# Penn State dairyman discusses iodine levels in dairy feeds rations

UNIVERSITY PARK — Levels of iodine in milk have become a concern of people in medicine and the dairy industry. Some data indicate that the iodine content of milk has increased by 17 percent or so in recent years.

While these levels have not been shown to be harmful to consumers, it is felt that voluntary steps should be taken to avoid further increases and alleviate the relatively high levels found in milk from some farms, reports R.S. Adams, Penn State Science professor.

Already some dairies are testing milk from their shippers for iodine content to determine which farms may be problem ones, and to encourage lowering levels. Tentatively a maximum iodine content of 5 ppm or 500 micrograms per liter is being recommended for milk.

Most cases of high iodine content in milk have been traced to excessive iodine supplementation in rations for dairy cows. Some of the problem may stem from the widespread use of organic iodine (EDDI) in dairy feeds, concentrates, mineral mixtures and sometimes trace mineral salt.

In other cases the high iodine levels result from use of several items in the ration which contain supplemental iodine in either inorganic or organic form. When several such items are used at generally recommended levels, considerable doubling up of iodine intake may occur.

Proper use of iodine-based teat dips does not appreciably add to the iodine content of milk. On some farms, however, careless use of iodine in sanitizing equipment, udder washing and backflushing may considerably increase iodine levels in milk.

Levels of iodine intake must be limited to not over 40 mg per head daily to maintain an iodine content in milk of under .5 ppm, says Adams. This is approximately 4.5 times the amount of total iodine intake which is necessary to meet nutritional needs for this element.

Some farms with high iodine milk may have average intakes of iodine which may exceed 100-200 mg daily.

the effects of reasonably high iodine intakes on cattle is somewhat controversial. Some studies suggest no adverse effects may result fron intakes which are 10 times nutritional needs. At somewhat higher intakes, an increase in the usual problems which afflict cattle may be expected according to some field studies.

Iodine toxicity may occur when rations consistently contain 50 ppm in the dry matter, or 100 times the nutritional needs for dairy cows. Young stock and calves generally are more susceptible to iodine toxicity than adults.

Symptoms of iodine toxicity include excessive tears, increased salivation, watery nasal discharge, tracheal congestion and coughing. Conjunctivitis and blood-shot eyes also may be noted. Hair loss may occur around the eye, over the neck and at the base of the ears. Protruding eyeballs also may be found. Milk production, feed intake and growth may be depressed. Animals may be more susceptible to infection. Symptons usually subside quickly after reductions are made in iodine intake.

The National Research Council recommends an iodine content of .5 ppm in the total ration dry matter for cows under normal conditions.

If a strongly goitrogenic crop furnishes over 20 percent of the total dry matter, the iodine level in the ration should be 1.0 ppm. Members of the Brassica family such as kale, rape and turnips are quite goitrogenic. Interest in these crops has returned in recent years as a means of increasing carrying capacity in pastures.

An iodine deficiency of long-standing may result in calves being born with goiter, even when no outward signs may be present in their dams. Milk production may be depressed when iodine is deficient for a prolonged period. Symptoms of hypothyroidism also may appear.

Most forages and feed ingredients may contain .2-.3 ppm of natural iodine on a dry matter basis. Somewhat less may be found in areas with extremely low levels in soil and water. Items grown in areas with appreciable levels in soil and water may contain 1.0-2.5 ppm iodine.

In the past, it has been a practice to use somewhat higher levels of iodine than recommended by NRC. This was done largely to provide more safety factor and, especially, to counteract the slightly goitrogenic properties of soybean meal.

Experience now indicates that current NRC allowances provide adequate iodine, even on rations high in soybean. In view of the doubling up of iodine sources which may occur and the apparent need to avoid excessive levels of iodine in milk, it is recommended that iodine supplementation be limited to levels which provide a total intake of natural and supplemental that is closer to NRC allowances.

Accordingly, it is recommended that the ration contain .8 ppm total iodine on a dry matter basis (natural plus any supplemental). Assuming that the naturally-occurring iodine content is .3 ppm, it is recommended that supplemental iodine be provided at a level of .5 ppm of the total ration dry mater (forage plus concentrate). A level of .1-2. ppm iodine in milk may result at this intake.

Adams reports one of the major factors which is thought to have contributed to high iodine intakes on some farms is the widespread use of ethylene diamine dihydriodide (EDDI) in manufactured feeds, concentrates, some trace mineral salts and mineral or mineral-vitamin products. This organic iodine source has been used in medicated products to aid in the prevention of foot rot and lumpy jaw.

Preventitive levels call for 50 mg per head daily. This would furnish about 40 mg of iodine from this source alone, compared to a need of around 9 mg. EDDI also has been used for treatment of these problems at levels of 400-500 mg per head daily for a period of 2-3 weeks.

In other cases the material has been used to allegedly help reproduction in cattle and horses.

While many products containing EDDI carry a medicated label, it has been included at comparable or sometimes lower levels for routine iodine supplementation. Thus non-medicated products may be a source, as well as medicated ones.

It is now recommended that use of EDDI at preventitive and treatment levels be confined to non-milking animals, Adams notes.

"EDDI is a readily utilized source of iodine, he adds. "It appears that it may result in slightly higher iodine levels in milk than inorganic iodine from potassium iodate, another community used source in supplements.

"Because of its mention in connection with higher than necessary iodine intake at medicated levels, there might be some competitive advantage to using another source of manufactured feeds and supplements. Iodine levels do not need to be stated on guarantees for some feeds and concentrates, but the source of supplemental iodine generally is given in the ingredient listing."

Alternatives

There are alternative methods to the control and prevention of foot problems in dairy cows. Treatment aids such as foot baths and boxes containing wet or dry mixtures which include copper sulfate are effective. Hoof trimming and monitoring of the condition of the feet are important in control and prevention of problem, Adams points out.

Low level feeding of tetracyclines may be used in some cases. An intake of .1 mg per lb. of bodyweight daily for milking

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