

Scientists develop a method to boost seed oil yield in crops

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Scientists from Nanyang Technological University, [Singapore](#) (NTU), have developed a method to increase the yield of natural oils in seeds by 15 per cent in laboratory condition.

According to the research published in the [Plant Signaling & Behavior](#), the new method can be applied to [crops](#) such as canola, soybean, and sunflower, which are in a multi-billion dollar industry that continues to see increasing global demand.

The research team led by [Wei Ma](#) from NTU genetically modified the key protein known as 'Wrinkled1' or 'WRI1' in plants which regulates the amount of [oil](#) they produce. This resulted in [larger oil](#) reserves in the seed that primarily serves as an [energy source](#) for germination.

"Plant [seed oil](#) is an essential component in our daily diet and the agricultural industry is seeking ways to maximise plants' yield while reducing environmental effects of crop cultivation, especially land use. Our research helps to increase the production of [seed oil](#) in a sustainable and cost-effective way, and it also opens up new doors in [agriculture](#) research," said Ma.

The ability to increase [oil yield](#) in a sustainable manner is expected to result in higher economic gain. Past research has shown that a small 1.5 per cent increase in [oil yield](#) (by dry weight) in [soybean](#) seeds equates to a jump of USD 1.26 billion in the [United States](#) market.

The increased yield in [seed oil](#) would also benefit the production of biofuel, which is a form of clean fuel produced from organic sources, such as [vegetable oils](#).

[Biofuel](#) is being used in various applications, including powering machines in protected forests to reduce fossil fuel contamination and fuelling [long-distant transportation](#) by automobiles, ships, and aeroplanes.

"Global demand for [vegetable oil](#) is increasing very rapidly, and it is estimated to double by 2030. In addition, research is also ramping up in the use of [biofuels](#) in various applications, which can provide a cleaner and more sustainable source of fuel than petroleum. Increasing [oil production](#) of key [crops](#) such as soybean, sunflower, and canola is thus essential for a more sustainable and greener future," said Ma.

Previous research efforts to improve [seed oil yield](#) involved increasing the number of the WR11 protein - known as overexpression - but this did not succeed in increasing the oil yield stably and consistently.

Ma used the [Arabidopsis plant](#) - a small flowering plant related to cabbage and mustard. It contains all the characteristics of [crops](#) such as sunflower, canola, and soybean, which serves as an ideal model plant for research.

He and the NTU research team developed a patent-pending method that stabilises the key WR11 protein which also improves its ability to interact with other proteins. This enhances its effectiveness in producing natural oils and the method can be easily done on other crops. This also encourages a more sustainable way for industries to produce natural oils instead of simply increasing the amount of land used for [agriculture](#).

"These discoveries will undoubtedly contribute to the optimisation of [seed oil yield](#) in a variety of crops. As such, Ma's research is helping to address some of the major 21st-century challenges we face in feeding a growing global population and developing renewable transport energy," said Dr. Eric Moellering, a [Senior Scientist](#).