More Information on Phytoestrogens in Breast Milk

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To the Editor:

Since writing the editorial “Phytoestrogens in Breast Milk—Another Advantage of Breast-Feeding?” (1) I have uncovered additional research that conflicts with some of the information included in the editorial.

In attempting to compare the isoflavone content of breast milk with soy-containing infant formulas, I referenced an article by Dwyer et al. (2) that concluded that “soy-based specialty formulas” were devoid of isoflavones. These formulas were not infant formulas. Further, the soy in the formulas may have been from soy polysaccharide, not soy protein, which would explain the low concentrations of isoflavones found in the soy formulas.

The actual isoflavone content of soy-containing infant formulas has not been well studied. These formulas are manufactured with soy isolates, which contain the isoflavones genistein and daidzein. Setchell and Welsh (3) reported the phytoestrogen content of two soy–milk infant formulas: ProSobee, 17.1 μg/g daidzein and 21.8 μg/g genistein; Isomil, 19.1 μg/g daidzein and 22.6 μg/g genistein. Irvine et al. (4) concluded that the quantities of soy formula recommended by manufacturers for infant feeding provide an intake of phytoestrogens (per kilogram of body weight) of approximately three to five times more daidzein and genistein than amounts that disrupt the menstrual cycle when fed to premenopausal women (5).

Metabolism of isoflavones in infants is not well studied since ethical considerations make it difficult to conduct metabolic studies on human infants. However, in a study of cholesterol synthesis rates in infants, Cruz et al. (6) found that infants fed soy-containing formula excreted significantly higher quantities of urinary isoflavones than infants fed human milk or cow’s milk-based formulas. Thus, the human infant fed soy-containing formulas absorbs and excretes dietary phytoestrogens. Bioavailability of isoflavones may vary between soy formula and breast milk since isoflavones are found as glucuronide conjugates in human milk (7), whereas they are present as glycosidic conjugates in soy milk (8).

Methods to measure isoflavones in foods and biological fluids have evolved as research interest in phytoestrogens has increased. Traditionally, gas chromatography–mass spectrometry (GC-MS) has been used to measure soy isoflavones and their metabolites in biological fluids. More recently, HPLC methods have been developed that require fewer steps for sample preparation and less analytical time. As methods have evolved, better information is available on the actual phytoestrogen content of foods and the effects of processing on isoflavone content of foods. Although all legumes have been assumed to contain isoflavones, Franke et al. (9) found that the lentils they analyzed did not contain phytoestrogens.

Processing is known to affect isoflavone concentration (10). Our laboratory found that isoflavones in tempeh were more bioavailable than isoflavones in unfermented soy pieces (11). Alcohol-extracted soy products contain low concentrations of isoflavones, so soy infant formulas could be manufactured with a low isoflavone content if desired. Yet, although infants should not be exposed to large amounts of isoflavones, limiting infants’ exposure to isoflavones may also be undesirable.

Several large trials are currently underway to further study the metabolism of isoflavones in infants. A symposium on phytoestrogen research methods is planned in June 1997 to further develop consensus on optimal methods to measure phytoestrogens in foods and biological fluids. Research in phytoestrogens is expanding quickly, and we currently do not know if phytoestrogens are our friends or foes (12), or whether they may be friends at certain stages of the life cycle and foes at other times. Clearly more information is needed on the metabolism of phytoestrogens at all stages of the life cycle and the biological effects of these amounts of exposure on steroid hormones and the disease process.

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Isoflavone Content of Breast Milk and Soy Formulas: Benefits and Risks The author of the Editorial referred to replies to the above Letters:
Clin. Chem. 1997; v. 43, p.850-852.
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