

Double fortified salt in India

To the Editor,

During recent months there have been some interesting and important developments relating to double-fortified salt (DFS) as a means of addressing iron-deficiency anemia as well as iodine deficiency disorder.

First, a study in Bihar India found that the use of DFS in school lunches reduced anemia by 20% among schoolchildren aged 7 and 8.¹ The randomized trial examined an intervention reaching nearly 2,000 children in each arm, chosen from 54 schools at a cost per child of approximately \$0.35,² and found the intervention to be cost-effective in terms of cost incurred per disability-adjusted life-years (DALYs) saved.

Second is an editorial by Schultink³ commenting on the use by Makkar et al.⁴ of a modelling approach to assess the benefit-to-cost ratio of reducing iron deficiency anemia in India through salt fortified with both iodine and iron.

Makkar et al. indicated a considerable potential of double-fortified salt in contributing to India's national nutrition efforts, but noted challenges in cost, production, and organoleptic properties compared to fortification with iodine alone. We would like to comment briefly on these challenges based on extensive studies of double fortified salt over recent decades.

First, concerning the organoleptic properties challenge: It is clear that when produced under controlled, supervised conditions, DFS is essentially indistinguishable from iodized salt, and there is zero loss of iodine. While, under close examination, the fortified salt reveals grey specks of the iron premix; these have no effect on the cooked food in terms of taste or smell.

While evidence to date indicates that DFS is a sound and efficacious intervention, the double fortified salt utilized for the large-scale trial in the Indian state of Uttar Pradesh⁵ was,

¹ Krämer M, Kumar S, Vollmer S. Improving child health and cognition: Evidence from a school-based nutrition intervention in India. *Review of Economics and Statistics*. 2021 Dec 2;103(5):818-34.

https://doi.org/10.1162/rest_a_00950. See also full text at <http://hdl.handle.net/10419/179794>

² Kramer M, Kumar S, Vollmer S, Double-fortified salt and anemia among schoolchildren in India. *VoxDev*, April 2022. <https://voxdev.org/topic/health-education/double-fortified-salt-and-anaemia-among-schoolchildren-india>

³ Schultink J W, Using double-fortified salt to reduce iron deficiency anemia in India," *JNutr* 2022; Volume 152, Issue 2, 2022.

⁴ Makhar S, Minocha S, Bhat KG, John AT, Swaminathan S, Thomas T, Mannar MG, Kurpad Av, Iron fortification through universal distribution of double fortified salt can increase wages and be cost-effective. An ante-ex modelling study in India. *JNutr* 2021; doi.org/10.1093/jn/nxab378.

⁵ *Journal of Nutrition*, Volume 151, Issue Supplement_1, February 2021. Supplement: The State of Evidence and Experiences in Double Fortified Salt (iodized salt with iron)

unfortunately, substandard. The mass production of this product (procured through a competitive tendering process) and the cost constraints in the production of the premix resulted in a sub-optimal product. These constraints can be overcome when the optimal premix is produced at a single location with regular inspections, when, at the salt processing plant, a proper blending procedure is in place with rigorous quality assurance, and when consumers are provided with simple but necessary information regarding the salt in terms of appearance, use and health benefits.

Second, concerning the cost challenge: While DFS adds an incremental cost, the figure often quoted: 3-4 US cents/kg may create an erroneous impression. This addition, 25-30% of the retail price of quality refined salt (currently marketed at \$0.20 -.30/kg) – much higher than the coarse salt normally consumed by low-income Indian families, translates, in absolute terms, to less than \$ 0.50 *per year* for a family of 5, and this is only in instances where the salt is indeed purchased by the family. Where DFS is included in the Public Distribution Program or other comparable delivery systems – ideal distribution mechanisms for DFS, the government covers the cost, and this cost is not excessive relative to other interventions.

It should be noted that large scale production and distribution of DFS is underway in the Indian state of Madhya Pradesh, and encouraging new initiatives in Africa are in preparation. We would urge that these undertakings move forward while collecting quality data both on distribution and effectiveness.

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