PLANT-BASED NUTRITION GUIDE FOR INFANTS AND TODDLERS

A practical guide to understanding the fundamentals of plant-rich diets, nutrition recommendations for stages of early childhood, and tips for transitioning your family to health-promoting diets.

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— *Intro*

This guide explains the fundamentals of plant-rich diets, nutrition recommendations for stages of childhood, and tips for transitioning your family to health-promoting diets.

The first 1,000 days: Why early nutrition matters

The first 1,000 days – the start of pregnancy until your child's second birthday – is critical for laying the foundation of good health. Your baby's brain and body grow more quickly during this period than at any other time in life. Health experts agreee that early nutrition influences health and development for years to come. Thus, ensuring babies get all the nutrients they need is essential.

What is a plant-based diet for infants & toddlers?

Breast milk or iron-fortified infant formula is recommended as the only source of nutrition for about the first six months, and it continues to be an important part of your baby's diet for the first years of life.(1-3)

After introducing solid foods, a plant-based diet consists mainly of whole, minimally-processed plant foods, including fruits, vegetables, grains, nut and seed butters, and legumes (e.g., beans, peas, lentils, soy). While some parents choose to not feed their babies animal products (e.g., meat, dairy, eggs, and fish), others may provide these foods occasionally.

Diets rich in whole plants support health

- Consuming whole plant foods provides numerous vitamins, minerals, fiber, and other critical nutrients often lacking in the typical Western diet (e.g., potassium).
- Plant-based diets may also lower intake of sodium, added sugars, saturated fats, and excessive calories while reducing the risk of developing obesity, diabetes, and heart disease in the future.(4)
- Eating plant-based meals also helps the environment by reducing greenhouse gases and preserving land and water resources.(5)

- Low/No Sodium
- No Cholesterol
- High in healthy, unsaturated fats
- High in vitamins, minerals, fiber
- Heart-protective and immune-boosting compounds
- Abundance of antioxidant and anti-inflammatory compounds

The Basics

Defining Plant-Rich

A plant-rich diet consists primarily of a variety of plant foods. In a vegan diet, animal products are excluded, and in a whole food plant-based diet, refined products (e.g., white flour, sugar, and highly-processed foods) are typically consumed in low amounts or are excluded.

Safety of Plant-Rich Diets

A well-planned, plant-rich diet can provide the nutrients needed for infants to grow and thrive. (6) Indeed, numerous studies have demonstrated that children consuming plant-based diets, including vegan diets, grow similarly to children on omnivorous diets. (7-11) Supplements, including vitamin B12 and vitamin D, are often needed.(6,12,13)

However, very restrictive diets (e.g., macrobiotic) can result in nutrient deficiencies and impaired growth in children. (14-16) Therefore, as with any diet, meals should contain a wide variety of foods to provide adequate calories and essential nutrients. It can be challenging to ensure that children get enough nutrients in their diets; thus, focusing on including foods rich in key nutrients, described herein, in their meals is important.

Components of Plant-Rich Diets

A plant-based meal focuses on a variety of plant foods, especially colorful fruits and vegetables, legumes (beans, lentils, soy), and whole grains.

Once foods are introduced, offering foods from each food group can help meet nutrient needs of infants and toddlers.

While some processed foods can be a part of a nutritious diet, particularly when fortified, many highly-processed foods are often higher in salt, added sugar, and calories and lower in nutrients and beneficial phytonutrients than whole, unprocessed, or minimally-processed foods.

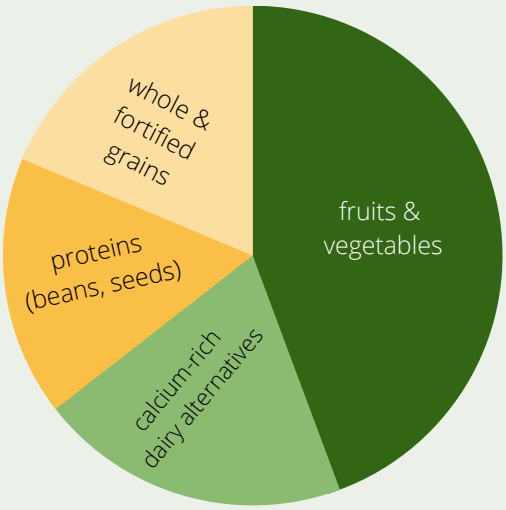


Chart based on (5)

Limit the amount of sodium provided to babies, including processed foods and salty snacks.
Avoid giving infants foods and beverages with added sugars because nutrient requirements are quite high relative to their size, and babies consume small amounts of foods. These foods can displace more nutritious foods.

Key Nutrients

As with any diet, a plant-based diet should provide adequate amounts of all essential nutrients and calories. Since most commercial infant formulas contain many of these nutrients, additional supplements may not be necessary for formula-fed babies during the first six months of life before introducing solid foods.

Food categories in a plant-based diet

Fruits

Fresh, frozen, canned, and 100% juice with no added sugar - fruits contain antioxidants, vitamins, potassium, and fiber. Choose 100% juice over juice "cocktails," and limit daily juice intake to ½ cup.

Vegetables

Fresh, frozen, canned - vegetables contain many nutrients, including fiber, vitamins, and minerals. Focus on serving many red, orange, and green vegetables.

Whole Grains

Whole grains and cereals, such as brown rice, whole wheat, oats, barley, quinoa, amaranth, buckwheat, and millet, are good sources of protein, fiber, B vitamins, selenium, and magnesium.

Legumes

Beans, lentils, soybeans, soy products (e.g., soymilk, tofu, tempeh), chickpeas, and peas - legumes are excellent protein sources. They also contain many other nutrients, such as fiber, iron, and zinc.

Nuts and Seeds

Ground and butters - nuts and seeds are good sources of healthy fats, protein, fiber, vitamins, and minerals (e.g., vitamin E, magnesium, selenium).

Fats

Ground flax and chia seeds; avocados; walnut, olive, canola, hemp, and other healthy plant oils enhance the absorption of fat-soluble nutrients and contribute vitamin E and omega-3 fats. Oils rich in monounsaturated fats include olive; oils rich in omega-3 fats include canola and flax.

KEY NUTRIENTS

These are the nutrients to pay particular attention to when consuming a plant-based diet. Ask your healthcare provider for advice before starting a new diet or giving your baby any supplements.

VITAMIN B12

Needed for brain and nervous system development and health and supports DNA and red blood cell production. **Irreversible nerve damage can occur with a B12 deficiency.**

Plant foods are not reliable sources of vitamin B12 unless they are fortified, which varies widely. **Therefore, a B12 supplement is usually needed if on a mostly or entirely plant-based diet.**

Foods with added vitamin B12 include some plant milks and yogurts, plant-based meat alternatives, cereals, and nutritional yeast (check labels)

CALCIUM

Calcium is involved in muscle contraction, blood clotting, and strengthens bones & teeth. Calcium requirements increase in the second year of life, and intake may be insufficient.(3) Offering a variety of calcium-rich and fortified foods can help meet calcium needs.

Food sources: tofu made with calcium, calcium-fortified plant milks and yogurts, tempeh, edamame,* dark leafy greens, calcium-enriched 100% juice, white beans,* some varieties of mineral water, breast milk, and infant formula

CHOLINE

Supports nerve cell health, cell communication, fat metabolism

Foods rich in choline: tofu, soy milk, broccoli,* cabbage,* peanut butter*, quinoa*, Brussels sprouts*

IODINE

Supports brain and nerve health; involved in growth and metabolism.

Iodine is necessary in the diet. Switching to iodized table salt (but not adding extra salt to the diet) can be a potential source of iodine for breastfeeding moms and toddlers who do not regularly consume dairy, eggs, seafood, or infant formula containing iodine.(3) Babies younger than 1 year should not consume added salt.

Sources: iodized salt, seaweed†, and some multivitamin supplements

OMEGA-3 FATS

Supports brain, eye, and nervous system health and development; has anti-inflammatory properties

Fortified foods and supplements containing omega-3 fats (e.g., EPA, DHA), such as those made from algae, may help increase amounts in breast milk and may be a source for babies. Ask your healthcare provider what is right for you before taking supplements.

Sources: Ground chia seeds,* flaxseeds,* hempseeds,*walnuts,* and their oils

VITAMIN D

Vitamin D works with calcium to form bones and teeth, & supports the immune system and cell growth.

The skin can produce vitamin D when exposed to sunlight. However, it is recommended to give vitamin D drops (400 IU) starting shortly after birth if breastfed.(1,3,17) Supplements may also be needed as children get older.(3,17)

Few foods contain vitamin D: Vitamin D-fortified foods (100% juice and plant milks), mushrooms exposed to UV light.

IRON

Critical for growth and development, energy production, and red blood cells that transport oxygen

Iron can be challenging to get from the diet, and breast milk is low in iron.(3) Thus, some babies may need a supplement.(1) Ask your healthcare provider what is right for your baby.

Foods: iron-fortified cereals and grain products, whole grains, beans,* lentils,* nuts and seeds,* nut and seed butters,* potatoes, dark green leafy vegetables

Pair iron-rich foods with vitamin C sources, such as citrus fruits and tomatoes, for better absorption. Soaking (discard soaking water), sprouting (cook before eating), fermenting, cooking, roasting, and baking can help improve iron absorption.

ZINC

Supports tissue growth and function, immune function, wound healing, and vitamin A transport

Food sources: zinc-fortified cereals, fortified and whole grains, beans,* soy, peas,* nuts and seeds,* nut and seed butters*

Sprouting beans, chickpeas, and lentils helps increase zinc absorption. Cook sprouted foods before eating to reduce the risk of foodborne illness.

*Caution: may be choking hazards. See also "Helpful tips."
† Caution some types of seaweed contain iodine levels that exceed recommendations

Breast milk & Infant formula

Breast milk provides an optimal source of nutrition for growing babies, and contains immune-supporting compounds not always found in infant formula. Breastfed babies are less likely to develop allergies, infections, and certain illnesses. (1,18,19) Whenever possible, breastfeeding exclusively (no additional formula, food, or water) is recommended for the first six months of a baby's life. (1-3,19) After starting solid foods, it is recommended to partially breastfeed for the first two years of life and beyond if you and your baby would like.(2,19)

However, many women may be unable to produce a full milk supply, may be unable to pump and store milk safely due to family or workplace challenges, or may choose not to breastfeed. Breast milk may also be unavailable, as in the case of adoption. When human milk is unavailable, babies should be given iron-fortified infant formula, designed to meet the needs of growing infants.

Babies should not be given homemade formula, cow's milk, or plant milk to substitute for commercial infant formula because these do not provide the nutrients required for infants to grow and develop.

Most commercial infant formulas are based on cow's milk or soy and contain added oils, vitamins, minerals, and other nutrients required for growing babies. Soy-based formula is safe for most babies (e.g., except for premature infants or hypothyroidism). Specialty formulas (e.g., high-calorie formulas for premature babies) are also available.

Consult your healthcare provider about what is suitable for your baby. See the "Resources" section for information on breastfeeding support services, safely preparing and handling formula and breast milk, and knowing when an infant is hungry or full.

Breastfeeding can be challenging, and many new moms benefit from the support of a lactation coach, their family, and other moms.

Your child's taste preferences and eating behaviors form in the first few years of life. This allows you to influence their healthy eating habits!

Introducing Solids

The key is to offer a wide variety of plant-based foods to introduce your baby to various tastes, textures, and colors. Your baby may take ten or more exposures to accept a new food.(3) Offering a food many times, especially vegetables, can help them develop a healthy diet.

Around six months of age is a good time to begin introducing solid foods. Iron-rich foods, such as legumes (e.g., lentils, green peas, beans) and iron-fortified infant cereals, are necessary at this age to prevent iron deficiency anemia. [3] Adding strained or pureed vegetables or fruits can enhance flavor, texture, and vitamin C intake, which is important for iron absorption. Zinc-rich foods (whole grains, legumes) are also necessary at this time, particularly for breastfed babies. [3]

At around 7 to 9 months of age, your baby can graduate to mashed and lumpy foods to experience different textures as they develop more chewing and swallowing skills. Offering finger foods – including sliced avocado, sliced pieces of soft fruit, and small cooked noodles – is a great way to encourage your baby to feed themselves.

Continue to offer breast milk or infant formula as it is an important source of nutrition for your baby's first year of life. Babies can be weaned from infant formula or breast milk to calcium-fortified soy milk after one year if desired. Focus on getting foods with key nutrients into meals (see preceding table) since it's challenging to get adequate amounts of these nutrients into tiny tummies.

For more information on child development stages and infant feeding, see the "Resources" section.

Transitioning to familiy foods

1 to 2 years old
Between the first and second year, your growing toddler will develop and practice important skills, such as drinking from a cup, using a spoon, and finger feeding. Around their second birthday, they will be able to enjoy most of the same foods as the rest of the family. Continue offering a healthy variety of plant-based foods that are good sources of the key nutrients described herein.

A plant-based diet is naturally high in fiber, which can be very filling for a toddler's tiny tummy. Offering a mix of refined and whole grains and focusing on nutrient-rich foods, such as avocados, tofu, and spreads made from beans and lentils, will ensure that your toddler gets all the calories they need. A plant-based diet that is diverse in many types of food from various food groups is necessary to meet nutritional requirements.

Meeting nutrition needs using food groups

Meeting nutritional requirements requires a diet that is diverse in many types of food from various food groups. Since food comes in multiple shapes, volumes, and densities, **it can take different amounts of food to get enough nutrients from each group.**

For example, **one tablespoon of peanut butter** provides the same amount of protein as **¼ cup (four tablespoons) of beans** because peanut butter is more densely packed.

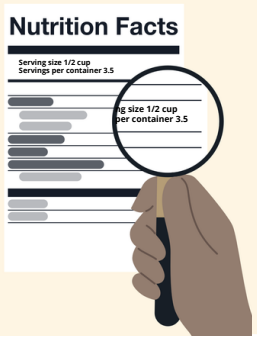
The term "ounce-equivalents" is used to compare the nutritional value of foods. In other cases, such as with fruits and vegetables, the term "cup-equivalents" is used to compare foods.

Amount of food to meet the nutritional needs of children ages 1 to 2 years who no longer receive breast milk or formula.(3)

Food Group	Ounce- or cup-equivalent	Amount equal to to 1-ounce or 1-cup equivalent
Whole grains *At least half should be whole grains. Choose iron- & zinc-fortified when using refined grains.*	**1.75 - 3**	1 slice (30 g) of bread, tortilla, or flatbread ½ cup (70 g) cooked pasta, rice, or cereal 1 oz. (30 g) dried pasta or rice 1 oz. (30 g) ready-to-eat cereal 1 cup (50 g) flaked cereal
Protein *Include a wide variety of plant foods to obtain all of the necessary essential amino acids.*	**1 - 2**	¼ cup (50 g) cooked beans or tofu* ½ oz. (15 g) nuts or seeds* 1 Tbsp (15 g) nut/seed butters* 1 oz. (30 g) tempeh* 1 oz. (30 g) plant-based meat alternatives* 6 Tbsp (90 g) hummus
Calcium-enriched soy milk/ products	**1.5 - 2**	1 cup (250 mL) fortified soy milk 1 cup (170 g) of fortified soy yogurt *Check labels for added calcium and other ingredients (e.g., sugar content)*
Vegetables *Focus on red, orange, and dark green vegetables.*	**1**	1 cup (250 mL) raw,* cooked, or juiced 2 cups (70 g) leafy greens ½ cup (80 g) dried*
Fruits *Focus on whole fruit, and limit juice to ½ cup per day.*	**0.5 - 1**	1 medium fruit* 1 cup (160 g) raw fruit* 1 cup (250 mL) fruit juice ½ cup (80 g) dried fruit*
Plant oils/fats	**0.5 -1 Tablespoon**	1 Tbsp (15 mL) plant oil (e.g., olive, canola) or margarine; many other foods, such as avocados, nuts, and seeds, also provide healthy fats.

The amounts shown are general estimates using data taken from the Dietary Guidelines for Americans (3) (DGA) for a Healthy Vegetarian Dietary Pattern for babies 1 to 2 years old. Legumes were transferred from the vegetable to the protein food group and values may be rounded. Grams of oil were converted to tablespoons to simplify. MyPlate.gov also was used to expand equivalent foods for each group. *Caution some foods may be choking hazards. See the "Helpful tips" section for more information.

Note that a serving may be smaller or larger than an "ounce- or cup-equivalent," and the amounts listed in the following table do not necessarily need to be consumed in one meal. The goal is to include them as part of the total foods eaten in a day.



Helpful tips for feeding babies

Babies have tiny tummies.

Get the good stuff in first, particularly foods rich in key nutrients.

Starting at around 6 months, offer a variety of foods and textures that are appropriate for a baby's ability to chew and swallow.

Avoid sweets, salty snacks, and fried foods until your child's first birthday. After 1 year, only offer these foods occasionally.

Healthy fats are necessary for proper brain development and should not be restricted in the first two years of life. When preparing meals, include foods with healthy fats, such as avocados, canola and olive oil, and nut and seed butters.
(Caution may be choking hazards; see below.)

Prepare food in a way that a baby can safely chew and swallow (e.g., mash, cut, purree, apply sticky ingredients thinly to other foods, or make into sauces.)

Babies under 1 year should not be given cow's milk, honey, unpasteurized milk (or cheese made from it), or unpasteurized juice. (3)

To minimize the risk of choking, avoid giving your baby:

- Popcorn
- Raisins
- Hard vegetables or fruits
- Cooked or raw whole corn
- Uncut small tomatoes, grapes, or berries
- Whole or chopped nuts and seeds
- Pieces of hot dogs or plant-based alternatives
- Chunks or spoonfuls of nut or seed butters or other sticky foods

Avoid sweets, salty snacks, and fried foods until your child's first birthday. After 1 year, only offer these foods occasionally.

To prevent cavities, limit the length of time sugars from juices and other sugary or carbohydrate-rich foods (e.g., milk, formula) remain on teeth (e.g., avoid prolonged sippy cup or bottle use, including at bedtime).

Babies over 1 year can be given fruit juice, but limit the amount to ½ cup per day. Make sure to offer 100% juice instead of sugary drinks.

Potential allergens, including peanuts, tree nuts, soy, and wheat, should be introduced one at a time starting around when other solid foods have been introduced and are well tolerated. [3] Talk to your doctor about this process, especially if there is an egg allergy, eczema, asthma, or other signs of potential allergies before starting new foods. [3]

To increase iron and zinc absorption, cook with cast iron, pair foods high in vitamin C with iron-rich foods, and sprout beans and other pulses. Be sure to cook sprouts before giving them to babies to reduce the risk of foodborne illnesses.

Babies born prematurely or with health issues often have special nutritional needs. Speak with your healthcare provider to develop an individualized plan for your child.

Daily recommended intakes for key nutrients. (3,20)

Nutrient | Unit	**6 - 11 months**	**12 - 24 months**
B12 | mcg	0.5	0.9
Calcium | mg	260	700
Choline | mg	150	200
Vitamin D | IU	400	600
Iodine | mcg	130	90
Iron | mg	11	7
Omega-3 fats | g from all types	0.5	0.7
Zinc | mg	3	3

Breast milk and infant formula make up most of the entire diet from birth to 6 months; thus, values are not reported for this age group.

Resources

Visit **NutritionforFamilies.org** for more information on:

- Breastfeeding
- Safely storing and handling breast milk and infant formula
- Cleaning and sanitizing bottles and other infant feeding items
- Infant growth and development stages, including when they are ready for solid foods
- Signs your child is hungry or full
- Reducing the risk of choking at mealtimes
- Food portion sizes and serving sizes for children
- Personalized food group recommendations to meet nutritional needs based on age, weight, gender, and other variables
- Organizations we trust for nutrition and health advice
- Plant-based books and other resources
- Nutrient Library with detailed information on key nutrients

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