

Stable Isotope Techniques

Stable (i.e., non-radioactive) isotope techniques have been used as research tools in nutrition for many years. However, the application of these techniques in nutrition programme development and evaluation is a relatively new approach, one where the IAEA has a great opportunity to contribute.

Stable isotope techniques have an advantage over conventional techniques in that they provide more sensitive and specific measurements. The IAEA has supported numerous activities in infant nutrition where stable isotope techniques have been applied. These include projects to estimate human milk intake in breast-fed infants, muscle mass in lactating mothers, energy expenditure and bioavailability of iron in infants and young children.

Human milk intake in breast-fed infants is assessed through a non-invasive method. A dose of deuterium-oxide is consumed orally by the mother. Briefly after intake, deuterium-oxide becomes mixed with the mother's body

water and ingested by the baby via human milk. By measuring the appearance of deuterium in the baby's urine or saliva, information about the intake of human milk can be obtained. Besides, this method also shows whether the baby is being fed food other than the mother's milk, a practice that often exposes babies to bacteria and viruses that cause infectious diseases. At the same time, by sampling the mother's saliva, her body water content can also be estimated. This allows scientists to estimate the mother's lean body mass (muscle mass), thus providing important information about the nutritional status of the lactating mother.

Iron absorption, on the other hand, is measured through a method based on the incorporation of iron stable isotopes into red blood cells. For example, studies supported by the IAEA have demonstrated that iron absorption in infants can be increased two- to threefold by adding vitamin C to food, thus indicating how simple dietary modifications can improve the nutritional value of food.