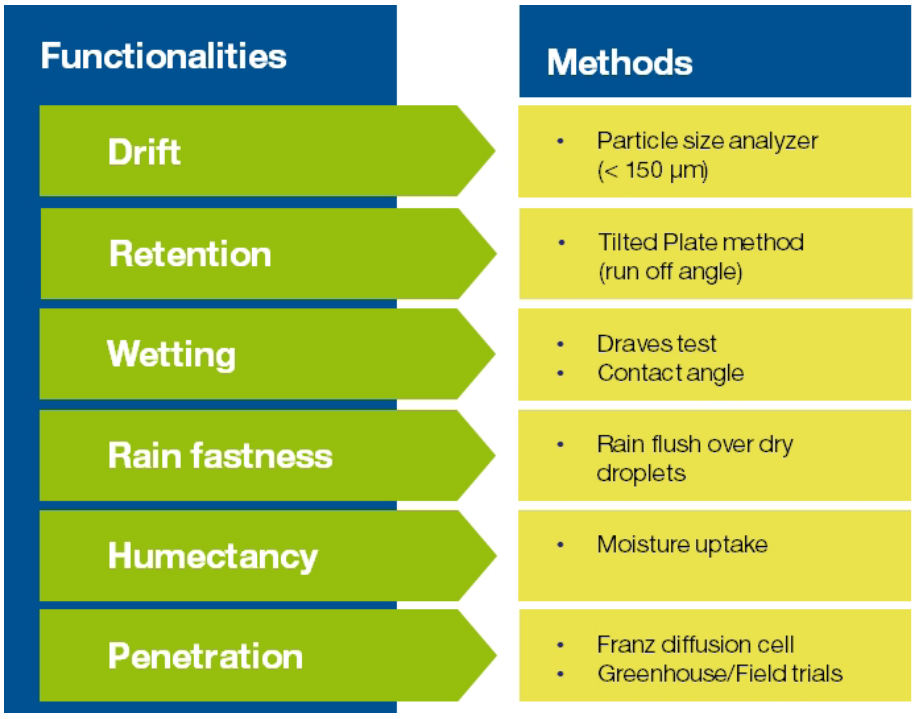
Adjuvant Selection

What is a good Adjuvant? Adjuvants play an important part in improving efficacy and reducing loss of crop protection products in the field. Several different mechanisms and functionalities are involved; to help choose the optimal solution for your needs, AkzoNobel has divided and measured the different functionalities.

Our **Adsee™** product portfolio contains a variety of solutions to increase bio-efficacy of pesticides by improving functionalities such as droplet retention, rain fastness, drift and penetration.

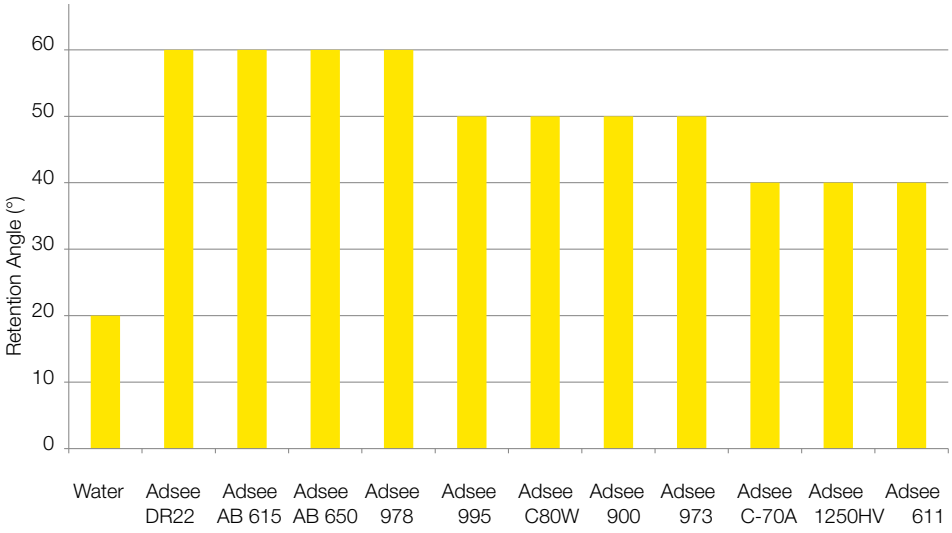
- **Adsee AB 650** (tank-mix) and **Adsee AB 615** (in-can) are multipurpose adjuvants with good bio-efficacy improvement for all pesticides
- **Adsee C80W** and **Adsee C-70A** are suited to Herbicides and are highly compatible with different salts and mixtures
- **Ethylan 995** is superior with Triazoles
- **Adsee 611** is a special development for Rice protection and **Adsee 1250HV** increases viscosity and bio-efficacy for Paraquat
- **Adsee 978** is our choice for Peat & Turf applications with excellent re-wetting properties
- **Adsee 900** can be used as a tank-mix or built-in adjuvant. A good wetting agent and increases penetration of many actives with logP>1



Adjuvant	Drift	Retention	Wetting	Rain fastness	Humectancy	Penetration	Use
Adsee™ 611	-	+	+	0	++	+++ Rice	Tank-mix
Adsee™ 900	--	++	+++	0	+	+++ High LogP	In can
Adsee™ 973		++	0	+	++	+++ Low LogP	In can
Adsee™ 1250HW	+	+		+++	++	+++ Paraquat	In can
Adsee™ 978	-	+++	+	0	+	0	In can
Adsee™ AB 615	-	+++	++	0	+	+++ Multi	In can
Adsee™ AB 650	0	+++	++	0	+	+++ Multi	Tank-mix
Adsee™ C-70A	-	+	0	+	++	+++ Herbicide	In can
Adsee™ C80W	-	++	0	+	+	+++ Herbicide	In can
Adsee™ DR22	+++	+++	0	+++	+++	0	Tank-mix
Ethylan® 995	++	++	++	++	0	+++ Fungicide	In can

Impact: - negative, 0 = no impact, + good, ++ very good, +++ outstanding

Retention Angle

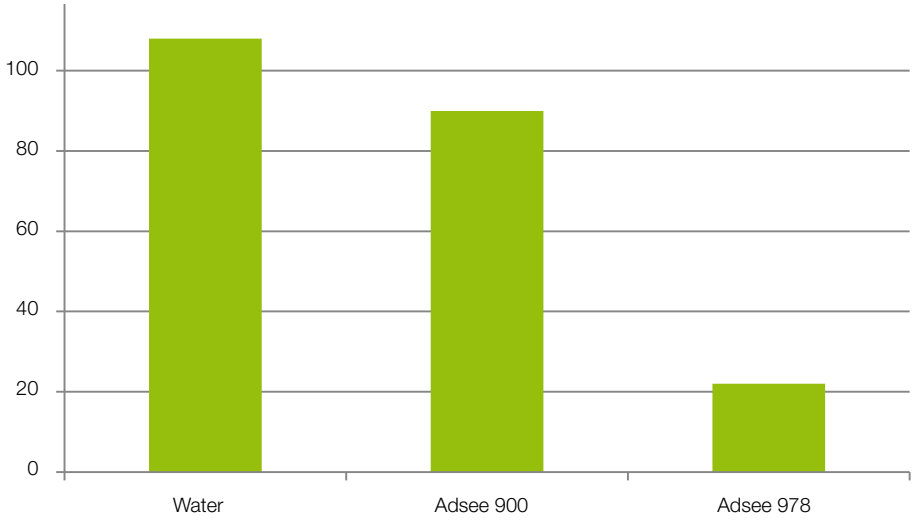


Good retention of droplets on plants is important to avoid pesticide loss that can reduce the efficacy of the formulation.

Adsee DR22 is a bio-polymer that is outstanding in reducing drift and improving retention/ deposition but does not affect the penetration through cuticle. Adsee AB 650 increases retention at the same level and improves penetration without reducing drift.

The retention angle is measured by the "Tilted plate" method. A parafilm surface is tilted and the max angle is recorded were a water droplet, containing 0,5% adjuvant, sticks to the surface without any run-off.

Contact angle of water on pre-treated peat

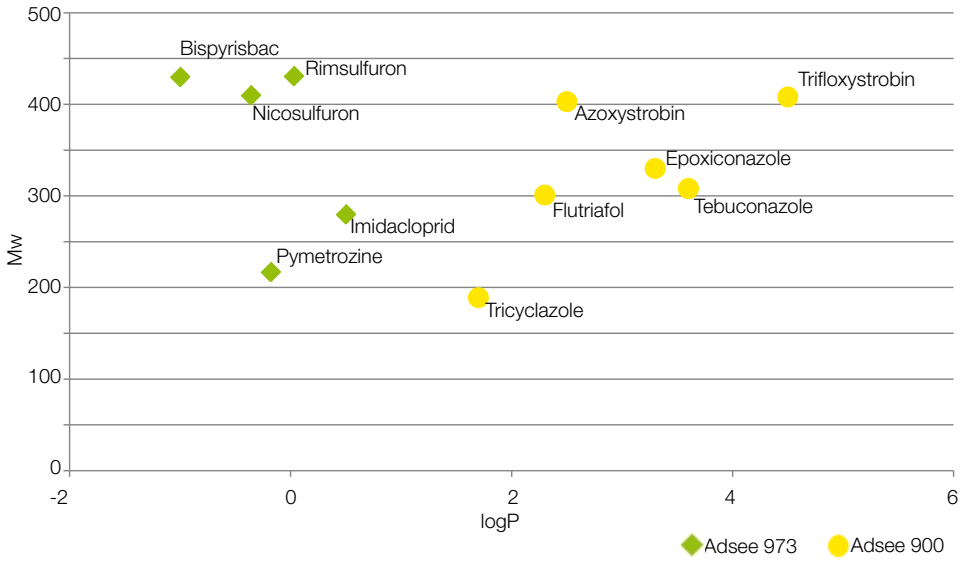


Adsee 978 is suited to turf & peat applications with excellent re-wetting properties. The graph shows the contact angle of a water droplet on peat after treatment with the adjuvant. In addition, Adsee 978 has shown to have minimal impact on root and grass toxicity.

Drop on a peat tablet, the red lines indicating how the contact angle is measured.

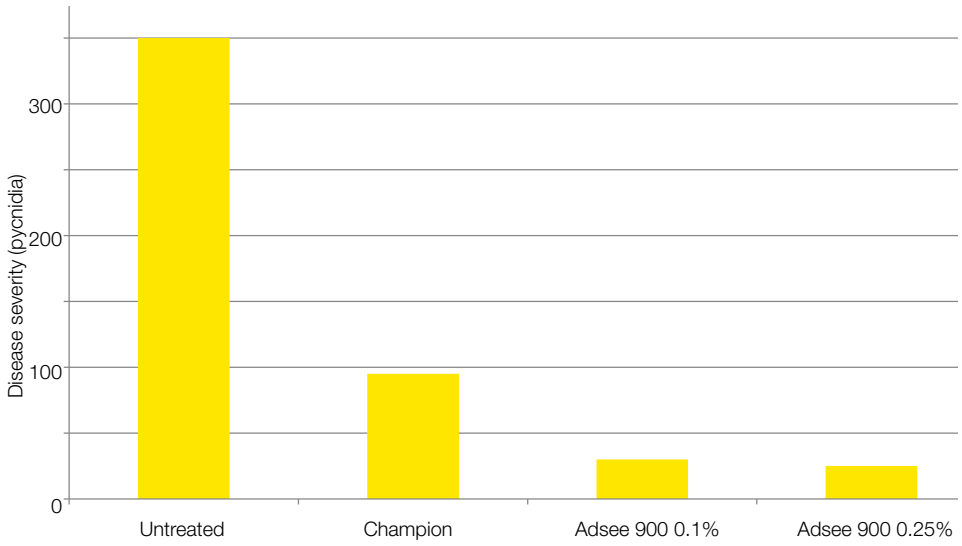
Field trial results

Adsee 900 and **Adsee 973** increase bio-efficacy and penetration of most pesticides dependent on the water solubility (log P) of the active. (As reference, Glyphosate has a logP of -4,6). The data shows the best adjuvant rated from field and green house trials.



Adsee 900 Green house trial

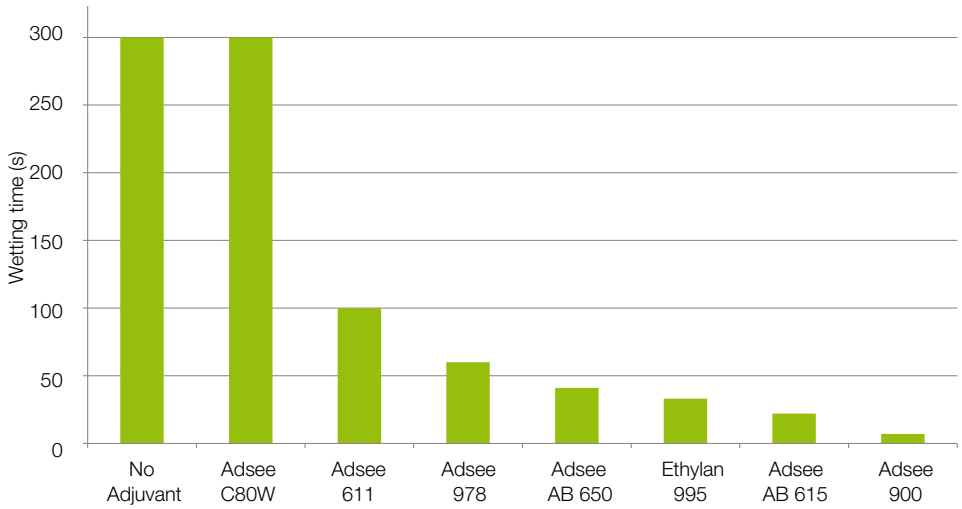
Adsee 900 was added to the fungicide formulation Champion (epoxiconazole + boscalid). Wheat was inoculated with Septoria tritici and treated with Champion, Champion + 0,1% Adsee 900 and Champion + 0,25% Adsee 900. Disease severity was assessed by counting the amount of pycnida. The graph shows that addition of 0,1% of Adsee 900 increase the efficacy of Champion by 20%.



Wetting Properties

Wetting properties of different adjuvants according to Draves test. The time it takes for a piece of yarn to sink to the bottom of a cylinder containing a solution of 1% adjuvant in distilled water is measured (max 300 sec).

The data shows that **Adsee 900** is the adjuvant with best wetting properties.



Planet Possible: Our commitment to doing more with less

Our success as a company depends on sustainability. At AkzoNobel we have sharpened our focus on sustainability by reviewing our sustainability risks and opportunities against global trends and evaluating how they will impact our customers by 2020. We express the outcome as our Planet Possible approach to sustainability. It's our commitment to creating more value from fewer resources.

Planet Possible™

We know only too well that our future hinges on our ability to radically do more while using less.

- More innovation, less traditional solutions;
- More renewable energy and materials, less fossil-based;
- More value chain focus, less introverted thinking.

Employing our new strategy of radical efficiency, we work with customers and suppliers to open infinite possibilities to a finite world. Learn more at **www.akzonobel.com/planetpossible**

Number 1

was our position in the Materials industry group on the 2015 Dow Jones Sustainability Index.

At least 20%

is the share of revenue we aim to achieve by 2020 from products with a sustainability advantage for customers.

More than 25%

is the reduction we aim to achieve in our cradle-to-grave carbon foot print per ton of product by 2020.

Asia/Pacific
AkzoNobel Surface Chemistry
22F, Eco City, No 1788 West Nan Jing Road
Shanghai China 200040
T +86 2122205000
F +86 2122205558
E agro.china@akzonobel.com

AkzoNobel Surface Chemistry
3 Changi Business Park Vista,
5-01 Singapore 486051
T +66 66355183
F +65 66355327

AkzoNobel Surface Chemistry
AkzoNobel India Limited, Plot No 1/1,
TTC Industrial Area, Thane Belapur Road
Koparkhairne, Navi Mumbai-400710,
Maharashtra, India
T +91 2227787386
F +91 2227787380

Europe
AkzoNobel Surface Chemistry
SE-444 85 Stenungsund,
Sweden
T +46 30385000
F +46 30388910
E surfactants.europe@akzonobel.com

Mexico, Central America and Caribbean
AkzoNobel Chemicals SA de CV
Av. Ejército Nacional 418, Office 507
Col. Chapultepec Morales,
C.P. 11570, México, D.F. México
T +52 5552617895

South America
AkzoNobel Surface Chemistry LLC
Rodovia Akzo Nobel 707
Bairro São Roque da Chave
P.O. Box 32
Cep 13295-000 Itupeva S.P.
T +55 1145918938
F +554 5911744
E sc-southamerica@akzonobel.com

USA and Canada
AkzoNobel Surface Chemistry LLC
525 West Van Buren Street
Chicago IL 60607-3835 USA
T +1 3125447000
F +1 3125447320

Customer Service
Telephone: +1 8009069977
E csrusa@akzonobel.com

Technical Service
AkzoNobel Surface Chemistry LLC
525 West Van Buren Street
Chicago IL 60607-3835 USA
T +1 3125447006
F +1 3125447410

AkzoNobel

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