

# Potatoes to Plastics

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## **Executive Summary**

This research project examined the resource and economic viability of Maine potatoes as a source for polylactic acid (PLA) to support InterfaceFABRIC's manufacturing requirements for use in their bio-based fabrics for commercial interiors. As part of this study, the following data was reviewed:

- the amount of acres currently harvested for potato production and the average number of acres in use;
- the average harvest yield of potatoes;
- the average price paid to growers per hundredweight (cwt) of potatoes;
- the raw materials costs associated with collecting, transporting and pre-processing waste potatoes for production of starch in preparation for PLA production;
- the availability of potato starch to meet the needs of InterfaceFABRIC; and
- the comparison of current cultivars of potato vs. one bred to use less fertilizer and fungicide (the Defender, a non-Genetically Modified Organism), both with approximately the same starch content.

The analysis of these data supports the conclusion that it is economically feasible for Maine potato growers to plant and harvest potatoes specifically for the purpose of providing a source of starch to manufacture PLA. It has also been determined that there would be little to no start-up costs to the potato growers themselves to provide potatoes for PLA using the potato cultivars (varieties) that are currently grown, in particular the Russet Burbank and/or Shepody potatoes. The planting, harvesting and pre-processing of these potatoes would be no different than what the growers are currently doing.

The analysis also shows that the cost of processing potatoes for PLA would be similar to that for a small capacity PLA facility that processes corn and the price which potato growers would receive for PLA potatoes would most likely be comparable to the average price paid to all growers for their potatoes. It also appears that the price of PLA from potatoes would be similar to that for PLA derived from corn.

The analysis further confirms that the amount of PLA needed by InterfaceFABRIC (13 million pounds per year) could, in principle, be supplied solely by waste potatoes, made up of those left in fields after harvesting, those not marketed or below grade, and potato waste from processing. However, the resources or economies to collect those wastes and waste potatoes and provide them to a PLA facility are not available at this time.

In conclusion, the research supports the concept of producing bio-based plastic feedstock from Maine potatoes. The potential to produce PLA from potato starch will not be limited by the ability of potato growers to provide a viable crop. Furthermore, the cost to growers will not be prohibitive for such a project and the return will be similar to that for food stock potatoes. Finally, no current table-ready or processing potatoes need to be taken out of the supply chain. An increase in the amount of acres planted and harvested can be implemented to provide the starch, and the potato varieties currently grown, in particular the Russet Burbank and/or Shepody potatoes, can be used as the source of starch for PLA manufacturing. The next step is to conduct the research to determine the location and technical specifications for a PLA facility in Maine

and examine the potential contribution of waste potatoes and processed starch to support a PLA facility and to examine the potential for new more cost effective and environmentally sustainable potato varieties which can be grown specifically for the PLA market.