

Polymeric excipients for control release: an industrial scale pharmaceutical solution

The controlled release:

In medicine, many excipients have been developed for the last 25 years to control the release of active molecules through synthetic or natural polymers that respond to external conditions. This chemistry, mainly used in the medical field, begins to attract other sectors because it allows better use of chemicals. Thanks to pharmaceutical applications, the mechanisms controlling release are becoming more diverse. The signals could be time, pH, enzymes, moisture, heat, ultrasound, light, electricity, magnetic field, solutes (such as glucose).

Examples of industrial applications:

- :: In agriculture, fertilizer released under control of temperature and moisture have optimized their use since a long time (although the cost limits the development of those “Meteo-sensitive fertilizers”);
- :: Sterilization of water, surfaces, areas with bacteria cause odors and some food packaging use a biocidal gas, released on moisture control from powder (case of Aseptrol® from BASF);
- :: Filters engines contain anticorrosion additives released into the cooling system controlled heat and cooling flow, can ensure a protection for at least 150 000 miles (Baldwin Filters®).

Other applications are still rare, while the potential is enormous, at both manufacture and domestic levels. However, transferring this technology to industry still faces several challenges. In particular, the matrix must withstand load capacities larger than drugs. In addition, the release mechanisms may be different from those used in the field of health and must be validated in the new conditions. Finally, the slightly higher price of these products should be offset by the benefit of the short term economy of chemicals and their application.

Proposal:

Our research team has developed several matrices derived from starch and chitosan. We are now proposing to promote those excipients to other industrial areas, studying the transfer challenges on a case by case basis. This research is funded by the collaborative program universities-colleges from the MELS.