



Potash

Potash is an important type of fertiliser, but what is its significance to the mining industry?



What is potash?

Potassium-heavy potash, used for various chemical processes in the pre-industrial world, gets its name from the practice of soaking plant or wood ash in a

pot. Chemically speaking, potash made up of potassium chloride (also known as muriate of potash, MOP), potassium sulphate (sulphate of potash, SOP) and potassium nitrate.

As the once-expensive material became widely available after industrialisation, its use as a fertiliser soon became common. Today over 90% of potash is used as fertiliser.

Since industrialisation, potash has been mined from potassium-rich evaporite minerals or synthesised chemically.

Evaporite minerals come from salt-heavy bodies of water that have evaporated and formed deposits. Of these minerals, sylvite, carnallite, kainite, polyhalites and langbeinite are mined most often.

Why do we produce potash?

Potash contains high concentrations of potassium, which is sought after by the agricultural industry and is essential for all life.

In plants potassium regulates the opening of stomata, tiny pores in plant tissue that handle gas exchange, increasing carbon dioxide uptake and growth. It also triggers enzyme synthesis, including growth enzymes and adenosine triphosphate, a molecule acts as a carrier for photosynthesised energy in plants. And it helps regulate the uptake of water through the xylem, a vascular system for plants, and its release through stomata.

Counterintuitively most agricultural soil contains enough potassium for crops. However, this potassium is typically insoluble, locked into the ground and difficult for plants to absorb via osmosis.

By contrast, the potassium in the two most common types of potash, MOP and SOP, is readily water soluble. MOP and SOP are absorbed by plant roots with ease, so they are effective fertilisers.

What are SOP and MOP?

MOP is typically mined from evaporite minerals then ground down to crystallised salts or processed into solid fertiliser.

Potash mines extract evaporite through conventional mining, solar evaporation or solution mining. In solution mining, water is injected into a deposit through a well to dissolve salts. The solution is then retrieved and the potash recovered from the dissolved salts. It can also be produced through solar evaporation similar to lithium brine production.

Although relatively cheap to produce, MOP has one fundamental flaw: its high level of chloride. In low-chloride environments, this is a boon. But many plants, especially high-value crops such as fruits, vegetables, nuts and tea, are chloride sensitive. In these cases SOP is often used, despite being more expensive.

In contrast to MOP, the majority of SOP is chemically synthesised from raw materials rather than mined directly from the earth.

This inevitably increases its cost and ensures it is used only when necessary. As a result, SOP holds a small percentage of the market, c 10%, to MOP's 85%.

Edison Insight

'As well as being one of the most important types of fertiliser in the world, when compared to the net present value of their projects, the potash sector also has some of the most undervalued companies within mining.' Charles Gibson, Edison, sector head of mining

How is SOP produced?

SOP is most often produced using the Mannheim process. Here a Mannheim furnace, effectively a big kiln is used, into which potassium chloride and sulphuric acid is fed and mixed together.

At temperatures of around 600°C, the reaction of the chemicals creates SOP.

The other common method of SOP production uses solar evaporation, concentrating sulphate- and potassium-

rich salts from lakes into brines. The salts are then processed to create SOP.

SOP can also be created as a by-product of salt production. When salt is concentrated via solar evaporation and retrieved, what remains is rich in sulphate and potassium, which can then be processed into SOP. The Mannheim process accounts for roughly 50% of all SOP production, solar evaporation another 30%.

Which companies are heavily involved in potash?

Of the most prolific producers, Nutrien, created from a merger of PotashCorp and Agrium in 2018, is one of the world leaders, along with the Mosaic Company. Both Nutrien and the Mosaic Company are highly involved in the world's largest potash reserve in Saskatchewan, Canada.

Elsewhere, Uralkali maintains five mines and seven milling plants in Russia. Uralkali and Belarusian state-owned miner Belaruskali were once partners, but Uralkali broke the partnership in 2013. However, Uralkali remains a large player.

Based in Germany, K&S is another giant, while Israel Chemical has a significant presence in potash in addition to its bromine business.

There are also a number of smaller companies breaking into the potash market. Among them, [BCI Minerals](#) is continuing with its Mardie salt and SOP project (solar evaporation potash facility) on the west coast of Western Australia, alongside its fully functioning royalty-type interest in an iron ore mine, Iron Valley.

Kalium Lakes is also active in Western Australia, with its Beyondie Sulphate of Potash exploration, as is Salt Lake Potash with its Goldfields Lake sites.

Meanwhile, Sirius Minerals is developing a polyhalite resource in North Yorkshire and Kore Potash is focused on its Kola project in the Republic of Congo.