Benefits

- One packet per day provides WHO recommended daily intake of 15 micronutrients to each child
- Contains 15 essential micronutrients that treat some micronutrient deficiencies and improve overall nutritional status
- Lipid encapsulation of iron masks its taste and prevents interaction with food resulting in minimal changes to taste, color or texture of food
- Encapsulation may also reduce GI discomfort and interaction of iron with other nutrients
- Packaged in convenient, ready-to-use sachets with long shelf-life (2 years); easily sprinkled or stirred into any semi-solid foods prepared at home
- Food-based rather than medical intervention, thus can be easily incorporated into everyday life
- Supports and promotes exclusive (up to the end of 6 months) and continued breastfeeding (after 6 months)
- Promotes appropriate complementary feeding practices
- Supports and promotes local foods
- Supports brain development and cognitive performance
- Improves concentration and attention
- Enhances learning capacity and memory functions
- Promotes proper physical growth
- Increases resistance to diseases
- Boosts appetite
- Reduces morbidity and mortality from infections

Side Effects

- Pushtikona causes no major side effects
- Might cause child's stool to become dark as a result of any unabsorbed iron being excreted
- In some cases, a change in stool consistency may occur for a few days

Caution

- Do not give more than one sachet of Pushtikona per day to a child
- Iron-containing supplements should be withheld from severely malnourished children during treatment of electrolyte imbalance (usually during the first 7 days of treatment)

Frequently Asked Questions

1. Can Pushtikona be used to treat anaemia or is it only used to prevent anaemia?
Pushtikona can be used both in the treatment and prevention of anaemia.

2. Can Pushtikona be used to treat vitamin D deficiency rickets?
No. The vitamin D dose in Pushtikona is meant to meet the RDA for vitamin D, rather than provide a therapeutic intervention. Thus, for rickets treatment, the recommended dose of vitamin D is significantly higher than the dose present in Pushtikona. The vitamin D dose in Pushtikona, however, is adequate to prevent rickets.

3. Should a person with thalassemia trait avoid iron supplements, such as iron-fortified vitamins or Pushtikona?
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. 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 replacement 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.

4. When should Pushtikona use begin and how long should Pushtikona be used?
The current recommendation from the World Health Organization (WHO) is that exclusive breastfeeding should last until the completion of 6 months of age. Afterwards, along with continued, frequent, on-demand breastfeeding, appropriate complementary feeding begins. Pushtikona can be mixed with complementary foods. One sachet a day will provide children with WHO recommended daily required intake of 15 micronutrients until a variety of mixed foods (containing iron and other micronutrients) are being eaten. For the treatment and prevention of iron deficiency anaemia, infants should receive 60 sachets consumed over 60 – 120 days. The provision of 60 sachets should be repeated every 6 months until a variety of mixed foods (containing iron and other micronutrients) are being eaten.

5. What are appropriate complementary feeding practices?
Exclusive breastfeeding until the completion of the first six months and continued breastfeeding for two years or beyond is essential for optimal child health. After the completion of six months, along with continued, frequent, on-demand breastfeeding until 2 years of age or beyond, appropriate complementary foods should be introduced. Infants are particularly vulnerable during the transition period when complementary feeding begins. Ensuring that their nutritional needs are met thus requires that complementary foods be:

- timely – meaning that they are introduced when the need for energy and nutrients exceeds what can be provided through exclusive and frequent breastfeeding;
- adequate – meaning that they provide sufficient energy, protein and micronutrients to meet a growing child's nutritional needs;
- safe – meaning that they are hygienically stored and prepared, and fed with clean hands using clean utensils and not bottles and teats;
- properly fed – meaning that they are given consistent with a child's signals of appetite and satiety, and that meal frequency and feeding method – actively encouraging the child, even during illness, to consume sufficient food using fingers, spoon or self-feeding – are suitable for age.

6. Can Pushtikona be used with fluids like milk or juice?
Pushtikona should be mixed with cooked, mashed, semi-solid foods and not liquids. Because the iron in Pushtikona is coated with lipid (to mask the metallic taste), it will float to the top of liquids and tend to stick to the side of the cup or glass. As a result, when mixed and taken with liquid, some of the contents of a sachet will not be ingested.

7. Can Pushtikona be used by Muslims who follow traditional food practices?
Yes. Neither alcohol nor porcine products are used in the production of Pushtikona. They are therefore Halal and may be used as part of a traditional Muslim diet.

8. Why does stool consistency (loose stools or constipation) and color change in infants when they start taking Pushtikona?
Stool consistency does not change in the majority of infants and children receiving Pushtikona. Stool color, however, changes to a dark or black color in all infants receiving Pushtikona on a regular basis. Iron itself is dark in color. When some quantities are left unabsorbed, the iron is excreted in the stool and causes the change in color. Some very young infants, who have not previously been exposed to any complementary foods containing micronutrients (i.e. who are exclusively breast-fed) may develop loose stools or even mild diarrhea. The diarrhea does not lead to dehydration, but is a valid concern to parents and health care providers. The diarrhea lasts for approximately one week and then will not recur. Parents have reported that diarrhea quickly disappears in these young infants, into whose diet complementary feeding has been introduced, if 1/3 - 1/2 of a Pushtikona sachet is used.

9. Isn't Pushtikona not supposed to change the taste and color of food? Why does this happen?
In order to mask the strong metallic taste of the iron, the iron in the Pushtikona is coated or encapsulated with a thin coat of a soy lipid. The melting temperature for the lipid is around 60°C. If Pushtikona is added to food hotter than 60°C, the lipid coating around the iron will melt and the food will be exposed to the iron. The iron can then change the color of the food and will certainly have a strong taste. To prevent changes in the taste and color of food to which Pushtikona is added, we recommend that Pushtikona be added to food after it is cooled to a temperature below 60°C.

10. Can Pushtikona be provided to non-anemic infants without producing any toxicity?
Yes. The amount of micronutrients in the Pushtikona sachets is high enough to meet the needs of infants with micronutrient deficiencies (e.g. iron deficiency anemia) but not too high for those who do not have deficiencies. SGHI has completed a research study in China with 400 preschool children, a majority of whom were non-anemic (95%). Pushtikona prevented anemia (when provided for 4 months) with absolutely no evidence of excessive iron stores. Serum ferritin values remained within the normal range in 100% of infants included in the study. Thus, Pushtikona are safe to use, even in infants without micronutrient deficiencies. In fact, Pushtikona was originally designed to prevent malnutrition in non-deficient children at risk of micronutrient deficiencies.

11. Is vitamin A toxicity of concern for children, who receive both Pushtikona (containing vitamin A) and high dose vitamin A capsules twice yearly?
There is no risk of toxicity. Pushtikona containing vitamin A is formulated to help children meet their daily vitamin A requirement (the Recommended Daily Allowance or RDA). It is safe to use the two supplements together because Pushtikona use is complementary to high dose vitamin A capsules and not competitive. With the distribution of high dose capsules, the WHO recommends an age-appropriate diet which would contain all micronutrients, including vitamin A.

12. Why was Pushtikona developed?
In 1996, a group of UNICEF consultants determined that the standard iron drops were not effective, as adherence to treatment remained poor. They called for a simple, inexpensive and potentially viable new method to provide micronutrients (including iron) to populations at risk. The Sprinkles (5-micronutrient predecessor to Pushtikona) concept was based on two observations from the 'West' where micronutrient deficiencies are rare: (a) fortification of commercially available food provides essential micronutrients and (b) no change in the color, texture or taste of the food ensures compliance. Responding to the challenge, the Sprinkles Global Health Initiative at The Hospital for Sick Children, University of Toronto, developed Sprinkles utilizing encapsulated iron that could be added directly to food. In Bangladesh, the 15 micro-nutrient Sprinkles is known as Pushtikona.

Ref: (1) Nutritional Surveillance Project of Helen Keller International in collaboration with Institute of Public Health Nutrition, 2004 **(2)** Nutritional Surveillance Project of Helen Keller International, Bulletin No. 17, May 2006 **(3)** Micronutrient Initiative, Global Report 2009 **(4)** WHO Global Burden on Disease 2004 Update **(5)** UNICEF State of the World's Children 2009

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How to use


Tear open the top of the sachet


Pour the entire contents of sachet into any semi-liquid cooked food at an acceptable temperature to eat (lower than 60°C)


Mix the food well after you have added the contents of one Pushtikona sachet. After mixing Pushtikona with a child's food ensure that the child consumes the entire meal so that the contents of an entire sachet are consumed


Give no more than one full sachet per day at any one mealtime


Do not share the food to which Pushtikona was added with other household members since the amount of minerals and vitamins in a single sachet of Pushtikona is just right for one child



The food mixed with Pushtikona should be eaten within 30 minutes otherwise the iron will cause food to noticeably darken

PushtikonaLiterature/04.12.2

পুষ্টিকণা
PUSHTIKONA
সুস্বাস্থ্যে বেড়ে উঠুক প্রতিটি শিশু



Combating Hidden Hunger
A New Approach to Improving the Nutritional Status of & Reducing Iron Deficiency Anaemia in Children

According to WHO, exclusive breastfeeding until the completion of the first six months and continued breastfeeding for two years or beyond is essential for optimal child health.

After the completion of six months, along with continued breastfeeding, appropriate complementary foods should be introduced.

Project Summary

Project	Global Alliance for Improved Nutrition (GAIN) Infant and Young Child Nutrition Program (IYCN)
Goal	To significantly improve nutritional status and reduce iron deficiency anaemia among infants and children and to protect and promote optimal infant and young child feeding practices (including breastfeeding)
Partners	GAIN, Sprinkles Global Health Initiative, Renata Ltd., BRAC
Product	Pushtikona – high quality and affordable sachets of vitamin and mineral powder to be added to complementary foods

What is Malnutrition?

- In developing countries such as Bangladesh, malnutrition refers to insufficient or imbalanced consumption of nutrients necessary for the growth and maintenance of vital functions.
- A nutrient is a chemical that an organism needs to live and grow. Nutrients are the substances that enrich the body. They build and repair tissues, give heat and energy, and regulate body processes.
- There are six major classes of nutrients: carbohydrates, fats, minerals, protein, vitamins and water.
- Macronutrients are nutrients needed in large quantities (carbohydrates, fats, fiber, protein and water). Micronutrients (minerals and vitamins) are only required in small quantities.

Micronutrients: Vitamins & Minerals

- Vitamins and minerals boost the immune system, support normal growth and development and help cells and organs function properly
- While each mineral and vitamin has its unique properties, they work synergistically to ensure reactions in the body occur appropriately
- The consequences of not getting enough vitamins and minerals can range from birth defects and mental impairment to child deaths due to lowered immune system and susceptibility to diseases
- Vitamins and minerals are required for energy metabolism
- Periods of enhanced requirements for energy and nutrients include infancy, childhood, adolescence, pregnancy and during lactation

Micronutrient Malnutrition

- Micronutrient malnutrition, the chronic lack of essential vitamins and minerals, is also known as **Hidden Hunger**
- The best way of preventing micronutrient malnutrition among children is to ensure exclusive breastfeeding for the first six months of age followed by continued breastfeeding (until two years or beyond) and the consumption of a balanced and varied diet (appropriate complementary foods) that is adequate in every nutrient
- In the absence of a balanced diet, food fortification (the addition of micronutrients to foods to ensure that minimum dietary requirement are met) is an effective strategy to increase micronutrient intake
- Special care should be given to children from birth to age 5 – the most critical period for physical and mental development
- Worldwide, the three most common forms of micronutrient malnutrition are iron, vitamin A and iodine deficiency. **Of the three, iron deficiency is the most prevalent**

Iron Deficiency Anaemia (IDA)

- Iron deficiency anaemia is a condition that occurs due to a lack of sufficient iron in the body to form hemoglobin which is necessary to carry oxygen throughout the body
- Iron deficiency occurs because of a poor diet, the body's inability to absorb enough iron from food, bleeding, or parasitic infections
- Iron deficiency is the most widespread health problem in the developing world, impairing normal mental development in 40-60% of children[1]
- In Bangladesh, 68% of children under five years, 92% aged 6-11 months (highest prevalence) and 85% aged 12-23 months are anaemic[1]
  - The prevalence of malnutrition among children aged 6-11 months was significantly higher among children who were not breastfed than among those who were breastfed[2]
- IDA may result in impaired physical growth, impaired brain development and cognitive performance, decreased concentration and attention, impaired learning capacity and memory functions, decreased resistance to diseases and increased morbidity and mortality from infections
- Anaemia also results in reduced work productivity – 7.9% of GDP in Bangladesh is lost due to anaemia[1]
- Intake of iron-rich food and iron-supplements can correct and prevent IDA

Hidden Hunger Statistics

- An estimated 2 billion people across the world live with hidden hunger[3]
- Vitamin and mineral deficiencies account for an estimated 7.3% of the global burden of disease[4]
- Deficiencies of iron, vitamin A and zinc rank among the top 10 leading causes of death through disease in developing countries[5]
- In the worst affected countries it can account for lost productivity of up to 2% of GDP[3]
- In Bangladesh, 46% of the population under five is underweight and indicators of micronutrient deficiencies are high [5]

In 2008, the Copenhagen Consensus panel considered 30 options and ranked the provision of micronutrients as the world's best investment for development

Product Overview

- Pushtikona is a micronutrient powder containing 15 essential minerals and vitamins that improve nutritional value of complementary foods
- Developed by the Sprinkles Global Health Initiative to prevent & treat some micronutrient deficiencies among young children and other vulnerable groups at risk
- Recommended for children aged 6 months to 5 years
- Enables families to fortify many different foods at home
- Benefits include the prevention of anaemia due to iron deficiency, growth retardation due to zinc deficiency and gastrointestinal infections related to Vitamin A deficiency and of other nutrients



Sachet Composition

A single Sachet (1gm dry powder) of Pushtikona contains:

Vitamin A	0.4mg	Vitamin B_{12}	0.0009mg
Vitamin C	30mg	Folic Acid	0.15mg
Vitamin D	0.005mg	Iron	10mg
Vitamin E	5mg	Zinc	4.1mg
Vitamin B_1	0.5mg	Copper	0.56mg
Vitamin B_2	0.5mg	Selenium	0.017mg
Niacin	6mg	Iodine	0.09mg
Pyridoxine	0.5mg		

Functions of Vitamins & Minerals

Vitamin A
- For new cell growth, healthy skin, hair, and tissues
- Prevents eye problems and improves vision in dim light

Vitamin C
- For healthy bones, teeth, gums, blood vessels
- Improves iron and calcium absorption
- Aids in wound healing and brain function

Vitamin D
- Promotes absorption and use of calcium and phosphate for healthy bones and teeth

Vitamin E
- Protects red blood cells and helps prevent destruction of vitamin A and C

Vitamin B_1
- For energy metabolism and proper functioning of nervous system

Vitamin B_2
- For energy metabolism and building tissue
- Helps maintain good vision

Vitamin B_3
- For energy metabolism, proper digestion and healthy nervous system

Vitamin B_6
- For normal brain and nerve function
- Helps break down proteins and make red blood cells

Vitamin B_{12}
- For building proteins and red blood cells
- Important for nerve cell function

Iron
- Needed for the formation of hemoglobin, which carries oxygen from the lungs to throughout the body cells

Zinc
- For cell reproduction, tissue growth & repair

Folic Acid
- Promotes normal digestion
- Essential for development of red blood cells

Copper
- For synthesis of hemoglobin, proper iron metabolism and maintenance of blood vessels

Selenium
- Strengthens the immune system by aiding in the production of antibodies

Iodine
- Regulates the rate of energy production and body weight and promotes proper growth
- Improves mental functioning
- Promotes healthy hair, nails, skin, and teeth

Recommended Use

- One sachet a day will provide WHO recommended daily intake of 15 micronutrients
- A child must be given minimum of 60 sachets over 60-120 days to prevent anaemia for at least the next 6 months. A dose of 60 sachets should be repeated every 6 months until a variety of mixed foods (containing iron and other micronutrients) are being eaten

Timing & Duration:

Child's age:	*Ideal age for Pushtikona*
0 – 6 months	7 months – 5 years
• **Exclusively breastfed** • No complementary foods or supplements	• Breast milk + complementary foods + Pushtikona • Dosage = one sachet per day per child • Single sachet of Pushtikona provides daily dose of 10mg Iron recommended by WHO