



NovaBalance®

**FMC** | An Agricultural  
Sciences Company

Anders Sylvan Sweden



# NovaBalance<sup>®</sup>

Waterconditioner



An Agricultural  
Sciences Company



# NovaBalance<sup>®</sup>

- **An agricultural water conditioner.**
- A preparation of sequestering, chelating and buffering agents for softening and conditioning water used for spraying agricultural chemicals.
- **Crops:** Any.
- **Pack size:** 5 liters
- **Packs per pallet:** 40 x 4 x 5 liters

# NovaBalance®

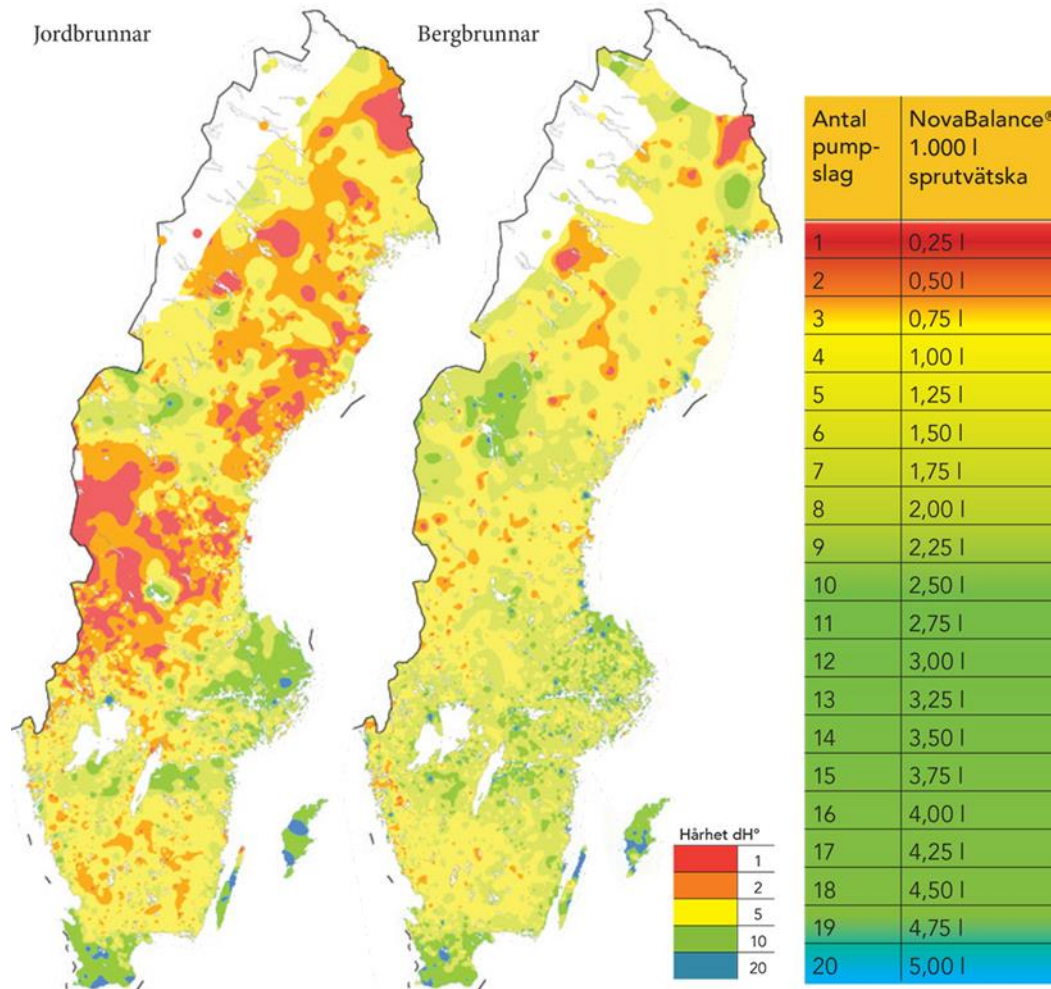
Waterconditioner

Active ingredient	Trade name f. ex.	Half life at different pH-levels		
		pH 5	pH 7	pH 9
Dimethoate	Danadim Progress	156 days		4,4 days
Tau-Fluvalinate	Mavrik 2F	48 days	22,5 days	30 hours
Gamma-cyhalothrin	Nexide CS	Stable	Stable	26 hours
Lambda-cyhalothrin	Karate 2,5 WG	Stable	Stable	7 days
Glyphosat	Glyfonova 450 Plus	33 days		77 days
Tribenuron	Nuance WG	1 dag		Stable
Metsulfuron	Accurate 20 WG	22 days	Stable	Stable
Propaquizafop	Agil 100 EC	10,5 days		12,9 hours
Fenoxaprop	Foxtrot	19,2 days		17 hours
Phenmedipham	Betanal	47 days	12 hours	7 min
Clomazon	Reactor 360 CS	Stable at pH 5 to pH 9		
MCPA	Metaxon	Stable at pH 5-9. Risk of Mg <sup>2+</sup> and Ca <sup>2+</sup> salts in hard water		
2,4-D	Catch	Stable at pH 5-9. Risk of Mg <sup>2+</sup> and Ca <sup>2+</sup> salts in hard water		
Tebuconazol	Riza, Folicur	Stable at pH 5 to pH 9		
Cymoxanil	Proxanil	Stable		31 min
Epoxiconazol	Rubric	Stable at pH 5 to pH 9		
Trinexapac	Quadro 25 EC	Stable		9,4 days
Chlormequat-chlorid	CCC	Stable at pH 5 to pH 9		

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## Hardness of water in Sweden



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Examples from the real life



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- In 2009 and 2010 Bayer Crops Science experienced problems with dispositioning of Betanal® Power and Kemifam® Power in Denmark
- Products contain 160 g/l desmedipham and 160 g/l phenmedipham
- Half Life of phenmedipham at pH 7 = 12 hours
- Problems increasing with time and amount of tanks filled
- Liters of water/ha (conc. of product) and filters had big impact
- Problem almost eliminated when farmers used pH lowering agent



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## Coverage of filters in test (%)

Tanks filled	Standby	Suction 50 Mesh	Line 80 Mesh	Nozzle	
				50 mesh	100 Mesh
Betanal® Power + Goltix®					
4		0	2	0	1
5	20 hours	1	3	1	20
Betanal® Power + Goltix® + NovaBalance®					
4		0	1	0	1
5	20 hours	0	1	1	3
Betanal® Power + Goltix® + pH FIX 5®					
4		0	3	0	2
5	20 hours	1	2	0	5



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- NovaBalance solved the dispositioning problems, that BCS were facing
- Not all pH-buffers did the same good job in tests as NovaBalance
- Farmers must be aware of water amount/ha
- Farmers must be aware of filters, (suction, line, nozzle)
- Start season with clean filters
- Ad NovaBalance to the tank FIRST – then the other products

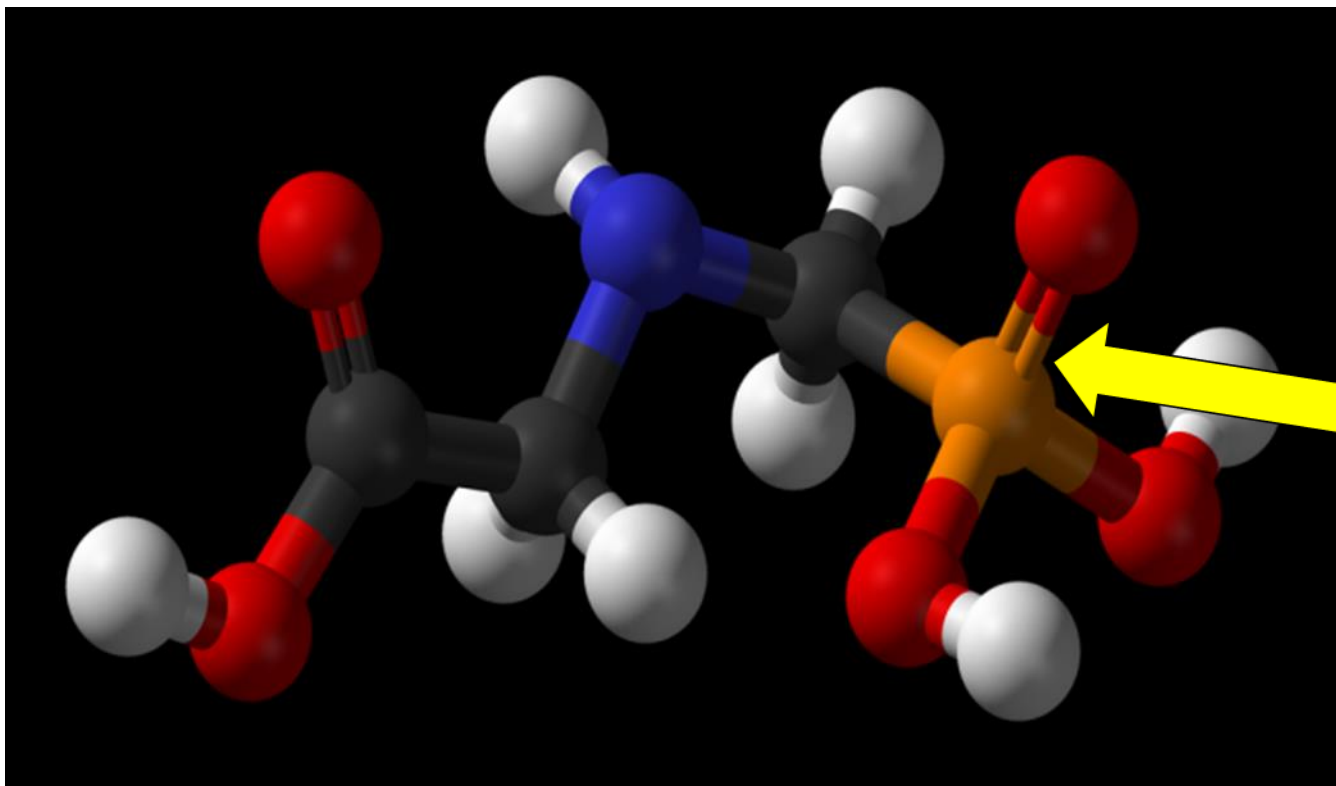


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## Hard water antagonism against glyphosate



$\text{Fe}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^+$   
og  $\text{K}^+$  ions will bind to the  
phosphorous molecule in  
glyphosat



Hence uptake, and  
transportation within  
the plants becomes limited



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- **What happens in the tank, when NovaBalance is added?**
- pH is lowered (down to 4,5-5,0)
- Glyphosat being a weak acid will make a species of distribution according to pH
- When pH is lowered in the solution, the glyphosate molecule has less tendency to bind to the metal ions.
- Calcium ions will be chelated (will not bind to glyphosate)
- Wetter/sticker agent helps uptake of the product
- NovaBalance<sup>®</sup> is hygroscopic. Prevents the droplet from drying out, gives more time for the glyphosate to travel from the droplet to the inside of the leaf

## Calculation of the hardness of a random water test from Sweden

(2,5 times  $\text{Ca}^{2+}$  ppm + 4,12 times  $\text{Mg}^{2+}$  ppm / 0,056 = ° dH)

Vananalyse OMDREV_REF2		
Södra Östersjön 18. november 2010		
pH	ppm $\text{Ca}^{2+}$	ppm $\text{Mg}^{2+}$
7,3	142,25	13,51

Hardness: 23,17° dH

Normally pH is high in hard water

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- **Hardness in spraying water: 23° dH. 13 DAT**



288 g/ha glyphosat + NovaBalance



288 g/ha glyphosat

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- **Hardness in spraying water: 23° dH. 28 DAT**



288 g/ha glyphosat + NovaBalance



288 g/ha glyphosat

## Dose rates NovaBalance

Hardness of water (°dH)	NovaBalance / 1000 l in tank
Under 8	0,5 l NovaBalance
Between 8 and 18	1,0 l NovaBalance
Above 18	2,0 l NovaBalance

### Examples:

3500 l in tank, water hardness 21° dH:

$3500/1000 \times 2,0 \text{ l}/1000 \text{ l} = 7,0 \text{ l}$  NovaBalance **added first** in the tank

3500 l in tank, water hardness 15° dH:

$3500/1000 \times 1,0 \text{ l}/1000 \text{ l} = 3,5 \text{ l}$  NovaBalance **added first** in the tank



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- Pyrethroid's breakdown at high pH
- pH 9 is not normal in spraying water
- Addition of Boron (B) as micronutrient in tank mix, will raise the pH to a critical high level
- 2 l NovaBalance/1000 l water can buffer the pH back to a more favorable pH for the pyrethroid



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- **NovaBalance logistically logic**
- In a 800 l sprayer tank with hard water (23 °dH) you need:
  - $800/1000 \times 2 = 1,6$  l NovaBalance to protect your glyphosate
- To do the same job with Team up (4 l/ha) you would need:
- $800/150 \times 4 = 21,3$  l Team up





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- **NovaBalance will protect:**
  - 1. Glyphosate in general**
  - 2. Phenmedipham from breaking down**
  - 3. Pyrethroids from breaking down**
  - 4. Hormones when the water is hard**