



Q: I've read that plants will soon be bred to produce medicines. Will Missouri soybean growers have a chance to grow these new plants?

A: The latest application of biotechnology is the production of Plant-Made Pharmaceuticals (PMP). These are crop plants that have been enhanced through biotechnology to produce pharmaceutical substances that can be used to treat or prevent many human diseases. Although some of these plants will be used as the delivery mechanism for vaccines, most PMPs will be plant products that are extracted and used exactly as today's medicines. An example is the production of immunoglobulins, a broad classification of naturally occurring antibodies that can be used to treat several devastating human diseases including heart disease, diabetes, and Alzheimer's.

Our grain plants are logical candidates for PMPs because their seeds produce abundant protein and dry down so that they can be stored for long periods of time. There are genetic signals available so that the trait is expressed only in the seeds – not in the rest of the plant. This is helpful because plant residues will contain little or none of the trait. These pharmaceuticals are presently produced in microbe or animal cell culture. Producing them in plants greatly reduces the possibility of contamination of pharmaceuticals by animal viruses and other contaminants.

There are at least 12 companies in various stages of development of PMPs. Although soybean has some advantages such as self-pollination and high protein production, most of these companies plan to use corn. Soybean has complicated genetics, can be difficult to transform (insert the gene) and regenerate, and often does not express the desired PMP trait very well. So, soybean farmers may not be able to grow these PMPs, at least in the near future.

PMPs are not without controversy. The subject has even been interjected into several political campaigns last fall. It is important that PMPs be grown and handled in a manner so that they do not enter the food chain. These PMPs are not meant to be consumed as food, and strict confinement procedures are being developed. Our fields will essentially be factories for PMPs, and we will need to follow appropriate operating procedures. For now, companies using corn to produce PMPs have decided not to grow corn-based PMPs in the Corn Belt. Unfortunately, this restriction will eliminate the opportunity for most of Missouri's farmers to grow corn-based PMPs.

It is important that decisions made about the production of PMPs are science-based, but it is also important to proceed cautiously. No one should confuse the decision to limit the geography where corn-based PMPs are grown as lack of support for biotechnology. One can be an ardent supporter of biotechnology and still agree with the decision to limit the places where PMPs can be grown.

These production restrictions may change with time and growers interested in the possibility of growing PMPs should start to prepare for the possibility. PMPs will be grown using an identity preserved (IP) system. Proven experience with other types of IP crop production will increase the chances of a grower to be chosen for PMP production.

Growers chosen to participate in PMP production will need to be trained by the responsible company, keep excellent records of all crop management practices, and have appropriate planting, harvest, storage, and transportation facilities. As with all contracts for crop production, producers should carefully determine if the incentives adequately reward the person for the increased management time and for some loss of freedom to operate.