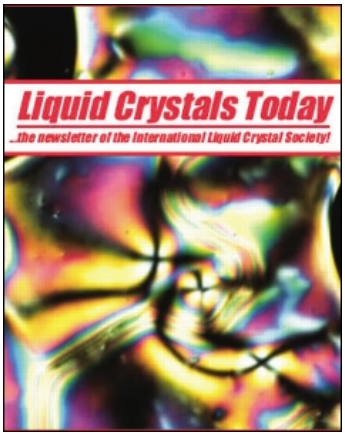

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A Note on the Melting Point of α-solanine: *The solution to a riddle*

V. Grassert[a]; V. Vill[a]
[a] Institute of Organic Chemistry, University of Hamburg, Hamburg, Germany

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A Note on the Melting Point of α-solanine

The solution to a riddle

V Grassert and V Vill, Institute of Organic Chemistry, University of Hamburg, Martin-Luther-King Platz 6, D-20146 Hamburg, Germany

Glycoalkaloids are natural toxins of *Solanaceae*. The purpose of these toxic glycoalkaloids appears to be as protection against pests and diseases. However, the only glycoalkaloids reported as actually causing human death are those produced by potatoes (α-solanine and α-chaconine). Therefore an intensive check of new potato cultivars for glycoalkaloid levels is required. Usually α-solanine, which can be isolated very rapidly and easily from potato blossoms [1], is used as the analytical grade standard for the investigation of potato glycoalkaloids. The purity of isolated α-solanine can be proved by different methods: HPLC, TLC and also by the determination of its melting point. Nevertheless, the reported literature melting points cover a wide range: from as low as 228°C to as high as 286°C. Two melting points are reported more frequently: 282-283°C and in the last few years 263-264°C. All values below 263°C are melting points of a mixture of α-solanine and α-chaconine.

W Porter [2] has tried to determine the exact melting point of α-solanine but failed to solve this problem, merely describing the exact heating and observation conditions for the two melting points.

Some years ago we needed a pure standard of α-solanine for the determination of the glycoalkaloid content of potato hybrids from crosses with wild *Solanum* species [3]. It was isolated from dried potato sprouts upon extraction with acetic acid, followed by precipitation with ammonia. The melting point of the repeatedly re-crystallised α-solanine should be used as a measure of its purity. In this connection we were confronted with the different melting points of α-solanine and the following is our explanation of the phenomenon.

α-solanine belongs to a class of naturally occurring steroidal glycosides. It is known from simple alkyl glycosides that they can form liquid crystalline phases [4, 5, 6, 7]. This phenomenon is often described by non-liquid crystal analysts as double melting [8]. The generation of these mesophases is caused by the amphiphilic character and the low melting point of these compounds. The mesophases can be interpreted as demixed liquids: hydrophilic and hydrophobic zones alternate with each other periodically.

Simple steroidal glycosides (Cholesteryl-β-D-glucopyranoside) also show melting anomalies [9]. However, the exact investigation of these compounds is difficult because they melt at high temperatures, decompose very fast during melting and do not form simple liquid crystalline phases [10]. Besides the relation between hydrophobic and hydrophilic molecular sections in these compounds is very unbalanced.

In contrast to these results it is possible to observe a very fine thermotropic liquid crystalline phase of α-solanine. At 263°C

α-solanine passes from the crystalline phase to the liquid crystalline state. A smectic A phase is formed in the same way as alkyl glycosides. This phase clarifies at 285°C with intense decomposition to the isotropic phase. At 263°C α-solanine shows the highest decrease of viscosity and disappearance of contours, until at 285°C the optical anisotropy disappears. As a result and depending on observation methods investigators classified the first or second temperature as the melting point of α-solanine. We believe that it is of some interest to know that the riddle of the melting points is now solved and that both are correct in a certain sense.

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SOCIETY NEWS

Nominations for President and Vice-President

In accordance with the Bylaws of the ILCS, the term of office of the all officers of the Society is two years. The President and Vice-President are elected by the membership, but can serve for two consecutive terms. Both our President (Professor Geoffrey Luckhurst) and Vice-President (Professor Shunsuke Kobayashi) are eligible to serve a further term of two years until 1996, however the membership can submit additional nominations for consideration by the Nominating Committee. Any names of candidates for consideration by the Nominating Committee should be sent to the Secretary (preferably by FAX) by May 15 1994. Candidates, who must be members of the ILCS and must agree to be nominated, should be endorsed by two other members of the Society. Nominations must be accompanied by a brief account (100 words) of the candidate's career in liquid crystal science

The Nominating Committee appointed by the Board of Directors consists of, Prof S Chandrasekhar (Past President), Prof A Fukuda, Prof G W Gray, Prof L Lam and Prof H Stegemeyer. The Secretary for the Society, Prof D A Dunmur, will act as Secretary for the Nominating Committee. The Committee has final responsibility for selection of candidates submitted to the membership for elected office.

Regional Representatives

Regional Representatives are appointed biennially by the Board of Directors. It was agreed at the Pisa Conference in 1992 that Regional Representatives should only be eligible for appointment for two consecutive periods of 2 years. Thus all Board Members will retire at the end of the 15th ILCC in Budapest, but those members who have only served for one term will be eligible for reappointment. The Secretary, Treasurer and Membership Secretary are Board appointments without restriction. The current list of Officers and Board Members of the ILCS is given below. Those marked with a (*) will have served a single term, and are therefore eligible for reappointment. Members should discuss with their Regional Representatives possible candidates to replace those retiring this year.

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