Isolation and Identification of Methyl Glyoxal from Human Milk, Preliminary Report*

By

Hiroshi Wako

From the Department of Pediatrics, Faculty of Medicine, the Tohoku University, Sendai. Director: Prof. A. Sato)

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Soon after the publication of Arakawa’s reaction1) from our Laboratory Prof. Sato2) was of the opinion that infantile beriberi was caused by methyl glyoxal (or like substance) in human milk, while he has since been doubting if pyruvic acid does ever play any all-important role in the disease.3) But some pediatricians want to ignore his theory, as, since the Embden-Meyerhof scheme of carbohydrate metabolism became known, pyruvic acid has come into favor, while methyl glyoxal seems to have lost in favor. I am inclined to say that our Clinic has been the only one to lay stress on methyl glyoxal as the sole causative agent of the disease.

After a long continued discussion with associate Prof. N. Nakamura, esp. proficient in carbonyl chemistry, I was able to identify successfully methyl glyoxal from human milk under constant cooperation of Prof. H. Tatsuta, another enthusiast in carbonyl chemistry.

1. Methyl glyoxal. Extracted from human milk, as methyl glyoxal bis-2;4-dinitrophenylhydrazone. M. P., 297°C, recrystallized by nitrobenzene:

C₁₅H₁₂O₃N₈ Theoretical C=41.70% H=2.80% N=25.90%

Found C=41.98% H=2.70% N=26.07%

2. Acetaldehyde. Extracted from human milk as acetaldehyde-2;4-dinitrophenylhydrazone. M. P., 162°C; recrystallized by alcohol:

C₈H₄N₄O₄ Theoretical C=42.90% H=3.60% N=25.00%

Found C=43.19% H=3.31% N=25.27%

3. Paper partition chromatography of human milk; methyl glyoxal: identified; acetaldehyde: identified. It was to our great surprise that pyruvic acid was not identified in my specimen of human milk from many lactants amounting to 1500 cc. and which was negative to Arakawa’s reaction.

References


* The details will be published in a coming issue of this Journal.

I am very grateful to Prof. Sano of Pediatrics for his sincere encouragement and helpful advice.