Reichstein process

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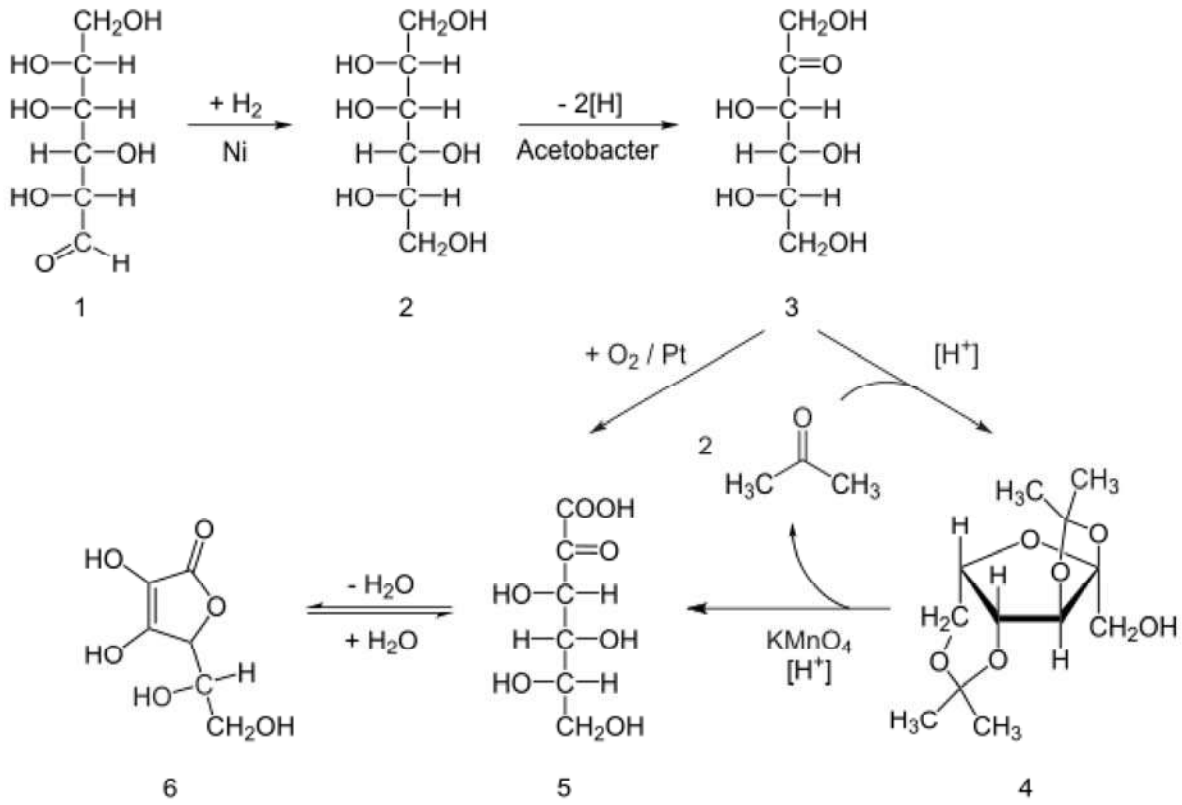
The **Reichstein process** in chemistry is a combined chemical and microbial method for the production of ascorbic acid from D-glucose that takes place in several steps. This process was devised by Nobel Prize winner Tadeus Reichstein and his colleagues in 1933 while working in the laboratory of the ETH in Zürich.

Contents

Reaction steps

The reaction steps are:

- hydrogenation of D-glucose to D-sorbitol, an organic reaction with nickel as a catalyst under high temperature and high pressure.
- Microbial oxidation or fermentation of sorbitol to L-sorbose with acetobacter[1] at pH 4-6 and 30 °C.
- protection of the 4 hydroxyl groups in sorbose by formation of the acetal with acetone and an acid to Diacetone-L-sorbose (2,3:4,6−Diisopropyliden−α−L−sorbose)
- Organic oxidation with potassium permanganate followed by heating with water gives the 2-Keto-L-gulonic acid
- The final step is a ring-closing step or gamma lactonization with removal of water.[2]
- Intermediate **5** can also be prepared directly from **3** with oxygen and platinum



The microbial oxidation of sorbitol to sorbose is important because it provides the correct stereochemistry.

Importance

This process was patented and sold to Hoffmann-La Roche in 1935. The first commercially sold vitamin C product was called *Cebion* from Merck.

Even today all industrial methods for the production of ascorbic acid are based on the Reichstein process. In modern methods however, sorbose is directly oxidized with a platinum catalyst (developed by Kurt Heyns (1908–2005) in 1942). This method avoids the use of protective groups. A side product with particular modification is 5-Keto-D-gluconic acid.[3]

Novel methods involve genetically modified bacteria.[4]

References

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