

HF-TAG Revised FAQ Page:

MICRONUTRIENT POWDERS (MNP)

1. What are micronutrient powders (MNP)?

MNP are sachets (like small packets of sugar) containing a blend of micronutrients (vitamins and minerals) in powder form, which are tasteless and easily added to semi-solid foods prepared in the home. Single serving sachets allow families to fortify children's food at an appropriate and safe level with needed vitamins and minerals for healthy physical and cognitive development. Micronutrient powders are recommended for infants, young children and school-aged children aged 6 months – 12 years to improve iron status and reduce anaemia in populations where anaemia is a public health problem.¹ Please see FAQ questions 3-5 for further information.

1. WHO guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO.

2. Why were MNP created?

In 1996, a group of UNICEF consultants determined that the standard iron drops were not as effective as they could be, as adherence to the recommended regime remained poor. They called for a simple, inexpensive, and new method to provide micronutrients (including iron) to populations at risk. Responding to the challenge, the Sprinkles Global Health Initiative at The Hospital for Sick Children, University of Toronto, developed MNP (branded at the time as Sprinkles®) using encapsulated iron that could be mixed directly into food. MNP additionally provide an alternative supplementation method to address the inability of infants and young children to safely ingest tablets or pills. Syrups and drops have been used for many years, but adherence has been documented to be poor (for iron) because of the strong unpleasant taste of the drops. The drops also tend to stain the teeth unless they are carefully placed at the back of the infant's mouth, and for caregivers who cannot read, it may be difficult to measure the appropriate amount of liquid iron, which is often supplied in a bottle with a dropper calibrated in milliliters. Furthermore, though industrially produced fortified complementary foods and large-scale food fortification (LSFF) are suitable for preventing micronutrient deficiencies in the adult population, these non-targeted interventions are not designed to meet the micronutrient needs of infants and young children, who ingest smaller amounts of food than adults.

3. Who should use MNP?

MNP should be considered for those who are at risk of having an inadequate intake of micronutrients; evidence from multiple countries suggests that the period of highest vulnerability is 6 to 23 months of age. This is when the variety, quality and/or quantity of foods provided to young children often do not meet the nutrient density and adequacy requirements for this period of rapid growth and development. WHO recommends MNP for children 6-23 months of age in populations where the prevalence of anemia in children under two or under five is $\geq 20\%$, and for children 2-12 years of age in populations where the prevalence of anemia among schoolchildren is $\geq 20\%$. Generally, MNP are recommended where foods do not provide enough essential micronutrients. This occurs where one or more of the following apply:

- a. Dietary diversity is low (due to limited availability or affordability).
- b. Complementary foods prepared for small children often have insufficient nutrient content and density (for example, watery porridges and foods with too low micronutrient content);
- c. There is a limited availability and a low consumption of fortified foods;

- d. The bioavailability of micronutrients is poor due to absorption inhibitors in the diet (fiber, phytate, tannin), this is quite common in many communities consuming plant-based diets; and
- e. Stunting levels (a proxy indicator for micronutrient deficiencies) are high.

4. Who should not use MNP?

Children who are severely malnourished should not be given MNP while being treated with Ready to use Therapeutic Foods (RUTF), as these products already provide the vitamins and minerals they need. According to WHO guidance, they should also not be used for severely malnourished children during the initial period of treatment of electrolyte imbalance. MNP can be used effectively and safely after this period (usually after the first 7 days of electrolyte treatment).

5. Can MNP be used in infants younger than 6 months of age, older children, adolescents, or other individuals?

MNP are intended for use in infants and young children aged 6-23 months as well as preschool and school-aged children aged 2-12 years¹. The use of MNP for infants under the age of six months is not recommended as they should be exclusively breastfed in accordance with WHO guidelines on breastfeeding. For other age groups, more choices for supplementation are available, including the use of fortified foods, pills, and capsules. Nevertheless, MNP can be used in the other age groups without fear of toxicity. Research on the use of MNP during pregnancy has been conducted. However, they are not recommended in lieu of multiple micronutrient supplements (MMS) or iron folic acid (IFA) supplementation³.

- 2. WHO guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO.
- 3. Use of multiple micronutrient powders for point-of-use fortification of foods consumed by pregnant women. Geneva: World Health Organization; 2016
- 4. Choudhury N, Aimone A, Hyder SMZ, Zlotkin SH. Relative Efficacy of Micronutrient Powders versus Iron—Folic Acid Tablets in Controlling Anemia in Women in the Second Trimester of Pregnancy. *Food and Nutrition Bulletin*. 2012;33(2):142-149.

6. When should MNP use begin and for how long should use continue?

The current recommendation from the World Health Organization (WHO) is that exclusive breastfeeding should last until 6 months of age. At age 6 months, complementary feeding should begin and MNP can be given. Infants and young children should receive 60-180 sachets consumed over 60-180 days (no more than one sachet per day). The WHO recommends a programme target of 90 sachets per six months period (equivalent to 15 sachets per month, or 3-4 per week), which is likely to be reasonable for most situations. This equates to a single sachet every second day for six months. Sachets should be made available throughout the year for the population groups. However, this is a recommendation and MNP intakes may range from 60 to 360 sachets or doses in a 12-month period. If the data on the iron status or other micronutrient status of the vulnerable population is available, the number of sachets or doses may be adjusted. To encourage adherence and appropriate use, implementers should also consider the number of sachets that are given to the caregiver each time¹.

- 5. WHO guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO.

7. What is the benefit/advantage to using MNP?

MNP have proven to be both efficacious and effective; studies in several countries have found that they reduce anemia by 18% and iron deficiency by 53% in young children aged 6-23 months¹. Preschool and school-aged children (2-12 years) receiving iron-

containing MNP also had a lower risk of anaemia prevalence ratio and iron deficiency in comparison to no intervention or those receiving a placebo². Given that iron is needed for optimal physical and cognitive development in young children, the impact of reducing iron-deficiency anemia on economic productivity of a nation has been modeled. Compared to other vitamin and mineral supplements in syrup or tablet form, MNP are particularly attractive due to their generally higher acceptability in field settings. They continue to show success in interventions for young children due to their limited gastrointestinal side effects and limited to zero effect on the taste and colour of the food to which they are added in most settings.

1. Suchdev, P. S., Jefferds, M., Ota, E., da Silva Lopes, K., & De-Regil, L. M. (2020). Home fortification of foods with multiple micronutrient powders for health and nutrition in children under two years of age. *The Cochrane database of systematic reviews*, 2(2).
2. De-Regil LM, Jefferds MED, Peña-Rosas JP. Point-of-use fortification of foods with micronutrient powders containing iron in children of preschool and school-age. *Cochrane Database Syst Rev*. 2017 Nov 23;11(11)

8. What key messages are given to caregivers when they receive MNP for the first time?

Caregivers are provided with the following key messages:

Key Message 1: In the first few days of taking MNP, darkening of child's stool may be observed. This is completely normal. The dark stool testifies to the fact that iron is being absorbed into the child's body normally. Therefore, continued use of MNP is advised. In addition, during the first days of taking MNP the child may have softer stools - mild loose stools or a mild form of hard stool, which usually passes in a period of 4-5 days. This does not happen to all children. This is also normal, and it should not be a cause for concern. If the loose stool is severe, bloody, or with mucous, care should be sought.

Key Message 2: Children already consuming other products containing a similar or higher amount of micronutrients should not be given MNP, until the child is no longer consuming these products. These products include RUTF (ready-to-use therapeutic food) for treatment of SAM (severe acute malnutrition), RUSF (ready-to-use supplementary food) or fortified blended foods such as WSB++ (wheat-soy blend) or CSB++ (corn-soy blend), also known as Super Cereal Plus,

Key Message 3: MNP can be safely provided in addition to twice-yearly high dose of vitamin A capsule, iodized salt, and general food fortification.

Key Message 4: Use of MNP is an integral part of the infant and young child feeding to improve the quality of complementary food. Therefore, along with good childcare, health care and nutrition, MNP can help prevent micronutrient deficiencies and anemia. During an illness, children need to continue to eat regularly. After an illness, children need at least one extra meal every day for at least a week. MNP should continue being provided during illness.

9. Are MNP safe?

MNP are formulated to contain the daily recommended intake of each nutrient per sachet, which is the amount that should normally come from the diet. Due to the design of single-dose packaging, there is little risk of overdosing (i.e. several sachets would need to be opened and consumed, which is unlikely to happen). Although there was previous concern¹, the most recent evidence indicates that when malaria surveillance and treatment options are consistently implemented and available, iron supplementation or the use of iron containing MNP do not contribute to an increase in incidence of malaria in children^{1,2}. Therefore, in regions where anaemia is a public health concern and children aged 6 months to 12 years are already at a higher risk for morbidity and malnutrition, the WHO recommends that iron supplementation (in any form, including

m micronutrient powders for home fortification) should be provided in conjunction with measures to prevent, diagnose, and treat malaria for these children³.

1. World Health Organization. (2016, February 29). Intermittent iron supplementation in preschool and school-age children in malaria-endemic areas. World Health Organization. Retrieved from https://www.who.int/elena/titles/iron_infants_malaria/en/
2. Zlotkin S, Newton S, Aimone AM, Azindow I, Amenga-Etego S, Tchum K, Mahama E, Thorpe KE, Owusu-Agyei S. Effect of iron fortification on malaria incidence in infants and young children in Ghana: a randomized trial. *JAMA*. 2013 Sep 4;310(9):938-47. doi: 10.1001/jama.2013.277129. PMID: 24002280.
3. Home Fortification Technical Advisory Group. Technical Brief on the Use of Home Fortification with Micronutrient Powders Containing Iron in Malaria Endemic Regions. Home Fortification Technical Advisory Group, 2018.

4. Can MNP lead to diarrhea ?

Stool consistency does not change in the majority of infants and children receiving MNP. Loose stools may be caused by a change in bowel flora (microorganisms) associated with the introduction of complementary foods containing micronutrients such as iron into the diet or possibly the impact of ascorbic acid on bowel peristalsis in infants, who previously had received only very small amounts of ascorbic acid in their diets (in breast milk). Although this form of loose stool lasts for approximately one week and does not lead to dehydration, it is a valid concern to parents and health care providers.

5. Can MNP lead to other side effects?

Stool colour changes to a dark or black colour in all infants receiving MNP on a regular basis. Iron itself is dark in colour. When iron is left unabsorbed during digestion, the iron is excreted in the stool and causes the change in colour.

6. Do MNP programmes currently monitor side-effects:

Reaching more than 10 million children aged 6-59 months, a total of 65 countries are implementing MNP programs.¹ These countries initiating and implementing MNP programs are encouraged to have monitoring systems in place which track all program indicators including information on MNP provision, coverage, adherence, and side effects. Apart from some reporting of expected, self-perceived side effects, which include stool darkening, mild constipation and loose stools, no other adverse, or severe, side effects have been reported by these programs.

[1. UNICEF. NutriDash: Facts and Figures – Nutrition Programme Data for the SDGs \(2015-2030\). UNICEF, New York, 2017](#)

7. Can MNP be used to treat rickets caused by severe vitamin D deficiency?

The vitamin D dose in MNP is meant to provide the recommended daily intake of vitamin D, rather than a therapeutic dose. For rickets treatment, the recommended dose of vitamin D is significantly higher than the dose present in MNP. The vitamin D dose in MNP, however, is adequate to prevent rickets.

8. Is vitamin A toxicity of concern for children who receive MNP and high dose vitamin A?

There is no risk of toxicity, and the two interventions are complementary. High dose vitamin A capsules given to children 6-59 months of age every four to six months are recommended in populations where vitamin A deficiency is a public health problem. MNP containing vitamin A are formulated to help children meet their daily vitamin A needs. It is safe for children to receive both types of supplements, no upper toxic limit is reached if consumed on the same day, and the supplements are not competitive.

9. Can MNP be used to treat anaemia or is it to only prevent anaemia?

Studies have shown that MNP can be used both in the treatment and prevention of anemia.^{1,2} However in accordance with the WHO 2016 recommendations, the use of

multiple micronutrient powders is a preventive strategy for implementation at population level without screening for any condition or disease. Children diagnosed with anaemia should be treated appropriately, according to WHO and national guidelines.^{3,4}

1. Hirve S, Bhave S, Bavdekar A, Naik S, Pandit A, Schauer C, Christofides A, Hyder Z, Zlotkin S. Low dose 'Sprinkles'-- an innovative approach to treat iron deficiency anemia in infants and young children. *Indian Pediatr.* 2007 Feb;44(2):91-100.
2. Zlotkin S, Arthur P, Schauer C, Antwi KY, Yeung G, Piekarz A. Home fortification with iron and zinc sprinkles or iron sprinkles alone successfully treats anemia in infants and young children. *J Nutr.* 2003 Apr;133(4):1075-80.
3. WHO guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. Geneva: World Health Organization; 2016. Licence: CC BY-NC-SA 3.0 IGO.
4. Guideline: Daily iron supplementation in infants and children. Geneva: World Health Organization; 2016. ([9789241549523_eng.pdf \(who.int\)](#))

10. Should a person with thalassemia trait avoid iron supplements, such as MNP?

People with thalassemia trait can safely consume MNP. Thalassemia and iron metabolism are closely linked. Iron deficiency and mild forms of thalassemia (e.g., thalassemia trait) are often confused. Both are associated with mild to moderate anemia and microcytosis (small red cells). At the other end of the spectrum, severe forms of thalassemia frequently produce iron overload. Excess iron accumulates due to a combination of enhanced iron absorption, repeated blood transfusions or both. People with thalassemia trait (thalassemia minor) are not at greater risk of complications from iron in the diet than anyone else in the general population and can safely consume MNP to prevent anemia and other micronutrient deficiencies. In the absence of concomitant iron deficiency, iron supplementation will neither correct nor improve anemia due to thalassemia. For people with both iron deficiency and thalassemia, iron supplementation will lessen the severity of the anemia until the iron deficiency is corrected. The blood count will then level off and no further improvement will occur.

11. Can MNP be used with fluids like milk or juice?

First and foremost, the aim of home fortification is to improve complementary feeding. MNP can be used in any food products and should be mixed into semi-solid foods. It is not recommended to add MNP to a liquid, because depending on the form of iron used, some of the iron will float to the top of the liquid. Furthermore, MNP mixed with liquid tends to stick to the side of the cup or glass, and hence some will be lost in the process, and it may make the liquid less acceptable to drink.

12. Can MNP be used in emergency rations?

MNP are safe to use and recommended to improve micronutrient status in emergency situations. In response to the 2004 Indian ocean earthquake and ensuing tsunamis, the provision of MNP at large scale proved to be a feasible, beneficial, and cost-effective intervention in Aceh, Indonesia, saving numerous lives and preventing the outbreak of diseases¹. Through quick product roll out, early establishment of partnerships, behaviour change communication and regular monitoring practices¹ this tsunami relief and recovery program led by Helen Keller International provided 28 million MNP sachets to more than 250,000 children displaced by disaster. Further assessments by UNICEF revealed that individuals in emergency settings who received MNP had lower rates of anaemia than those who did not². When emergency rations are not fortified with micronutrients themselves, they do tend to include corn-soya blend (CSB) or wheat-soya blend (WSB) - two vehicles suitable for the addition of MNP. Both of these rations produce a thick paste-like substance after cooking, to which MNP may be added after cooling to provide an additional source of micronutrients.

1. Martini, E., van Hees, J., de Pee, S. Home fortification in emergency situations: Distributing a micronutrient powder to tsunami-affected children in Indonesia. Home Fortification Technical Advisory Group (HF-TAG). 10.
2. UNICEF. Second health and nutrition assessment in Nanggroe Aceh Darussalam Province and Nias Island, September 2005. S.I. UNICEF, 2006

13. Can MNP be used by Muslims and Jews who follow traditional food practices?

Yes. Neither alcohol nor porcine products are used in the production of MNP. They are therefore both Halal and Kosher and may be used as part of a traditional Muslim or Kosher diet.

14. Isn't MNP not supposed to change the taste and colour of food? Why does this happen?

In order to mask the strong metallic taste of the iron, the iron in MNP is coated or encapsulated with a thin lipid-coat. The melting temperature for the lipid is around 60°C. If MNP are added to food hotter than 60°C the lipid coating around the iron will melt and the food will be exposed to the iron. This can further occur as a result of poor storage conditions. The iron can then change the colour of the food and will certainly have a strong taste. To prevent changes in the taste and colour of food to which MNP are added, it is recommended that MNP be added to food after it is cooled to a temperature below 60°C. Caregivers in eastern Uganda also reported a change in food colour when MNPs were added to food cooked with soda ash^{1,2}. In addition to organoleptic changes to food, studies have revealed that soda ash can affect the micronutrient bioavailability of MNPs by forming insoluble ternary compounds with iron and further reduce the absorption of iron due to changes in intestinal pH and therefore should be avoided in combination with MNP and porridge.¹.

1. Ford, N. D., Ruth, L. J., Ngalombi, S., Lubowa, A., Halati, S., Ahimbisibwe, M., Baingana, R., Whitehead, R. D., Mapango, C., & Jefferds, M. E. (2020). An integrated infant and young child feeding and micronutrient powder intervention does not affect anemia, iron status, or vitamin A status among children aged 12–23 months in eastern Uganda. *The Journal of Nutrition*, 150(4), 938–944. <https://doi.org/10.1093/jn/nxz314>

2. Ford, N. D., Ruth, L. J., Ngalombi, S., Lubowa, A., Halati, S., Ahimbisibwe, M., Mapango, C., Whitehead Jr, R. D., & Jefferds, M. E. (2019). Predictors of micronutrient powder sachet coverage and recent intake among children 12–23 months in eastern Uganda. *Maternal & Child Nutrition*, 15(S5). <https://doi.org/10.1111/mcn.12792>

15. Who owns the intellectual rights to Sprinkles®?

In September 2007, the Sprinkles Global Health Initiative (SGHI) and its sponsor, the Heinz Foundation, formally announced that they were putting the Technical Specifications for the MNP Sprinkles® products into the public domain. The Technical Specifications include information on formulations, ingredients, and packaging materials. Please note that this open access does not extend to SGHI's Canadian trademark rights to the brand Sprinkles®. This brand cannot be associated with any MNP product without SGHI's express, written permission, which will be granted only if SGHI is confident that the quality of the product meets or exceeds the standards set out in the Technical Specifications at all times.

16. Are MNP on the WHO Essential Medicines List?

The WHO classifies Essential Medicines as those that respond to the priority healthcare needs of a population and are available at affordable cost and the appropriate dose and quality to functioning health systems. Essential Medicines are selected based on disease prevalence, public health relevance, efficacy and safety evidence and comparative cost-effectiveness. MNP were first added to the WHO Essential Medicines List in 2019 for reducing the risk of iron deficiency anaemia in infants and young children. The list is updated every two years and MNP continues to maintain its essential medicine status. MNP can be found on the list under the ATC Code A11AA01 or [here](#).

