

## **Biodegradable polymers for environmentally-friendly fabric care formulations**

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This project will focus on the development of new biodegradable polymers for applications in fabric care, improving the environmental footprint of an essential human activity – the routine cleaning of clothes and other textiles.

In the UK, dishwashers and washing machines use 360 billion litres of water each year and cost households £1.6bn in energy bills.<sup>1</sup> Approximately two-thirds of the energy consumed by a washing machine is used to heat water,<sup>2</sup> so reducing the wash temperature, and selecting a cycle with minimal water consumption presents significant environmental benefits. The performance of existing fabric care formulations at low wash temperatures, with minimal water consumption, is possible only through the use of polymer additives.

We will construct a library of alternative additives derived from biological sources, prepared via ring opening polymerisation (ROP) with control over structural features such as monomer composition and degree of polymerisation. Polymers will be assessed for their biodegradability, and their performance in formulation will be analysed using high-throughput testing facilities at P&G Newcastle Innovation Centre. The performance of new polymers will be compared to additives currently in use, and the information obtained will be used to investigate how structural features contribute to performance for specific functions. The structure-function relationships established will be used to inform the design of future generations of candidate polymers, enabling structural refinement for enhanced performance.

### **References**

1. *At Home with Water*, Energy Saving Trust, 2013.
2. J. Bain, A. Beton, A. Schultze, M. S., M. Dowling, R. Holdway and J. Owens, *Reducing the Environmental Impact of Clothes Cleaning*, DEFRA, 2009.