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Concentration and distribution of sialic acid in sow milk during lactation

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Sialic acids (Sia), a family of 9-carbon acidic sugar molecules are key monosaccharide units of brain gangliosides and glycoproteins and a major component of sialylated glycocone in human milk. Human milk Sia has been proposed as a bioactive compound promoting immune function, gut maturation and neurodevelopment of the newborn. Porcine milk however has received little attention. The aims of the present study were to quantify and compare the levels of N-acetyl neuraminic acid (Neu5Ac), N-glycolylneuraminic acid (Neu5Gc) and keto deoxy nonulpsonic acid (KDN) in oligosaccharide, glycoprotein and glycolipid in sow milk during course of lactation. Milk samples from 22 sows were collected by manual expression on 3 occasions, day 1 (colostrum), day 3 (transition milk) and day 15-21 (mature milk) respectively. The concentrations of Neu5Ac, Neu5Gc and KDN were analyzed using UHPLC. The results showed that sow milk contained significant amounts of Sia with the highest concentration found in colostrum (1238.50 mg/L) followed by transition milk (778.32 mg/L) and then mature milk (347.21 mg/L). Most of the Sia in sow milk was conjugated to glycoproteins (41-46%), free oligosaccharides (31-42%) and then glycolipid (12-28%) throughout the course of lactation. Neu5Ac was the major form of Sia (93-96%) and then Neu5Gc (3-6%), KDN however contained as little as 1-2%. This distribution was common to each milk fraction and to each time point in lactation. In conclusion, porcine milk contains a rich source of sialylated glycan in the forms of glycoproteins, free oligosaccharides and glycolipids. The high concentrations of Sia in porcine milk suggest that Sia is an important nutrient that may contribute to the optimization of immune function, neurodevelopment and growth and development of piglets.

Biography

Marefa Jahan is currently a PhD student in School of Animal and Veterinary Sciences, Charles Sturt University, Australia. She is working for better health and nutrition of the livestock.

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