Bio-based and Biodegradable Superabsorbent Polymers Based on Citric Acid and Polyols

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1. In view of the clear global trend of banning the use of disposable plastic products and depleting natural resources, the development of bio-based, biodegradable polymers is extremely important (**chapter 1**).

2. From the point of view of energy barrier levels, for the self-catalyzed esterification of citric acid and diols at 70-130 ^{o}C, the likeliness of the reaction route via the formation of the citric anhydride intermediate is higher than the direct esterification (**chapter 2**).

3. Super absorbent polymers (SAPs) produced from citric acid and glycerol have a comparable water absorbing performance as SAPs based on polyacrylates and show far better biodegradability (**chapter 3**).

4. The type of counterion can influence the synthesis and cross-linking density and thus the absorbing performance of the resulting SAPs (**chapter 4**).

5. Besides glycerol, several multifunctional polyols can be utilized for the production of biobased and biodegradable alternatives to polyacrylate-based SAPs (**chapters 5 and 6**).

6. Scientific research follows the rule of going from easy to difficult.

7. For a PhD candidate, detailed thinking is much more important than purposeless hard-working. You can never first shoot and then aim!

8. Time management is also part of a PhD study; the one who can manage his (her) time well will most likely have a happier and more successful PhD journey.

9. Holding Plan B in advance is a good habit for all researchers.

10. Reality often comes worse than you've expected, so a PhD candidate should always aim high.

11. Help is always given to those who deserve it (adapted from Harry Potter, JK Rowling).