Compostion and concentration of bovine milk oligosaccharides varied in lactating cows with different parities

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Introduction

Milk oligosaccharides (MOs) are gaining more attention due to its biological function for human health especially for infants. MOs were shown to have prebiotic effects on gut microbiota, inhibit adhesion of pathogens, modulate immune system and promote brain development etd. Bovine milk is one of easily obtained source for producing MOs. The investigation of bovine milk oligosaccharides (BMOs) in lactating cows with different physiological conditions help in discover the best source for producing commercial MOs.

Aim

To elucidate the variations in composition and concentration of BMOs in lactation cows with 1-6 parities.

Methods

Milk samples of 60 Holstein cows (10 cows/parity, at 2 months of lactation) were obtained in local farm (Beijing, China). The fat and protein in bovine milk were removed. BMOs were separated and purified by using graphical carbon cartridges and derivatived by 2-aminoacridone. The BMOs were analyzed by using HPLC-IT-TOF-MS/MS (Shimadzu, Japan). The possible composition of oligosaccharides were searched by using GlycoPeakfinder and confirmed by tandem MS. Peak intensity was used for the relative quantitation of BMOs.

Results

In total, 19 BMOs were found in bovine milk in present study. The most abundant BMOs were Hex3 followed by Hex2Neu5Ac1. The concentration of BMOs were not significantly different in milk of cows in their first and second parities, but decreased gradually as the increase of calving number. The concentration of MOs in sixth parities were 2/3 less than these in first parity. The number of MOs of cows in first 5 parities were around 16-17, and 3 neutral MOs and 1 acid MOs were not identified of cows in sixth parities.

Conclusion

The concentration and number of MOs were decreased as the increase of cow parity. Milk from cows with first two paries might be better source for producing MOs.