Carbonate apatite structure of tooth means more or less a close approximation to the biological reality: besides carbonate further elements are present: F, Cl, SO_4 ; Na, K, Mg—also there is the close relation to the protein pattern—whose influences to the lattice combination is too complex to perceive an additive dependence on one of these ions. We should not go further now than stating that enamel crystals have the structure of an apatite which is partly substituted by carbonate, fluoride, chloride etc. and which crystallizes according to the type of the often tested hydroxyapatite.

I want to point out, however, that the mineral substance of the tooth is to be considered as a paracrystalline apatitic texture. This means that, besides the well ordered crystalline regions, heavily faulty ordered and amorphous mineral ranges are present, which do not differ in their qualitative chemical composition but show fluctuations in

their stoichiometric combinations. This paracrystalline structure is necessarily involved in the chemical conditions of the mechanism of the tooth mineralization.

Zusammenfassung. Der Aufbau der Zahnhartsubstanz ist im Verlaufe ihrer Bildung durch mehrere Faktoren – u.a. Begleitonen, Texturvorgabe (Proteinmatrix) – bestimmt. Der Einfluss des Carbonatgehalts wurde in diesem Zusammenhang besonders im Hinblick auf dessen kristall-chemische Funktion bei der Zahnmineralisation (parakristalline Struktur des teilweise isomorph substituierten Apatits) untersucht.

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Structure of Nepseudin. Synthesis of Dehydronepseudin

Nepseudin has recently been isolated along with neonone, dolineone, and pachyrrhizin from the root of the leguminous plant *Neorautanenia pseudopachyrrhiza*¹. As a result of degradative experiments, nepseudin has been shown to be the furanisoisoflavanone (I) similar to neonone but with a unique 2', 3', 4'-trimethoxylated ring A replacing the normal 2', 4', 5'-oxygenation pattern. On dehydrogenation with manganese dioxide, (I) has been converted into dehydronepseudin, the furanisoisoflavone (II). We wish to report the total synthesis of (II) confirming the proposed structures.

Hoesch condensation of 6-hydroxy-2,3-dihydrobenzo[b]furan² with 2,3,4-trimethoxybenzyl cyanide³ yielded 6-hydroxy-5-(2,3,4-trimethoxyphenylacetyl)-2,3-dihydrobenzo[b]furan (III, m.p. 129°~130°, IR 1637 cm^{-1} (Nujol) (CO). Found: C, 66.37; H, 5.99. $\text{C}_{19}\text{H}_{20}\text{O}_6$ requires: C, 66.27; H, 5.85%). Treatment of (III) with ethyl ortho-

formate-pyridine-piperidine gave the dihydro compound (IV m.p. 143°~144°, IR 1628 cm^{-1} (Nujol) (CO). Found: C, 67.87; H, 5.22. $\text{C}_{20}\text{H}_{18}\text{O}_6$ requires: C, 67.79; H, 5.12%) of (II). On dehydrogenation with N-bromosuccinimide (IV) afforded dehydronepseudin (II, m.p. 164°~165°, IR 1649 cm^{-1} (Nujol) (CO), UV $\lambda_{\text{max}}^{\text{EtOH}}$ m μ (log ϵ); 244 (4.59), 324 (3.86). Found: C, 67.96; H, 4.61. $\text{C}_{20}\text{H}_{16}\text{O}_6$ requires: C, 68.18; H, 4.58%)(lit.¹, m.p. 158°~160°, IR 1647 cm^{-1} (Nujol) (CO), UV $\lambda_{\text{max}}^{\text{EtOH}}$ m μ (log ϵ); 245 (4.64), 325 (3.92)). On alkaline hydrolysis (II) gave 6-hydroxy-5-(2,3,4-trimethoxyphenylacetyl)benzo[b]furan¹ (V, m.p. 118°, IR 1639 cm^{-1} (Nujol) (CO), UV $\lambda_{\text{max}}^{\text{EtOH}}$ m μ (log ϵ); 236 (4.76), 258.5 (4.07), 272.5 (3.97), 345 (3.71). Found: C, 66.69; H, 5.40. $\text{C}_{19}\text{H}_{18}\text{O}_6$ requires: C, 66.66; H, 5.30%)(lit.¹, m.p. 118°~119°, IR 1645 cm^{-1} (Nujol) (CO), UV $\lambda_{\text{max}}^{\text{EtOH}}$ m μ (log ϵ); 235 (4.66), 258 (4.00), 270 (3.86), 345 (3.60)). The parent isoflavone (II) could be reconstructed by treating (V) with ethyl orthoformate-pyridine-piperidine. On the basis of these syntheses the structure of (I) for nepseudin would be reasonably explained.

Zusammenfassung. Die Konstitution (I) für Nepseudin wird durch die Synthese des Dehydronepseudins (II), das aus 6-Oxy-2,3-dihydrobenzo[b]furan und 2,3,4-Trimethoxyphenylessigsäurenitril in drei Reaktionsstufen erhalten wird, aufgeklärt.

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