

## PO B 3

### The study of Vitamin C by Thermal Analysis and FTIR-Spectroscopy

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L-(+)-ascorbin acid or vitamin C plays an important role in the health of the human being. It is one of the first synthesized vitamins. Its colourless monocline crystals show the shape of needles or rectangular plates.

Vitamin C has become a famous drug. It is available as powder or sparkling tablette which can be bought in different preparations. Especially the tablettes include a lot of excipients such as citric acid (E330), sodium hydrogen carbonate, sugar or other additives. As excipients might have a major effect on the stability of the drug the samples were analyzed by Differential Scanning Calorimeter (Shimadzu DSC-60) and Simultaneous DTA-TG (Shimadzu DTG-60M). All thermal analysis runs were done in nitrogen atmosphere. For confirmation an FTIR analysis was done.

First of all a purity study of the L-(+)-ascorbin acid (p.a. grade) was done. The results were compared to commercial powder which is available in pharmacies. Actually no difference could be detected. The purity was calculated at 99.82%. However when changing the heating rate the melting peak shifted very strongly though the instrument was carefully calibrated by high-purity indium and tin for each heating rate. The melting was followed by an exothermic decomposition of the drug itself.

Comparing the pure powder to the sparkling tablette whose content of vitamin C varies from 4

- 20 weight-%, the DSC curve shows a lot of other signals. Therefore the influence of the excipients was checked in different mixtures using different concentrations. The influence of citric acid to the thermal stability of vitamin C is rather small. The melting temperature drops by 2 °C. If 2 % sodium hydrogen carbonate is used, the thermal stability is strongly effected. These effects could be proven by the thermogravimetric analysis, too.

In FTIR spectrometry the spectra of the sparkling tablette (4 % vitamin C), the pure drug and citric acid, its major excipient, were compared with each other. However it was very difficult to quantify the content of vitamin C or to identify other excipients by FTIR.

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