

Argus White Paper: Polyhalite's mixed European prospects



Polyhalite is a minor product in the context of the European fertilizer market, but it has attributes that could allow it to grow significantly.

The sole supplier is Israeli fertilizer and chemicals firm ICL, producing in the UK from a substantial North Sea resource. But Sirius Minerals plans to begin production by 2021, increasing availability of the multi-nutrient mineral.

When and how Sirius will ultimately enter the market remain topics of debate, but this article will instead centre on the perception of the mineral itself within Europe.

This principal focus is on two of Europe's largest fertilizer sub-markets, the prospects of polyhalite in relation to them, and its future in the region generally.

UK: Flexibility focus

The UK's polyhalite consumption is estimated at 6,000-10,000 t/yr by market participants. It is difficult to estimate more precisely, given the existence of multiple and relatively new product combinations containing the mineral, after initially only straight Polysulphate, produced by ICL, had been available.

But awareness of — and interest in — the mineral is increasing, with market participants repeatedly citing the “flexibility” that it provides to farmers. This flexibility could open the door to a substantial UK market segment — that of nitrogen-plus-sulphur (N+S).

N+S products of various ratios — such as CF's DoubleTop and SingleTop, and Yara's AXAN — are fertilizer staples in the UK. Annual N+S consumption is estimated by one market expert to include around 150,000t of 27N+30SO₃ (DoubleTop) and 27N+12SO₃ (SingleTop) combined, as well as approximately 30,000t of 27N+9SO₃ (AXAN).

Where and what is it?

Polyhalite is a naturally occurring mineral, containing one macronutrient in potassium, and three secondary nutrients in sulphur, magnesium and calcium, along with trace amounts of micronutrients. Sold under the brand name Polysulphate, ICL has produced it in North Yorkshire since 2011. The firm has also launched a product called PotashpluS, which is a combination of MOP and polyhalite, as well as range of fertilizers marketed as PKpluS.

The only mined polyhalite in the world comes from the North Sea resource, from which Sirius aims to begin production in 2021. The company, which has signed major offtake agreements in various regions, projects that its output will reach 10mn t/yr in 2024, before climbing to 20mn t/yr.

The only other major polyhalite resources currently defined are in New Mexico, in the southwest of the US, and western Kazakhstan.

Adding in imports from suppliers such as Poland, Russia and Spain, total N+S consumption is likely to be over 200,000 t/yr.

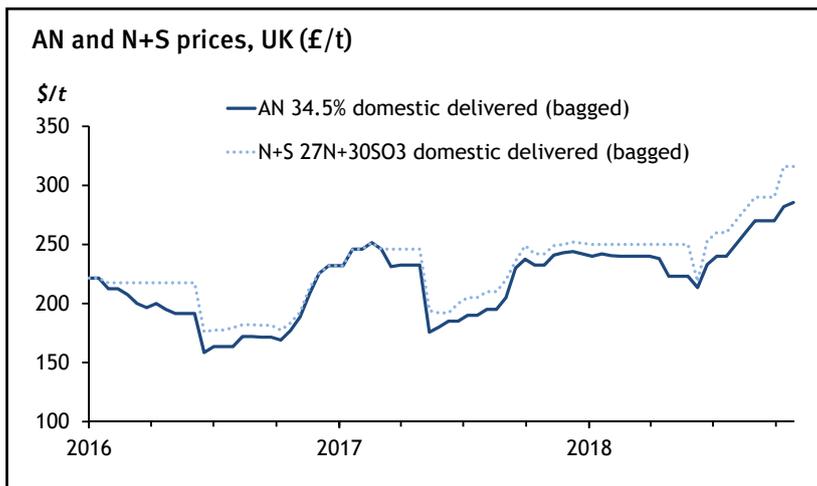
But with polyhalite as an alternative to N+S, farmers can purchase their required sulphur — along with the side benefits of the other ingredients — separately from when they buy their nitrogen.

UK farmers are already pursuing a purchasing strategy of acquiring Polysulphate and nitrogen products — predominantly ammonium nitrate (AN) — in separate orders. So far, this approach is used only on a small

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scale, but further agricultural education on polyhalite is considered key to unlocking its commercial and agricultural potential in the country.

In pricing terms, too, there are positives for polyhalite. Using recent market prices to derive delivered-to-farm rates for bagged product, CF's DoubleTop would be around £325/t, with its AN 34.5 approximately £295/t, and granular-grade Polysulphate at around £160/t.



So that is approximately £325 to have nitrogen and sulphur delivered to a farm in that single product, versus £455 for both ammonium nitrate and polyhalite, received separately.

Moreover, polyhalite is 19.2pc sulphur, making its sulphate (SO₃) content 48pc, compared with Double-Top's SO₃ measure of 30pc. This means that polyhalite offers more of the form of sulphur that plants can take up from soil solution and use for growth than DoubleTop.

It is also worth emphasising that in the second scenario, the farmer has received two tonnes of product for £455, rather than one tonne for £325. This appears to be an advantage, but it is also a potential logistical disadvantage for some farmers, because they will have to receive, store and apply two separate products in order to provide plants with nitrogen and sulphur — an outcome that they could achieve with N+S alone.

There is also the consideration of the trust associated with much-used N+S products.

Nevertheless, polyhalite suppliers and distributors who are interested in capturing some of the UK's substantial

N+S segment can point to their product's price — in the context of both quantity and nutrient value — and flexibility as key selling points.

Germany: Regulation and the challenge of a native force

An important feature of polyhalite is that it is organic, making it compatible with a core aim of EU fertilizer regulation — to extend usage of organic/mixed-organic fertilizers. But there is more on polyhalite's side than that alone.

EU-wide directives are passed with clear objectives, but implementation comes at the national level, meaning that each country — and, in certain cases, individual regions within countries — can enact slightly differing rules.

In Germany, the central emphasis of fertilizer regulations is on accurately matching nutrient applications to crop needs. That means the nutrient use has primarily to be efficient, including with regard to nitrogen.

With that in mind, a relatively straightforward agronomic argument points to positive potential for polyhalite. The presence of sulphur in soil allows for more efficient uptake of nitrogen, so the application of sulphur-rich polyhalite should result in greater efficiency in nitrogen uptake. As a result, polyhalite should be increasingly in demand in Germany.

The market perceives polyhalite predominantly as a sulphur-with-benefits product, putting it in an apparently strong position.

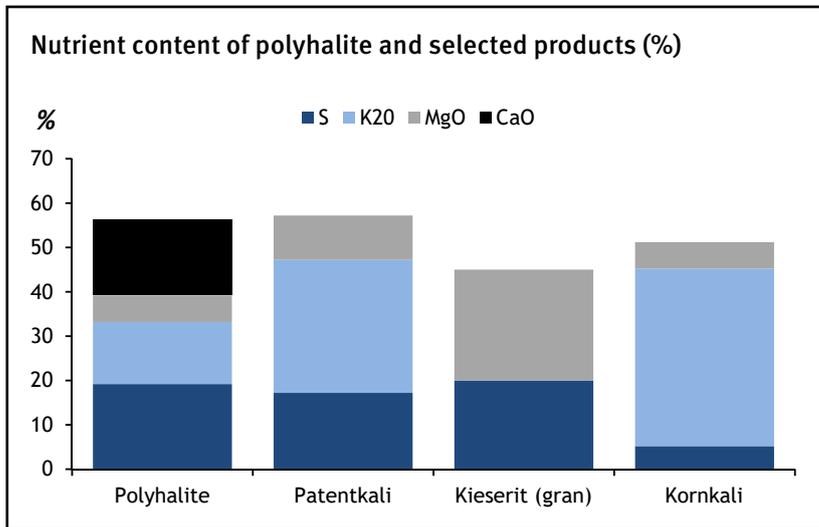
But complications to the argument include a debate over the form of sulphate in the multi-nutrient mineral — whether it is in an available form for immediate uptake by plants and, if not, how long it will take to dissolve. According to a collaborative research paper published by the International Potash Institute, around half of the sulphur in polyhalite is “immediately available”, while “the rest is slowly released later on”.

At least as pertinent is that there are already many other sulphur-containing products available to — and widely used in — the German market. Prominent among these are ammonium-sulphate and ammonium-sulphate-nitrate, as well as a whole family of sulphur-plus products produced and marketed by domestic firm K+S.

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Most notably, K+S's Patentkali and Kieserit contain comparable levels of sulphur to polyhalite, both include magnesium, and Patentkali also boasts significant amounts of potassium.

The mineral's best hope may lie in being a constituent raw material of a specialist combination fertilizer, such as PotashPluS and PKpluS, or as a substitute source of potassium, sulphur and magnesium in existing NPK formulations that contain those nutrients.



Polysulphate and PotashpluS: nutrient content (%)

	K2O	S03	MgO	CaO
Polysulphate	14	48	6	17
PotashpluS	37	24	3	8

But in Germany, there is a barrier to such a route. German use of complex fertilizers is, directly connected to the need for nutrient-use efficiency, widely understood to be declining. NPK imports in 2017-18 were at their lowest since 2009-10, and at less than 30pc of peak levels towards the end of the 20th century, trade data show.

A weapon that polyhalite has in its arsenal, and that the above products do not, is the secondary nutrient and soil conditioner calcium.

But a German market expert questions whether farmers will find this a significant enough distinguishing factor to favour the mineral over the tried and trusted offerings from K+S. Moreover, lime performs a similar function to calcium, and it is a low-priced option.

Current and future suppliers of straight polyhalite could face a sizeable task if they are to occupy some of the well-populated sulphur space in the German fertilizer market, including that inhabited by K+S.

Aside from nitrogen: Further to go

Besides its link to nitrogen applications, polyhalite's greatest chance of success is as a component of a complex product, according to market participants.

As a straight, polyhalite's appeal is likely to remain limited, mainly because it cannot be genuinely regarded as a potash substitute — “evidently”, as an Irish market participant put it, given that its K₂O-nutrient value is 14pc, compared with MOP's approximately 60pc.

In its straight form, polyhalite is seen predominately as a sulphur — not potash — product, something apparently not lost on ICL in its choice of brand name.

Farmers are increasingly leaning towards straights because, in a given field, they want to apply what they need, when they need it, rather than having to spread multiple nutrients that are not necessarily required.

This may prove to be a negative trend for those wanting to provide polyhalite-plus-X products to Germany.

Something to offer Europe

Nevertheless, polyhalite has plenty that it may offer to Europe, especially if successfully marketed. Firstly, relative to other products, it has been reasonably priced — granular grade at around £160/t bagged delivered-to-farm in the UK, and €175/t (\$200/t) fca bulk from an inland warehouse in northern Germany.

Secondly, it provides the option of being mixed with other nutrients to become a popular mineral, particularly in markets where the use of complex fertilizers is not declining.

Finally, polyhalite's high sulphur concentration links it indelibly to Europe's most popular fertilizer family, nitrates — a group of fertilizers that could be set for consumption growth, at the expense of urea, as the effects of EU regulations further take hold.