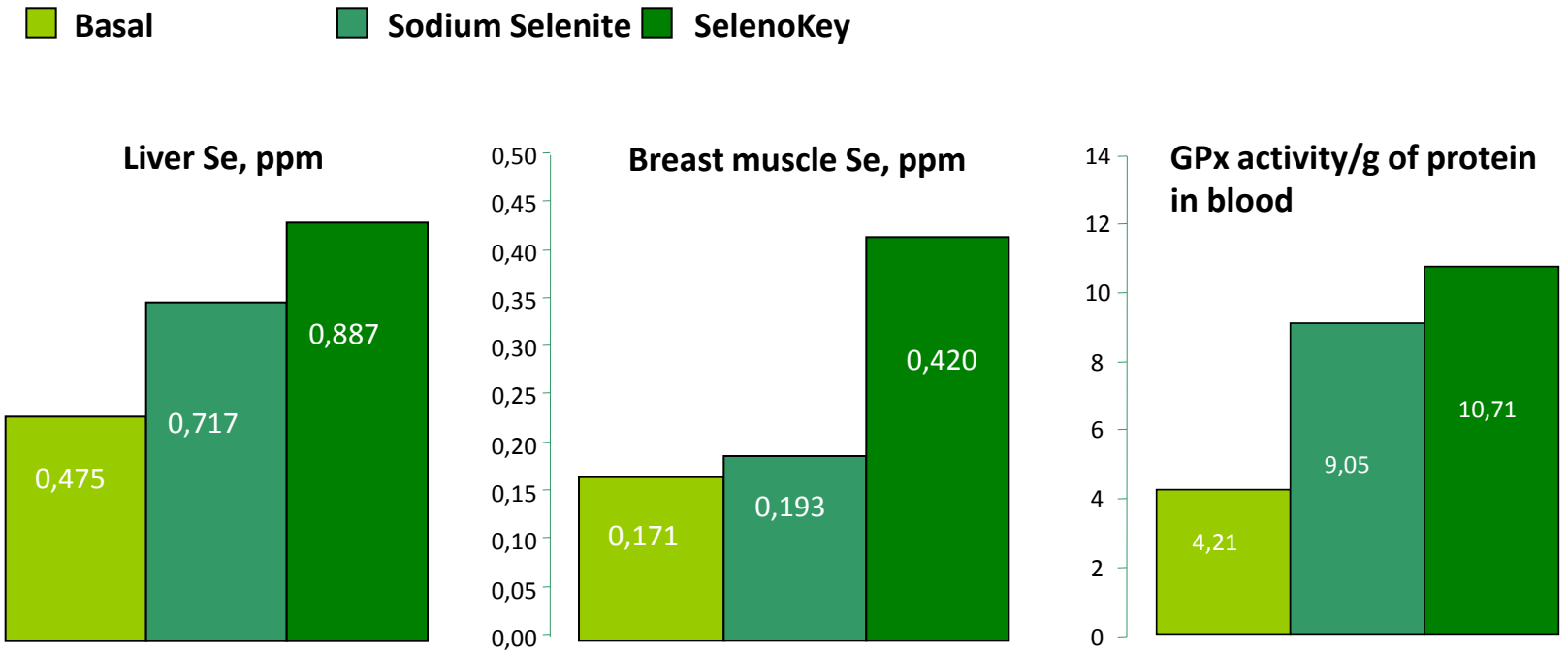
Organic selenium metabolism



Trial - Bioavailability in broilers

Added selenium (ppm) levels of treatment diets (day 1 – 49)

Treatment	Starter	Grower	Finisher
Basal	0	0	0
Sodium selenite	0.264	0.253	0.303
SelenoKey	0.191	0.232	0.232



Sims, 2001

Effect of selenium source on selenium content in eggs

- Feeding trial with 90 laying hens (26 weeks of age)
- Treatment: Control or 0.3 ppm Se from sodium selenite or **SelenoKey**
- Treatment period: 26 to 34 weeks of age

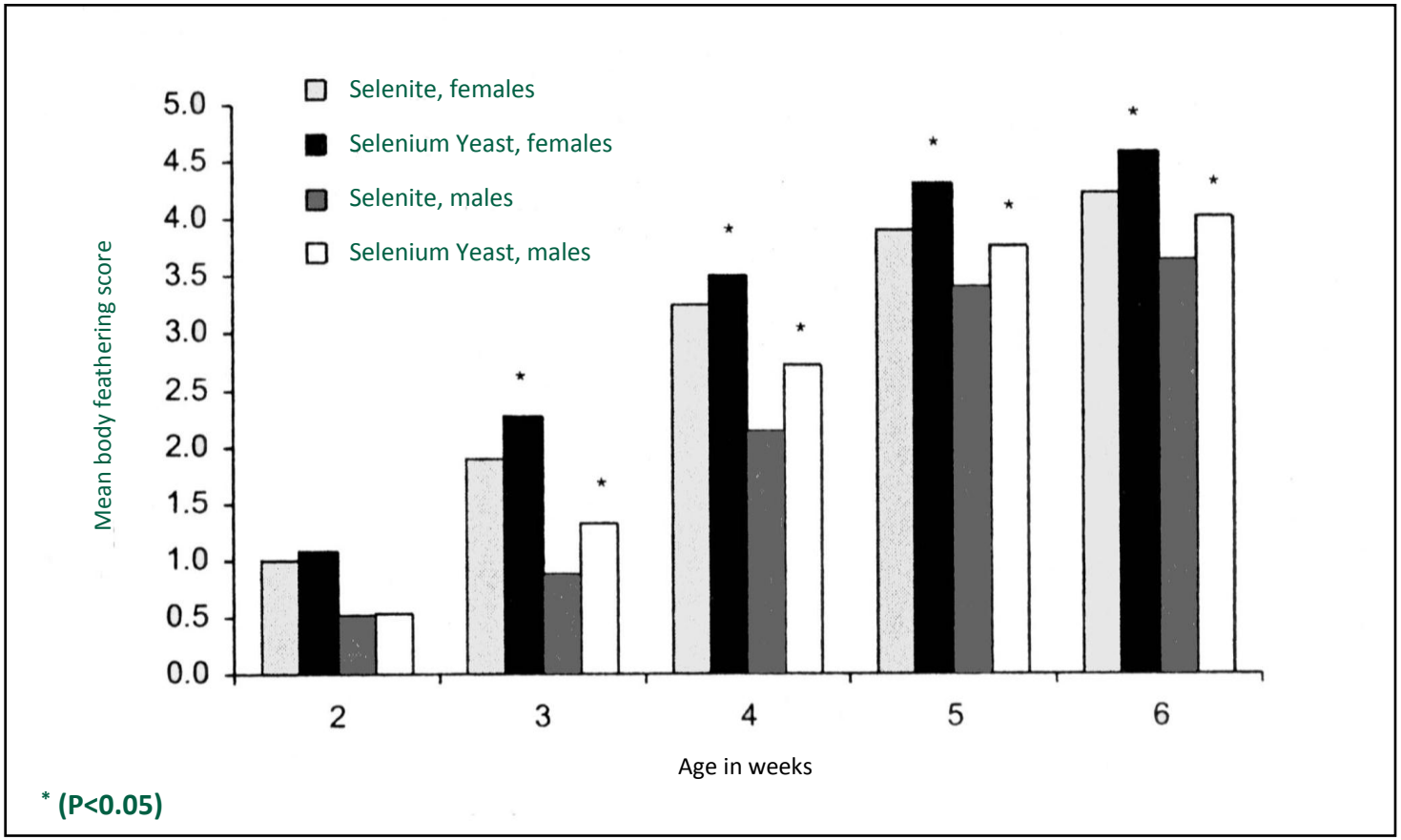
ppm	**Selenite**	**SelenoKey**
Week 0	0.104	0.103
Week 4	0.180	0.301
Week 8	0.182	0.311

Selenium yeast from **SelenoKey** resulted in a higher selenium accumulation in the egg -> “Functional food”

Utterback et al., 2005

Feathering score

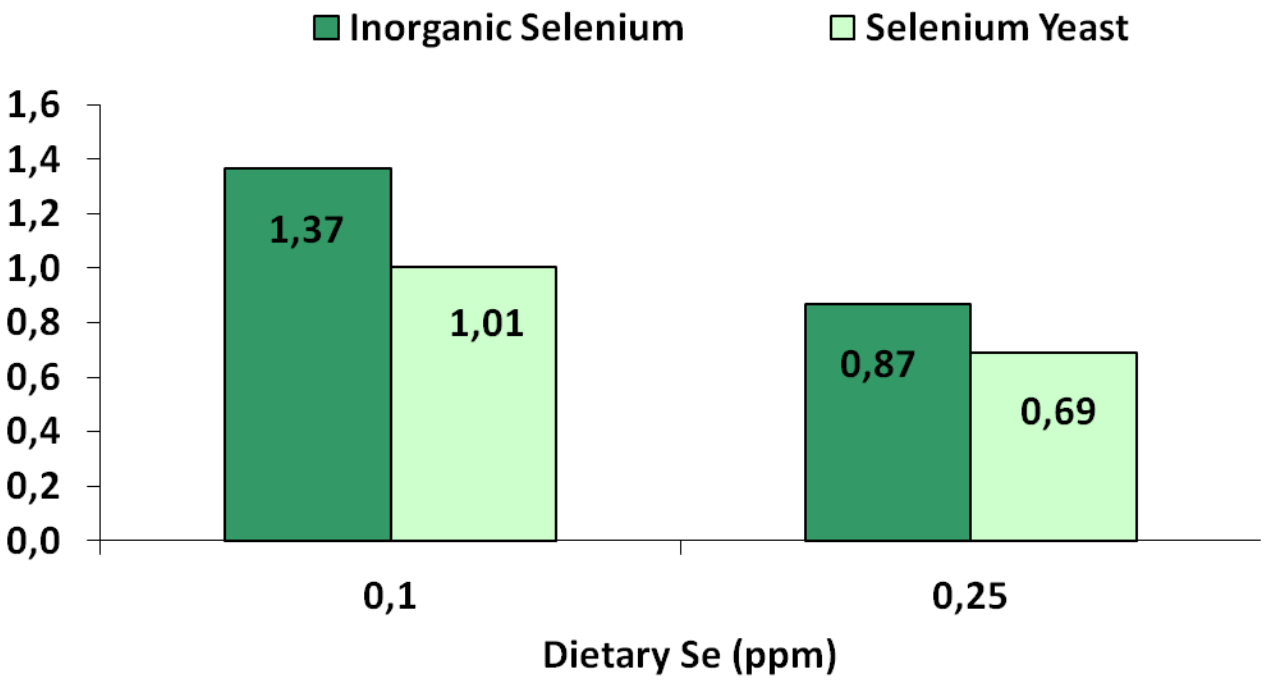
Selenium yeast promotes feathering



Edens, 2001

Meat drip loss

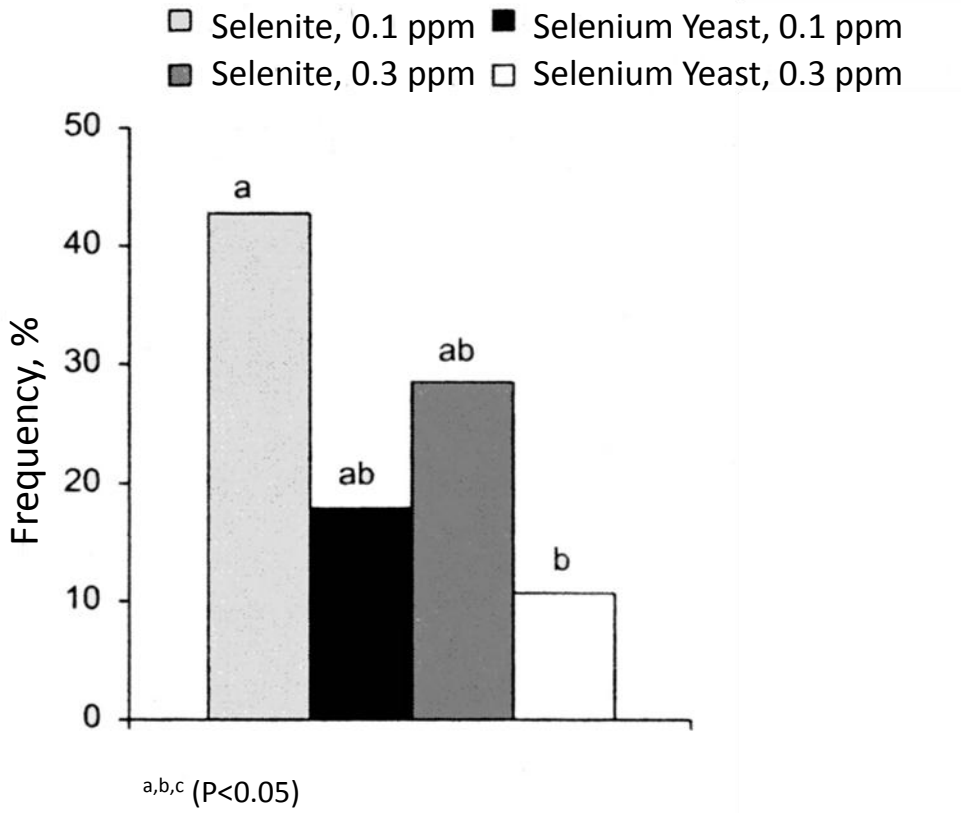
Figure: Meat drip loss within 24 h (%)



Selenium yeast reduced drip loss by 23,5%, due to reduced cell damage in cause of oxidative stress!

Adapted from Naylor, et al. 2000

Meat quality
Pale Soft Exudative
- PSE -



a,b,c (P<0.05)

Using selenium yeast instead of selenium selenite reduces the risk for PSE in meat after a slaughtering due to improved water holding capacity and texture.

Adapted from Edens et al., 2001; Photo: Petracci & Cavani 2012

Trial: Effect of level of SelenoKey on growth performance and carcass quality in broiler chickens

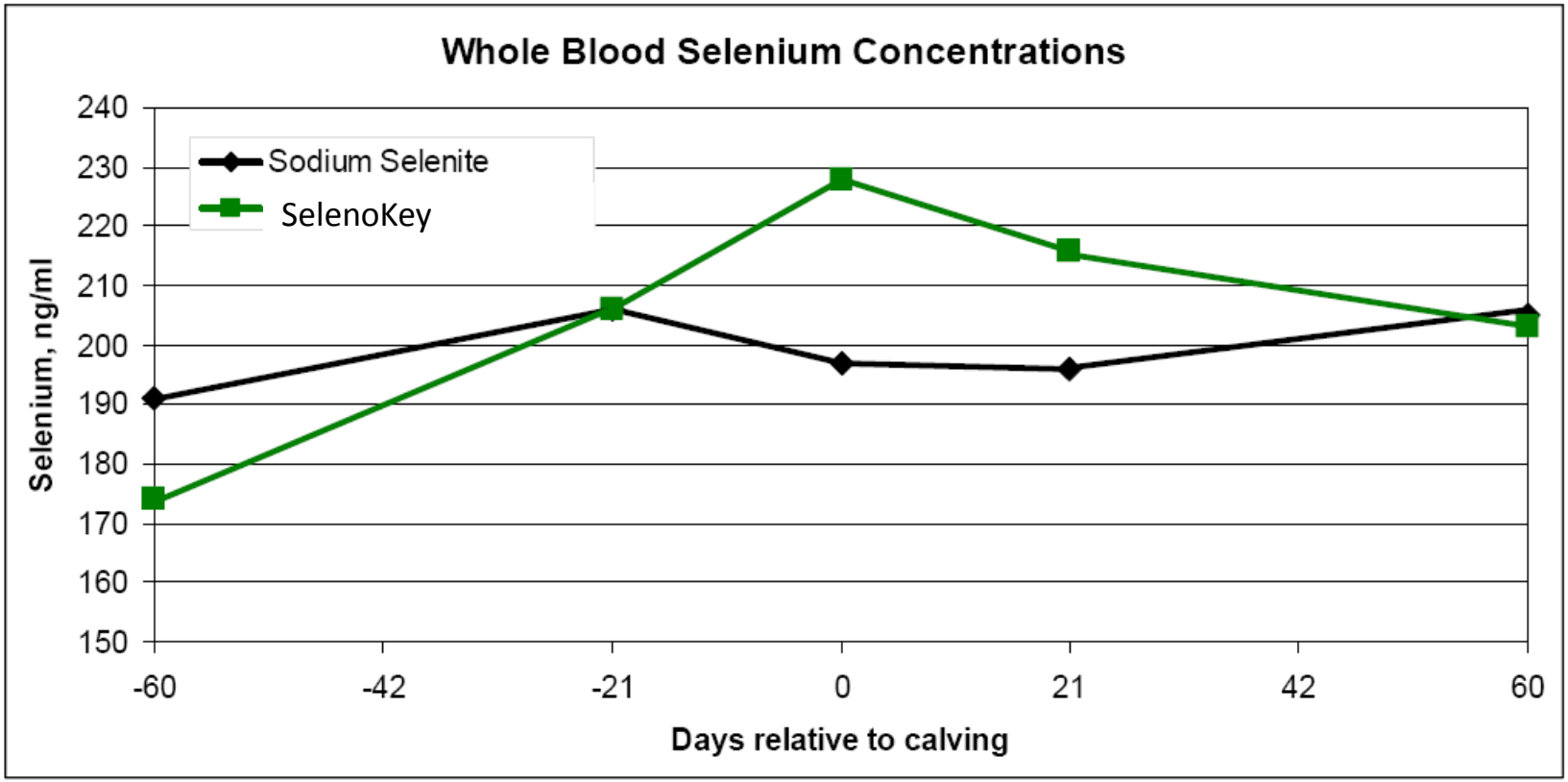
- 165 one-day-old COBB broiler chicks
- Treatment period: d 1 to 35 days of age

Treatment	1	2	3
Sodium selenite	**0.3 ppm**	**0.1 ppm**	**-**
SelenoKey	**-**	**0.1 ppm**	**0.15 ppm**
Live weight (d 35), kg	1.81	1.84	1.85
FCR	1.83	1.77	1.79
Meat content, %	72.1	73.1	75.3
Breast meat, %	18.6	19.2	20.5
Breast meat humidity, %	74.6	75.4	75.6

Biochem, 2012

Trial - Bioavailability in dairy cows

- Treatments: 0.3 ppm Se from SelenoKey or sodium selenite (38 heifers)
- Treatment period: 60 d pre-calving to 21 DIM (all cows selenite after d 21)



Wallace et al., 2005

Trial - Bioavailability in dairy cows/ calves

- Treatments: 0.3 ppm Se sodium selenite or 0.3 ppm Se from SelenoKey (fed to 40 cows and heifers)
- Treatment period: 120 days; 60 d precalving to 60 d after calving
- Sample collection from cows directly after calving, and 15 d, 30 d & 60 d after calving

	Selenite	SelenoKey
Whole blood Se, ng/mL		
Cows	262	291
Calves	222	248
Serum Se, ng/mL		
Cows	113	128
Calves	77	86
Milk Se, ng/mL	88	115

Effect of SelenoKey

- Improved Se status of cows during whole trial period
- Improved Se status of calves at birth and on the 60th day of life

Koenig and Beauchemin, 2009

Trial - Effects of SelenoKey on clinical response in dairy cows

- 6 commercial dairy herds, Approximately 9000 cows total; range of 600 to 2200 cows per herd
- Treatment: 0.3 ppm sodium selenite or 3 mg Se/head/day from SelenoKey plus the remainder of recommendations from sodium selenite
- Treatment period: 90 days

	Selenite	SelenoKey
1st cycle pregnancy rate, %	20	24
Aborted, %	8.3	7.0
Retained placenta, %	6.0	5.4
Cystic ovaries, %	3.8	3.4
Average SCC, x 1000	225	212

Effect of SelenoKey

- Improved 1st cycle pregnancy rate
- Lower percentage abortions and SCC

Engstrom et al., 2006

Summary

Using **SelenoKey** instead of sodium selenite is advantageous for **improving…**

- Selenium status of animals and progeny
- Immune response and antioxidant status
- FCR and growth performance
- Quality of milk, eggs and carcass (↓ drip loss)
- Reproductive performance

Recommendation

Replacing at minimum 0.1 ppm Se from inorganic source by organic Se from **SelenoKey** (-> combination of inorganic and organic Se source)