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Regional difference of fatty acid, vitamin and β -carotene concentration in milk of Hokkaido in Japan

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INTRODUCTION

Hokkaido is a large island located in northernmost of Japan, and produces a half of milk production in Japan. In Hokkaido, feeding regime for dairy cows differs essentially among geographical regions because climate, soil and farm land conditions vary widely among regions. The objective in this study was to investigate the relationship between fatty acid, vitamin E and β -carotene concentration in milk and regional difference in feeding regime.

MATERIALS AND METHOS

Bulk milk sample and feeding management were collected with a field survey three or four seasons a year at three areas in Hokkaido as follows: 1) CENTRAL; located nearby Sapporo, more than half of feed is depended on purchased feed, 2) NORTH; most of forage is grass, with grazing in summer and conserved grass in winter, 3) TOKACHI; feeding management is distinctive upland type, a main forage is corn silage. Total 153 milk samples were collected and measured fatty acid (FA), vitamin E and β -carotene concentration.

RESULTS

Milk in CENTRAL was characterized by high in saturated FA and linoleic acid, and low in conjugated-linoleic acid (CLA) and β -carotene concentration. Milk in NORTH-summer was characterized by high in poly-unsaturated FA (PUFA), CLA, vitamin E and β -carotene, and low in saturated FA concentration. Milk in NORTH-winter was characterized by high in saturated FA, and low in PUFA and CLA concentration. Milk in TOKACHI was characterized by high in PUFA and linoleic acid, and low in CLA, vitamin E and β -carotene concentration. These differences in milk among geographical regions were caused by forage type and amount in each region such as grass feeding in NORTH, and corn silage feeding in CENTRAL and TOKACHI.

CONCLUSION

Regional difference in milk produced in Hokkaido can be characterized by fatty acid, vitamin E and β -carotene concentration, which are caused by feeding regime of forage.