Designing plants for increased industrial utilization has at least two aspects: (i) modification of the plant to produce specific new products or altered ratios of normal products, and (ii) the adoption and utilization of plant derived products in a wide variety of commercial applications to create new markets for agricultural commodities. Methods of modifying plant products include insertion of new genes to direct production of economically important secondary products, or chemical/environmental regulation of development and alteration of specific pathways of production. On the industrial side, new products from plants or value added modifications of commodities may be produced that can alter the economics of a process, replace more expensive or unavailable products, or even create new technologies around themselves. Although rare secondary products and expensive pharmaceuticals are exciting potential candidates for production by designed plants, the production of new materials by chemically and/or physically modifying the starch, protein, lipid, and fiber components of plants is an equally attractive option. These components are already in the mainstream of industrial utilization, and modifications can be readily adapted and speedily accepted, provided that properties and selling prices are competitive with those of existing products.

The modification of starch and the utilization of value-added starch products has a well-documented history and a potentially bright future. This chapter describes two different modifications of starch carried out at our laboratory and the efforts to transfer these technologies to the private sector. The first of these projects was carried out in the 1970s and led to the development of the water-absorbent starch graft copolymer commonly referred to as “Super Slurper”. The second is a current project dealing with the preparation, properties and end-use applications of a new class of starch-oil composites referred to as Fantesk. The 20-yr time period separating these projects saw a drastic change in the U.S. Government’s philosophy regarding technology transfer. During that 20 yr, a new philosophy of utilization research and interaction between government and industrial scientist arose. This evolution of thought culminated in the Technology Transfer Act of 1986 that allowed government scientists to enter into cooperative research and development agreements (CRADA’s) with industrial partners to co-develop specific products for commercialization. Under this new legislation, exclusive licenses to government