

03.2-12 THE CHARACTERIZATION OF VARIOUS CRYSTALLINE FORMS OF ASPARTAME (A DIPEPTIDE SWEETENER). By N. Nagashima, C. Sano, S. Kishimoto, and Y. Iitaka\*, Central Research Labs., Ajinomoto Co., Inc., Kawasaki, Japan and \*Faculty of Pharmaceutical Sciences, University of Tokyo, Tokyo, Japan.

Aspartame, a dipeptide L- $\alpha$ -aspartyl-L-phenylalanine methyl ester: a sweetener, tends to crystallize from an aqueous solution as extremely fine needles (or fibres) with diameters of 10 $\mu$ m or less, unsuitable for industrial process operations.

Crystals obtained by a new industrial crystallization method (S. Kishimoto et al., Chem. & Ind., in press) are relatively large, however, most of them appear to be bundle-like. For the purpose of elucidation of a correlation between crystallization and structure, we have tried to solve the crystal structure. One of the crystal forms, applicable for X-ray diffraction examination, was found and crystal structure determination is underway. The space group is P2<sub>1</sub>, with a=22.959(23), b=4.964(5), c=22.124(22) $\text{\AA}$ ,  $\beta$ =117.17(12) $^\circ$ . This crystal is different from the reported one (M. Hatoda et al., J. Am. Chem. Soc., 1985, 107, 4279-4282), which was crystallized from a quaternary solvent system (water, ethanol, acetone, Me<sub>2</sub>SO) in space group P4<sub>1</sub>, with a=b=17.685(5), c=4.919(2) $\text{\AA}$ .

We have also found that the present crystal changes its form during the loss of water of crystallization upon drying. In this transition, four forms have been confirmed by powder X-ray diffraction.

03.3-1 CRYSTAL STRUCTURE OF A SYNTHETIC ANTI-LEUKAEMIC AGENT-5,5', 10,10'-DIOXO-1,1',3,3'-TETRAPHENYL-10,10' - BI (BENZ (G) ISOQUINOLINE), C<sub>50</sub>N<sub>2</sub>O<sub>2</sub>H<sub>32</sub>.

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The title compound was synthesised from Indan-1,3-dione as the starting material. Yellowish crystals were obtained from glacial acetic acid and belong to the space group P1 with a=10.4411(9), b=11.746(1), c=15.929(1) $\text{\AA}$ ,  $\alpha$ =86.21(1),  $\beta$ =82.83(1),  $\gamma$ =64.57(1) $^\circ$  and Z=2. The structure was solved by direct methods using the program MULTAN80 after several trails and was refined to R=0.041 for 3636 observed reflections.

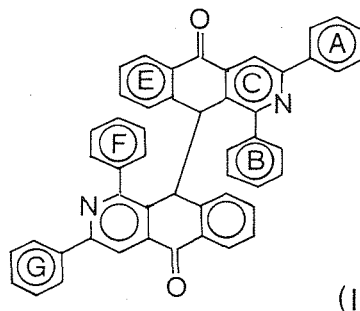
The molecule (I) consists of two similar fragments (a dimer) linked through a weak C(Sp<sup>3</sup>) - C(Sp<sup>3</sup>) bond of length 1.617(6) $\text{\AA}$ . The angles around the Sp<sup>3</sup> carbon deviate from the normal tetrahedral values due to strain caused by dimer formation. The planes through rings A,B,E,F and G respectively are planar while the two pyridine rings are distorted. The central rings are in distorted sofa conformation. Planes A&B make an angle of 14.5 $^\circ$  and 63.3 $^\circ$  with C and F&G make 47.6 $^\circ$  and 16.1 $^\circ$  with H. The tricyclic groups take a butterfly shape with the angle between outer rings being 17.5 $^\circ$  and 18.9 $^\circ$  in the two fragments. The angle between the mean plane through the tricyclic groups is 27.8 $^\circ$ .

There is one C-H...O intermolecular hydrogen bond and the molecules are stabilised by vander Waals forces. Probable intercalation of the monomer (one fragment) with DNA may account for the reported anti-leukaemic activity.

03.2-13 STRUCTURE AND CONFORMATION OF A NUCLEOSIDE ANALOG 5-NITRO-ARAU. By G. Biswas & A. Banerjee, Department of Biophysics, Bose Institute, Calcutta-54, India.

As chemotherapeutic agents many C-5 substituted pyrimidine nucleosides have been shown to exhibit activity against Herpes Simplex and Vaccinia Viruses, some acting as inhibitors of certain enzymes. The structure determination of 5-NO<sub>2</sub>-AraU was undertaken as part of a series of structure determinations of nucleic acid components and their analogs of antitumor, antiviral or anticancer activities to correlate, if possible, their structure function relation. The 5-NO<sub>2</sub>-AraU conformation reveals a similar type of structure function correlation in line with other.

Crystals of 5-NO<sub>2</sub>-AraU (David Sugar & W. Duax) were obtained from ethanol in the form of transparent needles. Crystals belonged to the space group P2<sub>1</sub>2<sub>1</sub>2<sub>1</sub> with unit cell parameters: a = 9.241, b = 20.518, c = 6.187  $\text{\AA}$ ,  $\alpha = \beta = \gamma = 90^\circ$ , D<sub>x</sub> = 1.29 gm cm<sup>-3</sup>, Z=4. 3D intensity data were collected on a CAD-4 diffractometer at room temperature in the  $\omega$ -2 $\theta$  mode using Mo K $\alpha$  radiation. The structure was solved by MULTAN 78 and refined by full matrix least squares to a final R of 0.055 for 1155 reflections with I > 2 $\sigma$ (I). The sugar pucker, C(2') endo, is similar to that in the related analog of AraU structures. The glycosidic torsion angle defined for the sequence of atoms O(5)-C(1')-N(1)-C(6) = -27.5 $^\circ$ . The conformational features of the nucleoside include a glycosidic bond conformation in the anti range and the C(5')-O(5') bond that is trans to C(4')-O(1') but gauche to C(4')-C(3'). The structure consists of successive layers of hydrophobic and hydrophilic zones, with the layers running parallel to the bc plane.



(I)