



Does post-milking teat disinfection with iodophors lead to iodine residues in milk?

Moderate levels of iodine in milk can make a significant and healthy contribution to the recommended daily dietary requirement of people. The recommended dietary allowance for iodine is 150 µg/day for adults, 70-120 µg/day for children, and 40-50 µg/day for infants (National Research Council 1980). In the United States, a nation of high consumption of dairy products, milk and dairy products contributed 56% of total food iodine intake for most age groups according to 1978 Food and Drug Authority survey data. Supplemental iodine in rations for dairy cows has been documented as the main contributing factor to high milk iodine levels in the United States.

Iodophor sanitisers and teat disinfectants also increase milk iodine levels. Their contribution depends on type and concentration, and milking practices. Iodophor post-milking teat disinfectants have consistently increased iodine in milk. The results of an Australian study is summarised in the table below. For those who would like a comprehensive review, see Galton et al (1986).

In a study of iodine concentrations in milk from individual quarters that were teat-dipped after milking, Sheldrake et al (1980) concluded that the bulk of iodine residue in milk came directly from unwashed teat skin. Although other researchers have concluded that the primary mode of increased iodine is absorption through the skin and entry into the milk by the milk synthesis process rather than by direct contamination from the teat skin (Conrad and Hemken 1978), it is evident that both pathways are important.

Post-milking teat dips and iodine levels in individual quarters (Sheldrake et al 1980)

| Pre-milking preparation | Available iodine concentrations in milk (µg per quarter per milking) | |
|-----------------------------|--|--|
| | Initial post-dip concentration of 0.1% | Initial post-dip concentration of 0.5% |
| Not washed or wiped | 143 | 291 |
| Thoroughly washed and dried | 70 | 99 |

The 'Pre-milking teat disinfection' FAQ sheet discusses the possibility of iodine residues when using this technique.

The Foods Standards Code specifies an iodine limit of 500 µg/L, and this is the maximum acceptable level used by the dairy industry. Surveillance by state dairy authorities has shown no problems occurring with normal use of iodophor, even when cows are strategically washed prior to milking. Hubble and Mein (1986) found that iodine residues in milk, on farms using iodophors for teat disinfection only and various washing techniques, averaged levels of 160 µg/L in summer-autumn and 110 µg/L in winter-spring.

Monitoring in recent years in Victoria and NSW found very few milk supplies to register milk iodine levels above the legal limit of 500 µg/L. In the few instances where elevated iodine occurred it was due to excessive dietary iodine supplementation of cows or inappropriate use of iodine-based milking machine sanitisers. Other circumstances that may increase iodine levels in milk include high iodine content of water (especially in drought conditions), and iodine from sanitisers that has adhered to rubber components of the milking machine.

Countdown Downunder recommends washing teats only if they are dirty. Minimising use of water on udders and teats is beneficial for teat skin health and also generally leads to better milk quality (coliform counts, sediment) unless very careful drying techniques are used. If it were necessary, iodine levels in milk could be reduced markedly by careful pre-milking teat preparation (washing and wiping of teats) when post-milking iodophor teat disinfectants were used.

If particular dairy farming areas do experience milk iodine levels that are unacceptably high at certain times of the year, alternatives to iodophor teat disinfectants could be chosen if farmers are not prepared to wash and wipe the teats of cows before milking.

Although iodine residues in milk can be reduced by lowering the concentration of available iodine in teat disinfectants, there is no point in post-milking teat disinfection if the product is too dilute to be effective.

Key papers

Conrad LM, Hemken RW. Milk iodine as influenced by an iodophor teat dip. *J Dairy Sci* 1978;61:776-780.

Galton DM, Petersson LG, Erb HN. Milk iodine residues in herds practicing iodophor premilking teat disinfection. *J Dairy Sci* 1986;69:267-271.

Hubble IB, Mein GA. Effect of pre-milking udder preparation of dairy cows on milk quality. *Aust J Dairy Technol* 1986;41:66-70.

National Research Council. Recommended dietary allowances. In: Committee of Dietary Allowances, Food Nutrition Board, 9th edition, Division of Biological Sciences, National Academy of Science, Washington DC, 1980.

Sheldrake RF, Hoare RJT, Chen SC, McPhillips J. Post-milking iodine teat skin disinfectants: 3. Residues. *J Dairy Res* 1980;47:33-38.