Maternal Nutrition for lasting health

From pre-pregnancy to lactation
Pregnant and breast-feeding women have special nutritional needs

Maternal Nutrition before, during and after pregnancy

A mother’s nutritional status at conception, during pregnancy and lactation, plays a key role in determining her health and well-being, as well as that of her child. So does the quality and quantity of her diet. What a mother eats is essential for her reproductive health and for the outcome of her pregnancy.

An infant’s optimal growth and development depends directly on its mother’s diet. Providing a nourishing diet for pregnant and lactating women therefore results in significantly better infant health outcomes. Recent evidence suggest that it may also reduce the risk of chronic diseases later in life. During pregnancy and breast-feeding, the recommended intakes for most nutrients increase. For example, a number of global recommendations for PUFAs have emerged including that of the FAO/WHO expert panel, suggesting a range of at least 200-300 mg of DHA per day.

Integrated vitamin and premix producer

Our global network, in combination with our uniform standards, allows us to deliver the same premium quality across all regions. Wherever you are, you can always be sure that you are sourcing the top products from the world’s leading producer of nutritional ingredients.

We ensure full traceability along our entire production chain. This runs from acceptance of incoming raw materials through final quality release to delivery to our customers. Careful facility design and quality programs mitigate the risk of cross-contamination during production. We guarantee that our ingredients and premixes are of the highest purity. You can rest assured that they all meet the following quality standards: GMP, HACCP, and ISO.

Quali®-Blends for Maternal Nutrition

DSM Nutritional Products leads the world in the manufacture and supply of micronutrient blends. We offer a complete portfolio of quality vitamins and nutritional ingredients with very high safety standards. We also provide custom-made blend formulations made to your requirements and those of consumers.

With strict control of our sources, we can be sure of what goes into our blends. You can be equally sure of what you will be getting in your own customized formula to meet the requirements of your market, your regulatory environment and the consumer trends of today and tomorrow.

References:

Quality for Life™

Quality for Life™ is a seal of excellence for our products. It is the mark of quality, reliability, traceability and sustainability. It means you are getting the very best ingredients, you know where they come from and you can rely on their safe source. It also symbolizes our commitment to our environment, our business partners, our people and the regulatory framework that governs our operations.

With the Quality for Life™ seal, we guarantee peace of mind for you and for your customers.
Operating at the forefront of nutritional science, DSM Nutritional Products can help you stay ahead of influential developments in Maternal Nutrition. We identify consumers’ concerns, understand their needs, and translate these into innovative marketing solutions.

Quality solutions for Maternal Nutrition

Preconception and the First Trimester
Adequate intake of long-chain polyunsaturated fatty acids LC-PUFAs, vitamins and minerals reduce the risk of nutritional insufficiencies / deficiencies. Additionally, they help to support hormonal balance, preparing the body for conception and a healthy pregnancy.

- Vitamins
- Minerals
- Choline
- LC-PUFAs

Pregnancy
Vitamins, in particular folic acid and vitamin D, minerals, choline, and LC-PUFAs, are essential for neurological development, eye health, to help build and maintain adequate bone mass, and support immune system development and function. They are also needed for energy metabolism.

- Vitamins
- LC-PUFAs
- Minerals
- Choline
- Taurine

Postpartum and Lactation
Nutrition is critically important during post-natal recovery, as well as when the mother is breastfeeding her newborn baby. An appropriate blend of nutrients ensures an appropriate supply of vitamins and minerals for both the mother and her growing baby. Extra calcium and vitamin D, for example, help prevent the depletion of maternal bone deposits, while DHA supports brain, eye and immune system development of the baby via breastmilk feeding.

- Vitamins
- Lutein and zeaxanthin
- Minerals
- LC-PUFAs
**Product applications**

Our premixes can be used in the following product applications to achieve a wide range of health benefits. Local legislation for ingredients, levels, and claims must be checked.

- Dietary supplements
- Milk in liquid form
- Milk in powdered form
- Cereals
- Beverages
- Bars
- Yoghurts
- Shakes
Even before a woman becomes pregnant, what she eats helps determine her reproductive health and, importantly, influences the healthy development of her infant. The time for the baby’s optimal nutrition therefore starts before conception.

For example, supplementation with folic acid and iron appears to exert a protective effect with respect to neural tube defects and anemia during the periconceptional period. Pre-pregnancy and prenatal weekly supplementation can prevent underlying deficiencies and favor better pregnancy outcomes.

Did you know?
Studies that looked at non-pregnant women who were supplied with a daily dose of ≥ 2,000 IU of vitamin D have shown that these amounts are safe and effective at achieving normal vitamin D levels that support a healthy pregnancy.

Preconception and the first trimester

Essentials for life
Even before a woman becomes pregnant, what she eats helps determine her reproductive health and, importantly, influences the healthy development of her infant. The time for the baby’s optimal nutrition therefore starts before conception.

For example, supplementation with folic acid and iron appears to exert a protective effect with respect to neural tube defects and anemia during the periconceptional period. Pre-pregnancy and prenatal weekly supplementation can prevent underlying deficiencies and favor better pregnancy outcomes.
Vitamins
Adequate intake of micronutrients such as vitamins (e.g., vitamins A, C, D, and K) are crucial for a healthy pregnancy. Vitamin D, for example, is essential for maintaining normal calcium metabolism. Importantly, it has been also linked with significantly higher rates of clinical pregnancy following an IVF (in vitro fertilization) embryo transfer.

In contrast, adverse health outcomes – such as pre-eclampsia, low birth weight, neonatal hypocalcemia, poor postnatal growth, and increased incidence of autoimmune diseases – have been linked to low vitamin D levels during pregnancy and infancy.

Taking extra vitamin B6 (also known as pyridoxine) may increase the likelihood of conception and decrease the risk of early pregnancy loss. It may also relieve queasiness for some pregnant women.

The beneficial role of folic acid in the growth of the baby during early pregnancy has been well established. Neural tube closure takes place during early embryogenesis. There is convincing evidence that folic acid supplementation from before conception to early pregnancy can decrease neural tube defects in infants. This is why many health organizations recommend routine folic acid supplementation of 400 micrograms per day for women who are trying to conceive, or are in the first trimester of pregnancy.

Minerals
A well-balanced blend of minerals (e.g., iron, calcium, magnesium, zinc, iodine, and copper) is important for growth and development. Calcium is also essential for the development and function of bones and other body parts and organs, including teeth, nerves, and the heart. Zinc, meanwhile, plays a role in ovulation and the menstrual cycle.

Iron
Iron affects the proper myelination of neurons and is a co-factor for a number of enzymes involved in neurotransmitter synthesis. Brain areas which are particularly important for cognition (including the cortex, hippocampus, and striatum) are especially sensitive to iron deficiency. Women of reproductive age are at risk of developing iron deficiency. Pregnant women suffering from iron-deficiency anemia are reported to have impaired immunity.

Choline
Choline has been identified as a required nutrient for membrane synthesis, methylation reactions, and neurotransmitter synthesis. It is also necessary for normal neural tube closure in early pregnancy.

LC-PUFAs
Increased preconception DHA and EPA intake improves embryo morphology and may positively supports the success of achieving pregnancy.

Did you know?
Early nutrition, beginning during pregnancy and extending throughout infancy and childhood, is well known to influence linear growth and mental development and immune health. The latest research has expanded the impact of early nutrition to affect long-term health and chronic diseases (such as cardiovascular diseases, allergies, autoimmune diseases, bone health, and obesity).

Current studies on early nutrition showed:
• a correlation between excessive weight gained during pregnancy and children’s increased risk of obesity; and
• that supplementing with LC-PUFAs during the last trimester of pregnancy can help reduce the risk of asthma later on.

References:
The major nutrient groups positively promote healthy growth and development. They replenish cells, support gastrointestinal and immune function, and ensure normal skeletal and brain development. Adapting vitamin D intake, for example, reduces a mother’s risk of low calcium levels and bone diseases. It also improves the vitamin D status of the fetus.

Pregnancy is a time when a woman most needs to ensure that her diet contains sufficient amounts of all nutrients, including essential fatty acids. LC-PUFAs such as DHA, for example, are necessary for the healthy development of the infant’s brain during pregnancy. Prenatal multimicronutrient supplementation has been associated with improvement in birth outcomes, e.g. birth weight.

Because we understand how crucial brain and immune system development is, we provide the full range of essential nutrients to fully supplement the needs of a mother and her infant.
Maternal Nutrition

Vitamins 18-21

B-complex vitamins are needed for the synthesis of several neurotransmitters. Vitamins C and B6 are necessary for synthesizing collagen and therefore support bone formation. Some research suggests that ascorbic acid – in the form of daily intake of 100 mg of vitamin C – plays an important role reducing urinary infections, improving the health of gestating women.

Severe maternal vitamin B12 deficiency, for example, may result in megaloblastic anemia, with subsequent outcomes including infertility and poor pregnancy. Antioxidant vitamins support the immune function and help reduce susceptibility to infections. Vitamin D deficiency is common in pregnant women and a lack of vitamins – especially vitamin D – can make infants vulnerable to rickets. It is essential for maintaining normal calcium metabolism. It also plays an important role in controlling cell proliferation and differentiation, immune responses, and insulin secretion.

Minerals 24-28

Iron is essential for normal brain development, supporting the synthesis of brain neurotransmitters, and thus communication among nerve cells (i.e., neurons).

Zinc is a component of a large number of metalloenzymes and is found in high concentrations within the brain. Copper is present in the brain as a key component of cytochrome-C oxidase and superoxide dismutase. Calcium is an essential mineral for bone development and bone formation. Magnesium, zinc, fluorine, and phosphorus are also essential minerals for healthy bones.

Choline 29,30

Existing data show that the majority of pregnant women are not achieving target choline intake levels. Choline is important during the perinatal period, especially for spinal cord and brain development. The nutrient choline is involved in normal memory function.

Taurine 31,32

Taurine is found in high concentrations in the newborn and neonatal brain. As a sulfur-containing amino acid, it is assumed to function as an endogenous antioxidant.

LC-PUFAs 22,23

LC-PUFAs form the basic components of cell membranes. They are transferred from mother to fetus in the womb via the placenta. Maintaining the lipid composition of neuronal and immune cell membranes is important for the proper functioning of the central nervous (CNS) and immune systems. Adequate intake of LC-PUFAs increases tissue fatty acid status and is important for fetal growth and development.

Did you know? 17

Seventy percent of the human brain develops during fetal life. The remaining 30% of development occurs during preschool years.

DSM’s nutritional solutions:

References:
If a mother’s intake of vitamins, minerals and LC-PUFAs is low, the breastfed baby can suffer a deficiency of these nutrients. This may compromise overall growth and development.

Although the immune system begins to develop in the womb, babies are born with a functionally immature immune system. Immune system function matures soon after birth and continues primarily through the first two years of life. Immunity is transferred to the fetus through the placenta during pregnancy and passive immunity is conferred to the baby via the intake of breast milk.

At DSM, we are mindful of how important it is for infants to have the capacity to be strong and healthy, resist harmful bacteria, provide resistance to infection and also to tolerate substances that are normally harmless and naturally exist in the environment.

Did you know? If a mother’s vitamin A intake is inadequate, her supply to the fetus will also be inadequate and her milk will be deficient of vitamin A. β-Carotene is a safe source of vitamin A during pregnancy and lactation. Having a sufficient intake of β-Carotene helps to improve and maintain adequate vitamin A status and to support appropriate physical growth and development.
Vitamins

During pregnancy and throughout the breastfeeding period, vitamin A has an important role in the healthy development of the fetus and the newborn. β-Carotene is a safe source of vitamin A. Vitamin A derivatives – retinoids – are involved in a complex signaling pathway which regulates gene expression. They are essential in the early development of several organs, including the hindbrain, spinal cord, heart, lung, and eye. Vitamin A is also important in maintaining the integrity of mucosal lining (barrier function) of other important organs, such as the gastrointestinal and respiratory tracts.

The mother is the major source of circulating 25-hydroxyvitamin D concentration in the young infant. Maternal vitamin D status is an important factor in determining the vitamin D status of the infant. Vitamin D also helps regulate and differentiate immune cells. It is therefore a crucial micronutrient for strengthening the immune system of both mother and infant.

Vitamin C is a powerful antioxidant. Along with vitamin E, it can neutralize harmful free radicals, and aid in the neutralization of pollutants and toxins. Importantly, vitamin C is also able to regenerate other antioxidants, such as vitamin E (the major lipid-soluble antioxidant in cell membranes) to its functional form. Vitamin C levels in maternal blood decrease during pregnancy, and the vitamin C content in breast milk depends on the mother’s daily vitamin C intake. Low levels of vitamin C in the blood are associated with a reduction in the ability of white blood cells to kill bacteria.

Lutein and Zeaxanthin (L&Z)

L&Z are the only two carotenoids found within the tissues of the eye. They are located within several areas of the eye (including the lens, retina, and photoreceptors). The highest concentration of L&Z to be found in the human body is within the inner layers of the central retina. Lutein is found in association with zeaxanthin; it is one of the major carotenoids present in breast milk and is derived exclusively from the mother’s diet. L&Z help prevent oxidative damage to the eye.

Protection of the developing retina by L&Z can contribute to the prevention of much of the ageing that occurs during early life. It is therefore assumed to retard the development of age-related diseases later in life.

Minerals

A well-balanced blend of minerals (e.g. iron, calcium, magnesium, zinc, iodine, and copper) is important to support the immune system.

LC-PUFAs

LC-PUFAs are used by the body to make the molecules that balance the inflammatory process, which is an important part of the immune response. Maternal intake of the omega-3 LC-PUFAs, particularly DHA, during pregnancy and lactation may be favorable for the mental development of children at later stages.

References:
DSM Nutritional Products

To find out more about our products, our Maternal Nutrition and applications, please visit www.dsm-maternalnutrition.com or www.quali-blends.com, send an email to maternal.nutrition@dsm.com, or contact your nearest DSM Nutritional Products office.

Europe
DSM Nutritional Products Europe Ltd.
P.O. Box 2676, 4002 Basel
Switzerland
Phone: +41 61 815 7777
Fax: +41 61 815 7860
Email: marketing.dnpe@dsm.com

Asia Pacific
DSM Nutritional Products Asia Pacific Pte Ltd.
2 Havelock Road #04-01
Singapore 059763
Phone: +65 6632 6500
Fax: +65 6632 6600
Email: marketing.dnppap@dsm.com

North America
DSM Nutritional Products, LLC
45 Waterview Boulevard, Parsippany, NJ 07054
United States of America
Phone: +1 800 526 0189
Fax: +1 973 257 8675
Email: hnh-marketing.dnpna@dsm.com

Latin America
DSM Produtos Nutricionais do Brasil Ltda.
Av. Engº Billings, 1729 Prédio 31
Jaguaré – São Paulo – SP – Brasil 05321-010
Phone: +55 11 3760 6402
Fax: +55 11 3760 6492
Email: america-latina.dnp@dsm.com

China
DSM (China) Ltd.
No. 476 Li Bing Road Zhangjiang High Tech Park
Pudong Area, Shanghai 201203
P. R. China
Phone: +86 21 6441 8188
Fax: +86 21 6441 8088
Email: china.vitamins@dsm.com

South Asia
DSM Nutritional Products India Pvt. Ltd.
Windsor House, 401 Fourth Floor, CST Road, Kalina,
Santa Cruz (E), Mumbai 400 098 India
Phone: +91 22 4034 9100/101
Fax: +91 22 4034 9199
Email: marketing.dnpia@dsm.com

For DSM, quality is a way of life. This is the core of Quality for Life™.

Quality for Life™ is the mark of quality, reliability and traceability. It means that DSM customers are getting the best nutrition & health ingredients, knowing the source on which they depend. Quality for Life™ means sustainability. It symbolizes our commitment to our environment, consumers, our business partners, our people and the regulatory framework that governs our operations.

With the Quality for Life™ seal, we guarantee peace of mind for you and for your customers.

www.qualityforlife.com

DISCLAIMER

Although DSM has used diligent care to ensure that the information provided herein is accurate and up to date, DSM makes no representation or warranty of the accuracy, reliability, or completeness of the information. This brochure only contains scientific and technical information for business to business use. Country or region-specific information should also be considered when labeling or advertising to final consumers. This publication does not constitute or provide scientific or medical advice, diagnosis, or treatment and is distributed without warranty of any kind, either expressly or implied. In no event shall DSM be liable for any damages arising from the reader’s reliance upon, or use of, these materials. The reader shall be solely responsible for any interpretation or use of the material contained herein. The content of this document is subject to change without further notice. Please contact your local DSM representative for more details. All trademarks listed in this brochure are either registered trademarks or trademarks of DSM in The Netherlands and/or other countries unless explicitly otherwise stated.