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Aflatoxin M1 health risks vs. benefits of dairy consumption in Ethiopian children: An epidemiological trial and risk-benefit analysis

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Why this research project matters

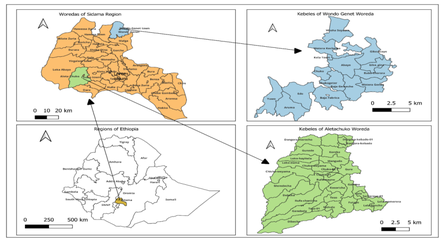
- In Ethiopia, dairy is a critically important animal source food, with essential nutrients for child growth – including high-quality protein, fat, calcium, and vitamin B12 – in people's diets. These dairy nutrients are particularly important where other animal source foods can be difficult to obtain.
- However, aflatoxin M1 (AFM1) can be present in milk if dairy animals consume its parent compound aflatoxin B1 (AFB1) in feed. AFB1 is a known human carcinogen, and is linked to child stunting, immune system dysfunction, and death from liver failure at high doses. **Little is known about AFM1 health effects**.
- Dairy production and trade are important in rural Ethiopian livelihoods, where dairy can be an important source of supplemental income. If excessively strict AFM1 standards are set and then enforced in Ethiopia, this could result in both economic and nutritional losses.
- Dairy producers may need to discard milk with AFM1 levels exceeding 0.05 µg/L, which could lead to income losses.
- Public perception of AFM1 as being dangerous because of the strict standard could lead to caregivers being reluctant to give milk to children, who would otherwise benefit greatly from the nutritional benefits that milk provides.

Overarching goal

Provide sound risk and epidemiological science to the question of aflatoxin M1 (AFM1) in dairy products: 1. What its true health effects are, 2. How any health risks compare to the nutritional benefits of milk consumption, and 3. What the implications are for rational policymaking on AFM1 in dairy foods.

Our work is based in

Sidama Zone



What we aim to do

- Determine association between dairy consumption and growth outcomes in children aged 6-36 months, controlling for socioeconomic, nutritional, and behavioral factors.
- Determine the association between AFM1 levels in milk and nutrient density in milk.
- Determine association between AFM1 exposure and growth outcomes in children aged 6-36 months who consume dairy, controlling for confounders/co-factors described above.
- Compare health benefits vs. risks of dairy consumption in children; derive policy recommendations for AFM1 regulation AFM1 and communications about dairy consumption and risk-benefit tradeoffs.


Our work on the cross-cutting themes

Gender and Youth:

- We stratify our results by sex, to determine if there are behavioral, nutritional, or physiological differences between boys and girls in growth outcomes related to milk consumption and AFM1 metabolism.
- We determine how gender differences in dairy production, household food decisions, market access, and childrearing affect child growth outcomes.

Local Capacity Development:

- We partner with EPHI to improve local capacity development of dairy animal smallholders by providing information on feedstocks less likely to be contaminated with aflatoxins, how nutritional outcomes improve as a result of dairy consumption, and information about AFM1's potential health effects.
- The participating institutions – MSU, EPHI, and IFPRI – will involve students, junior researchers, and staff in this work to train the next generation of global scientists in diverse areas of nutrition, public health, agricultural economics, and risk assessment.
- The project will support one female Ethiopian PhD student from Hawassa University.

Enabling Environment:

- Our project will inform on health-based regulations on AFM and dairy feed to improve cattle & human health,

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