



Technical report

This report is a summary of research that has been undertaken in the last ten years into the effects of treating black and white peat substrates with Fiba-Zorb® wetting agent.

The research has been undertaken by the following organisations:

UK	Levington Agriculture Ltd, Ipswich Stockbridge Technology Centre, Cawood
Netherlands	PBG, Naaldwijk
Denmark	DEG Green Team, Odense
Germany	Fachhochschule Weihenstephan, Freising



Aim

The aim of this technical report is to show the reader the proven outstanding features of Fiba-Zorb® and how the research results answer the following frequently asked questions:

- ▶ What is the effect of Fiba-Zorb on the speed of water absorption?
- ▶ What is the effect of Fiba-Zorb on the quantity of water absorbed?
- ▶ How long does Fiba-Zorb work for after treatment?
- ▶ Is it possible to wash out Fiba-Zorb during culture?
- ▶ Does Fiba-Zorb have any influence on the quality of the substrate?
- ▶ Does Fiba-Zorb have any influence on fertilisers?
- ▶ What happens to Fiba-Zorb in extreme drying-out conditions?

This technical report is a compilation of test results, shown in a simple format, without inclusion of the test protocols, which are available upon request.

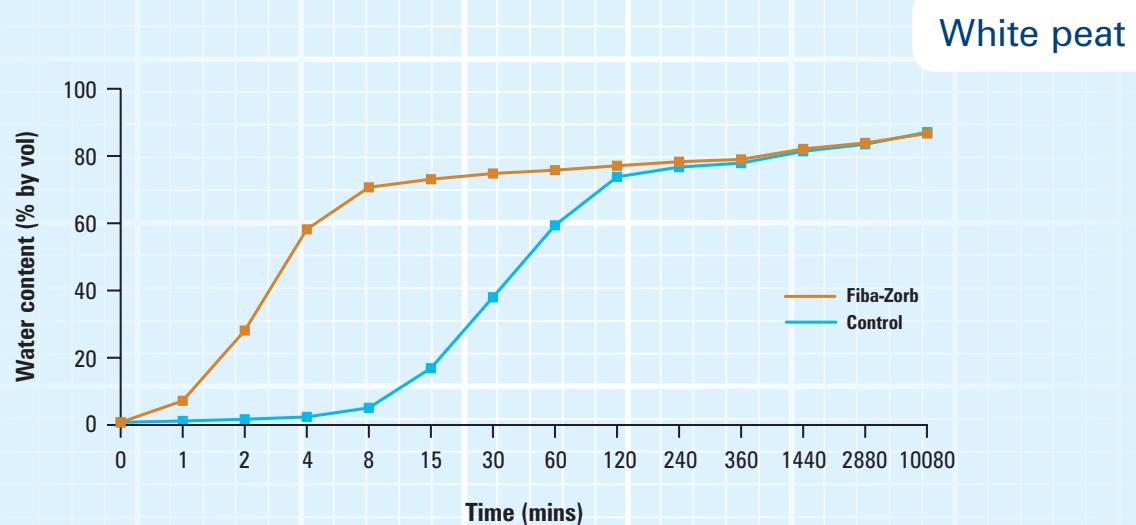
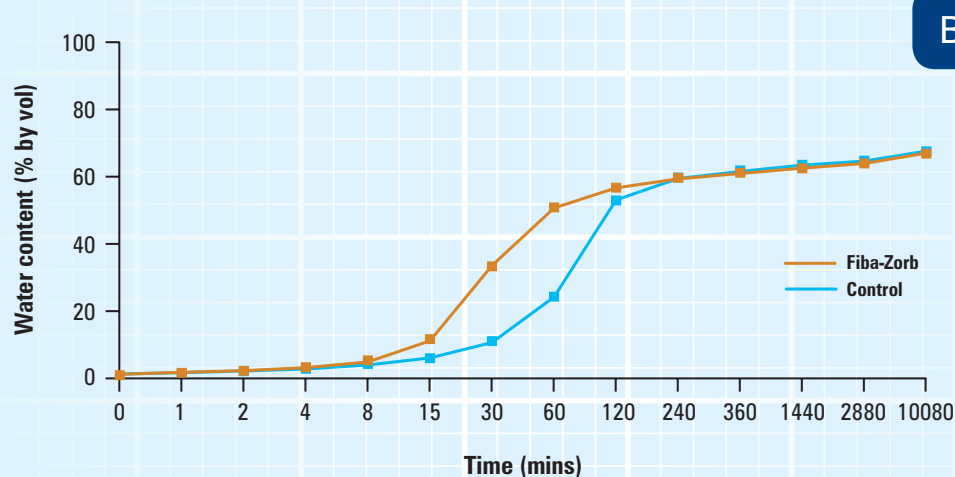


What is the effect of Fiba-Zorb on the speed of water absorption?

The main reason for using a wetting agent is to allow the substrate to be re-wet easily if it becomes dried out.

This can happen due to long delivery times and different growing techniques. The speed of wetting is very important as it is the absorption speed that ensures a more uniform water uptake.

This is shown below by the PBG test at Naaldwijk, Holland in 2000. In the top figure you can see the results for German black peat and below the results for the speed of water uptake by capillary for Baltic white peat.





What is the effect of Fiba-Zorb on the quantity of water absorbed?

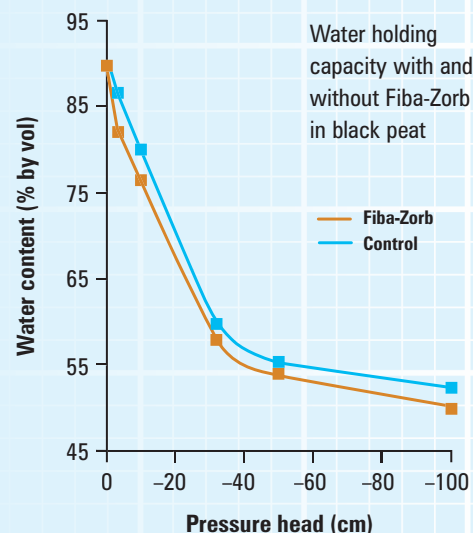
Frequently asked questions are “Will my potting soil be too wet if I add a wetting agent?” and “What will be the effect on my substrates in the dormant or dark period of the year when there is little evaporation and growth activity”.

It is important for the grower to know that the wetting agent that he uses ensures growing media does not hold more water than it would without the wetting agent and preferably a little less.

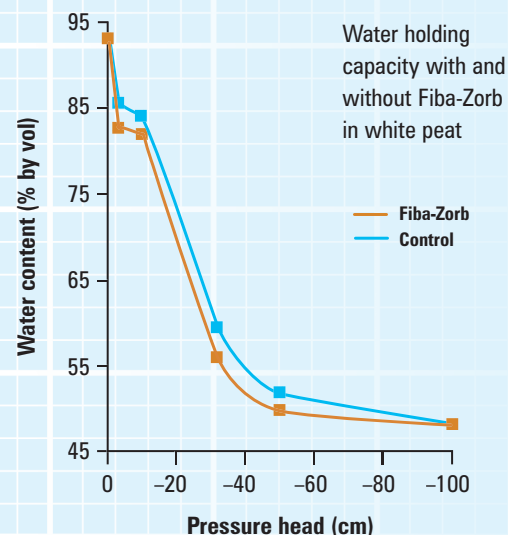
The PBG in Naaldwijk made the following observation **“For white peat addition of Fiba-Zorb improved the air content (AFP) in the whole measurement range for the Naaldwijk method.”**

The following research was undertaken by PBG in Naaldwijk, Holland in 2000.

Black peat



White peat

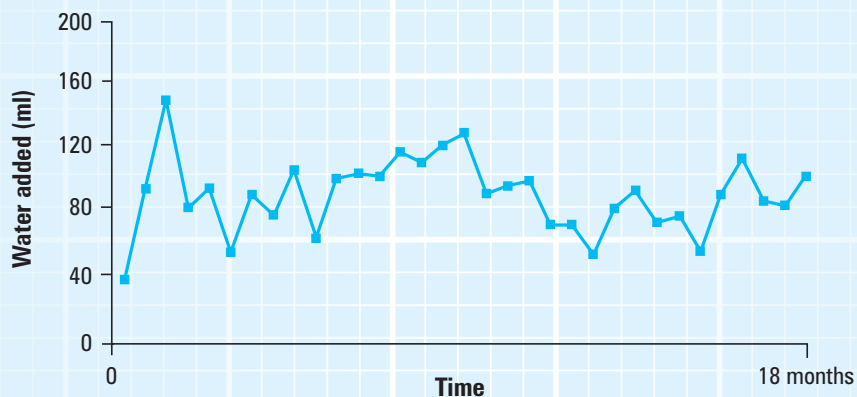


From this research we learned that Fiba-Zorb not only ensures that the substrate shows a much improved wetting speed and volume of water uptake but equally important to the grower is the fact that during the dormant or dark period the substrate treated with Fiba-Zorb actually improved the drainage and slightly reduced the amount of water in the substrate, as seen in the PBG graphs above for black and white peat compared to the untreated sample.

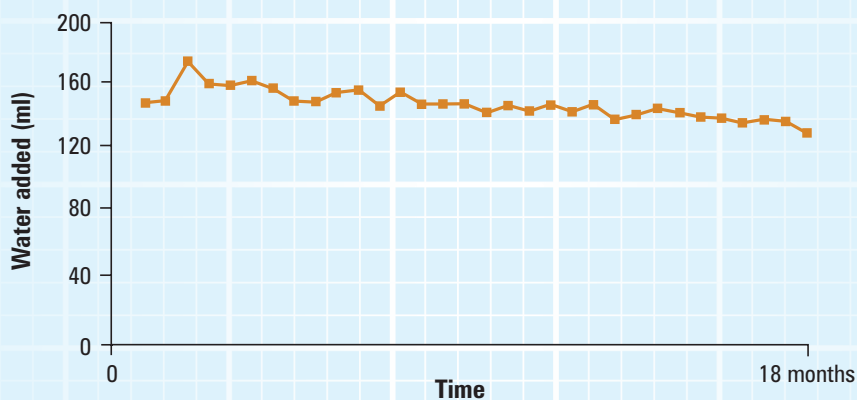


How long does Fiba-Zorb work for after treatment?

Many cultures take from 6–12 months to grow before transportation and shelf-life for marketing. For this reason it is important to know how long Fiba-Zorb will work. In order to investigate the longevity, Levington Agriculture Ltd, undertook research over 18 months to prove that during this time Fiba-Zorb was not easily leached out.



In the above test without a wetting agent it is clear to see how irregular water absorption was.



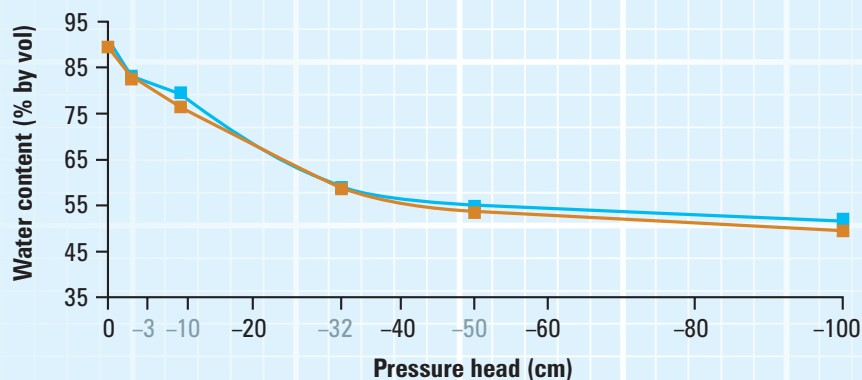
With the addition of Fiba-Zorb the water uptake was better and more uniform and still working after 18 months.

This can be a very important reason for choosing Fiba-Zorb as this longevity is a great benefit to the overall plant-life and the ability for the grower to ensure maximum water uptake for the often long journey to the market and subsequent retailer.



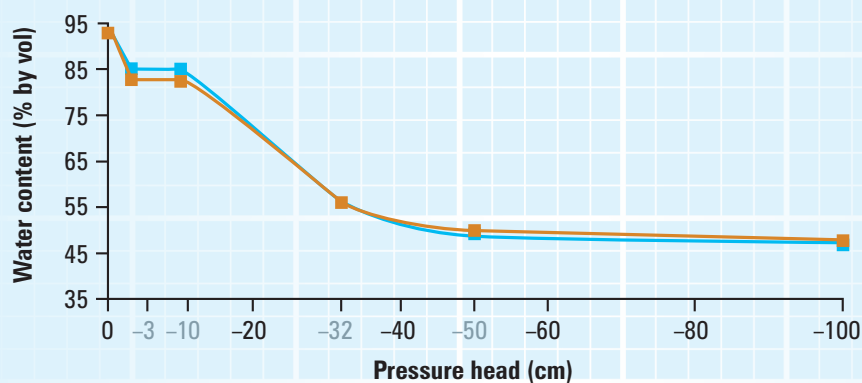
Is it possible to wash out Fiba-Zorb during culture?

We know that the wetting agent Fiba-Zorb lasts a long time from the 18 month Levington trial, but growers irrigate continuously during cultivation and we researched, with PBG at Naaldwijk, the possibility of Fiba-Zorb being rinsed or leached out by continual irrigation, as is the case with many wetting agents.



Black peat

Rinsed black peat treated with Fiba-Zorb. The ochre line, unrinsed, shows to be almost the same as the rinsed blue line.



White peat

The rinsed white peat potting soil having been treated with Fiba-Zorb unrinsed, ochre line, compared with rinsed, blue line.

In both figures it can be seen that the irrigation has hardly any effect on the leaching of the Fiba-Zorb from the potting soil.

This is a most important feature and one that is important for the grower to use Fiba-Zorb.



Does Fiba-Zorb have any influence on the quality of the substrate?

It is most important that when something is added to a substrate it does not harm the culture. To test the influence of the growth of plants many toxicity tests have been undertaken in several research stations. In the 2004 Stockbridge Technology Centre tests Fiba-Zorb was added at normal and extremely high dose rates to the potting soil mixes.

Several very sensitive cultures such as impatiens and begonia were monitored over the germination and early growing period.

A remarkable result was the standard doses of Fiba-Zorb showed an improvement over untreated potting soil mixes. Also with double and triple doses the results were equally non-toxic and beneficial.

Also during a long-term project by the DEG Green Team in Denmark on the culture of roses, cyclamen and exacum they concluded the Fiba-Zorb had no negative effects whatsoever on the plant growth.

Lettuce

Shown after 14 and 28 days



Impatiens

Shown after 9 and 32 days



Cucumber

Shown after 14 and 28 days



Does Fiba-Zorb have any influence on fertilisers?

The results of several tests concluded that Fiba-Zorb cannot be leached out and has good longevity during the culture of plants.

Nevertheless Turftech undertook research to prove that Fiba-Zorb did not effect the existing chemistry in the potting soil.

In 2000 the PBG in Naaldwijk investigated the effect of Fiba-Zorb on the fertilisers used in black and white peat respectively. To achieve this chemical analyses were carried out in duplicate. Half of the samples were rinsed. Water extracts were made by two methods: 1:1.5 volume extract (Sonneveld *et al*, 1974), and 1:5 volume extract (PrEN 13652, 1998). The obtained volume, determined with the 1:1.5 method, was rinsed with 4 times this volume with water. For the 1:5 method, the sample volume as a whole was placed in a cylinder and rinsed with 4 times the volume with water. A correction was made for the higher water content of the rinsed samples. In the extracts plant nutritional elements were determined.

The results of the chemical analyses of macro- and micro-elements for black peat and white peat treatments are shown in Table 1 and 2 overleaf, using the 1:1.5 extraction and the 1:5 extraction, respectively. No effects were found on the nutrient concentrations of the extracts in either of the used extraction methods. As expected, the nutrient concentrations were higher in the 1:1.5 method compared to the 1:5 method, due to the more than 3 times higher amount of extraction fluid in the CEN-extraction. Rinsing lowered the nutrient concentrations in both methods, because during this procedure, nutrients were leached out. The higher EC and macro-element concentrations in black peat may be attributed to the higher addition of Dolokal extra.

Table 1

The chemical analyses of rinsed and non-rinsed samples of black peat and white peat with 0 and 1 time the standard concentration of the wetting agent (1:1.5 extraction by volume).

	pH	EC mS/cm	NH ₄ mmol/l	K mmol/l	Na mmol/l	Ca mmol/l	Mg mmol/l	NO ₃ mmol/l	Cl mmol/l	SO ₄ mmol/l	HCO ₃ mmol/l	P mmol/l	Fe μmol/l	Mn μmol/l	Zn μmol/l	B μmol/l	Cu μmol/l	Mo μmol/l
B-0	5.9	0.6	0.6	0.8	0.7	0.7	0.9	2.4	0.4	0.6	<0.1	0.29	3.8	1.2	2.1	1.3	0.2	<0.1
B-1	5.9	0.7	0.7	0.9	0.7	0.8	1.0	2.7	0.5	0.8	<0.1	0.07	4.0	1.3	2.3	1.1	0.2	<0.1
W-0	6.0	0.4	0.5	0.9	0.2	0.5	0.4	1.0	0.2	0.9	<0.1	0.69	7.3	0.9	1.9	1.5	0.3	0.1
W-1	6.0	0.4	0.6	0.9	0.4	0.4	0.3	1.1	0.3	0.9	<0.1	0.31	6.2	0.9	1.6	2.1	0.3	<0.1
B-0r	6.0	0.2	0.2	0.5	0.4	0.3	0.3	0.7	0.2	0.6	<0.1	0.27	4.0	0.4	0.9	3.0	0.1	0.2
B-1r	5.3	0.2	0.3	0.4	0.3	0.3	0.3	0.6	0.2	0.4	<0.1	0.28	3.7	0.5	1.0	2.0	0.1	0.1
W-0r	5.9	0.2	0.2	0.7	0.4	0.7	0.3	0.6	0.2	0.5	<0.1	0.44	7.3	0.6	1.0	5.4	0.2	0.2
W-1r	6.0	0.2	0.2	0.5	0.8	0.4	0.2	0.3	0.3	0.5	<0.1	0.10	8.0	0.7	0.7	3.8	0.2	0.4

Table 2

The chemical analyses of rinsed and non-rinsed samples of black peat and white peat with 0 and 1 time the standard concentration of the wetting agent according to CEN (1:5 extraction by volume).

	pH	EC mS/cm	NH ₄ mmol/l	K mmol/l	Na mmol/l	Ca mmol/l	Mg mmol/l	NO ₃ mmol/l	Cl mmol/l	SO ₄ mmol/l	HCO ₃ mmol/l	P mmol/l	Fe μmol/l	Mn μmol/l	Zn μmol/l	B μmol/l	Cu μmol/l	Mo μmol/l
B-0	6.0	0.3	0.2	0.4	0.4	0.4	0.4	1.0	0.2	0.3	0.2	0.17	2.3	0.5	0.8	2.3	0.1	0.2
B-1	5.8	0.2	0.2	0.4	0.3	0.3	0.4	0.9	0.2	0.3	<0.1	0.19	2.0	0.5	0.8	<1.0	<0.1	<0.1
W-0	5.9	0.1	0.2	0.4	0.1	0.2	0.1	0.2	<0.1	0.3	<0.1	0.17	3.6	0.5	0.8	<1.0	<0.1	0.3
W-1	6.0	0.2	0.3	0.4	0.1	0.2	<0.1	0.3	0.1	0.3	<0.1	0.20	4.4	0.3	0.7	<1.0	<0.1	0.3
B-0r	5.5	0.1	<0.1	0.2	0.1	0.2	0.2	0.3	<0.1	0.1	<0.1	0.09	1.7	0.2	0.4	<1.0	<0.1	0.1
B-1r	5.6	0.2	<0.1	0.2	0.2	0.2	0.2	0.4	0.1	0.2	<0.1	0.09	1.6	0.2	0.4	<1.0	<0.1	<0.1
W-0r	6.1	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.08	3.1	0.4	0.3	<1.0	0.1	0.5
W-1r	6.3	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.09	3.7	0.1	0.6	<1.0	0.3	0.5

B-0 Black peat, no Fiba-Zorb
 B-1 Black peat + Fiba-Zorb
 W-0 White peat, no Fiba-Zorb
 W-1 White peat + Fiba-Zorb
 B-0r Black peat, no Fiba-Zorb, rinsed
 B-1r Black peat + Fiba-Zorb, rinsed
 W-0r White peat, no Fiba-Zorb, rinsed
 W-1r White peat + Fiba-Zorb, rinsed



What happens to Fiba-Zorb in extreme drying-out conditions?

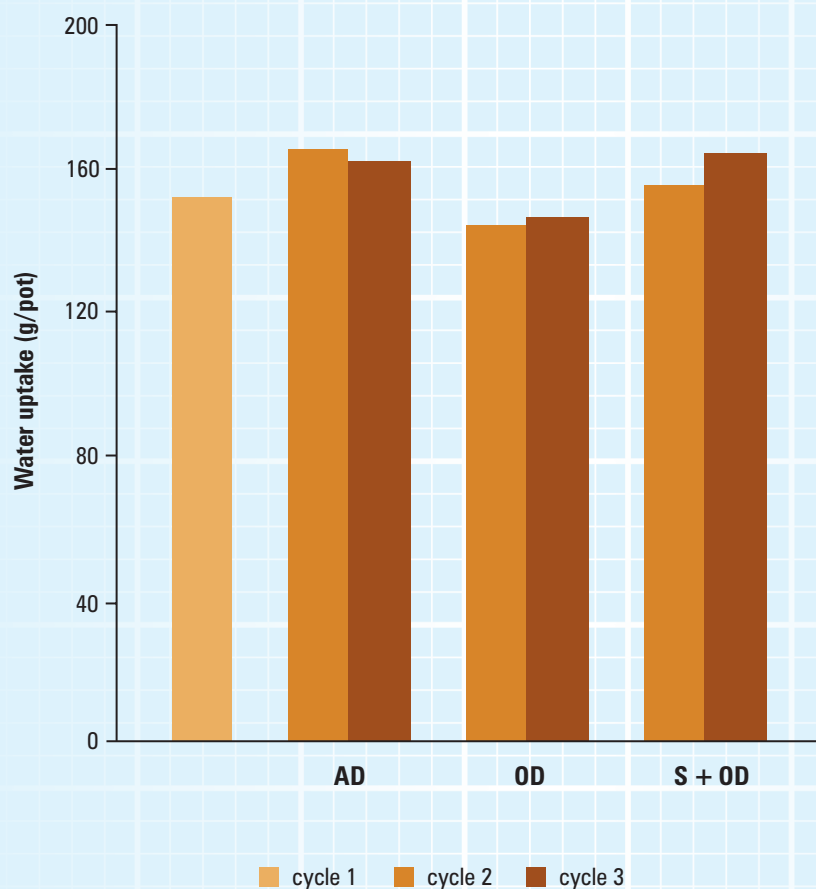
Fiba-Zorb is not only added to enable initial fast and even wetting but to ensure that if the potting soil ever becomes really dried out it can then be re-wet and that the water is absorbed evenly and thoroughly without any dry areas.

The effect of Fiba-Zorb in really dried-out peat was investigated by Fachhochschule Weihenstephan in Germany.

In cycle 1 you can see the water uptake with a standard dose of Fiba-Zorb.

In the figure you can also see the difference in water after drying out once and twice in the air (AD) and in the oven (OD) plus drying out once and twice in storage and oven drying (S+OD).

The conclusion is that Fiba-Zorb is very beneficial even after extreme drying-out.



Conclusion

In this technical report we have shown to you the results of our exhaustive research into the effects of incorporating Fiba-Zorb into potting soil mixes.

We trust that after reading this report you will be convinced by our test results Fiba-Zorb is a safe and beneficial additive for all substrates.

Turftech will endeavour to assist you and your customers with information to ensure you enjoy the benefits of Fiba-Zorb.

If you need further information please do not hesitate to contact us – we store Fiba-Zorb in Belgium, Latvia, UK and USA and delivery of your orders are always dealt with promptly.



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