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Characteristics of Element Concentrations in Dry Milk and Its Fractions

Atsuko Sshinohara[1)], Momoko Chiba[1)], Taku Nakano[2)] and Yutaka Inaba[1)]

1) Juntendo University Schoole of Medisine
2) Bean Stalk snow. Co., Ltd.

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Abstract:
The concentrations of 48 kinds of major and trace elements in dry milk were determined by microwave-induced plasma mass spectrometry, atomic absorption spectrometry, or colorimetry. The order of the element concentrations in dry milk was K > Ca, P > Na > Mg >> Zn > Rb > Fe > Sr > Cu, Ba, Ni, Mo, Mn, As > Se, Co, Cr. Other elements determined were much lower or under detection limit. Element concentrations in fractions of milk (skim milk, butter milk, acidic casein, whey, whey protein concentrate (WPC), and milk mineral) were also determined. The concentrations of each element in these powdered samples were dependent on the fractions. Concentrations of Ca and Mg in skim milk, butter milk, whey and WPC were similar to those in dry milk, but those in acidic casein fraction were very low and those in milk mineral fraction were extremely high. The concentrations of P in milk mineral fraction were about twice of dry milk, and Na was almost the same, and K was lower than those in dry milk. The present study indicates that the milk mineral fraction is a good source of Ca and Mg.

Key words: dry milk, butter milk, whey, whey protein concentrate, milk mineral, major elements, trace elements

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