

## **Non-Enzymatic Glycation of Melamine with Sugars and Sugar like Compounds**

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### **Abstract**

Melamine (1,3,5-triazine-2,4,6-triamine) is employed in the manufacture of plastics, laminates and glues, yet, it has been found sometimes added illegally to dairy products to artificially inflate foods' protein content. In 2008, dairy products adulterated with melamine were blamed for the death of several infants in China, a situation that forced Beijing to introduce stricter food safety measures. The objectives of this study were threefold: 1) to investigate the susceptibility of the amine groups of melamine to glycation with D-galactose, D-glucose and lactose, sugars commonly found in milk, 2) to study the rate and extent of melamine's glycation with methylglyoxal, glyoxal and DL-glyceraldehyde, three highly reactive metabolites of D-galactose, D-glucose and lactose, and 3) to characterize, using HPLC and mass spectrometry, the Advanced Glycation Endproducts (AGEs) of melamine with sugars found commonly in milk and their metabolites. Incubation of D-galactose, D-glucose and lactose with melamine revealed that D-galactose was the most potent glyicator of melamine, followed by D-glucose, then lactose. Methylglyoxal, glyoxal, and DL-glyceraldehyde glycated melamine more extensively than D-galactose, with each yielding a broader range of AGEs. The nonenzymatic modification of melamine by sugars and sugar-like compounds warrants further investigation, as this process may influence melamine's toxicity in vivo.