What is this research about?
- Fiber reinforced polymers (FRPs) are used in a wide range of structural applications. Currently, the polymers (i.e., resin) in these products are composed of chemicals, such as epoxies, which are unsustainable.
- The goal is to develop and characterize a new sustainable bioresin and FRP.

What did the researchers do?
- Developed an eco-friendly, renewable green resin from corn cob waste.
- Seventy concrete cylinders, representing small columns (6 inch diameter) in buildings and bridges, will be wrapped with bioresin and epoxy FRP sheets to improve their strength.

What is a bioresin FRP?
- E-glass fibres, which provide strength to the resin
- Organic resin derived from corn cobs
- Fibre reinforced polymer (FRP). The fibres are saturated with the bioresin.

What did the researchers find?
- Preliminary material testing of both the resin and a resin-based E-Glass FRP have been completed. Test results will be compared to conventional FRP composites, using epoxy resin, which represent the current state of practice.
- The bioresin has the potential to have strength in the range of epoxy FRPs.
- More testing will be conducted to quantify the short and long term bioresin properties in greater detail.

Averaged Test Results (MPa)

<table>
<thead>
<tr>
<th></th>
<th>FRP Coupons</th>
<th>Resin Coupons</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRP Epoxy</td>
<td>450</td>
<td>300</td>
</tr>
<tr>
<td>FRP Bioresin</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>Epoxy</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Bioresin</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What you need to know
- This bioresin has the potential to replace the use of epoxies, reducing the impact epoxies have on the environment.
- The use of corn cobs as raw materials for making resins will provide a new market for farmers and give a significant economic advantage to Ontario.