

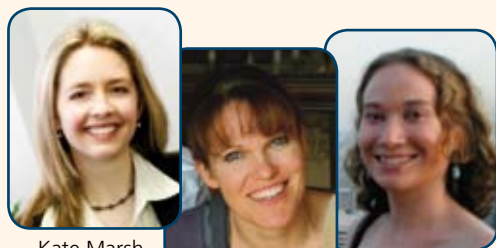
Editorial

Most babies are vegetarian until around 7 months of age, as meat is rarely introduced before then. After this time, the parental decision to follow a vegetarian eating pattern may be because of religious beliefs, environmental concerns, animal rights or health issues, cultural issues or financial reasons. While vegetarian diets are generally healthy, the diets of vegetarian infants and young children need careful planning to ensure they obtain the energy and nutrients required for optimum growth and development. Health professionals need to be familiar with the potential nutrient deficiencies associated with vegetarian eating so they can help parents meet their child's nutritional needs. In this issue of HeinzSight, dietitians with an interest in vegetarian eating discuss healthy vegetarian eating for infants and young children.

Penelope Stone APD
Consultant Dietitian / Nutritionist
Heinz Infant Feeding Advisory Service

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Kate Marsh

Carol Zeuschner

Rebecca Prior

Kate Marsh is an Advanced Accredited Practising Dietitian (APD) working in private practice in Sydney with a particular interest in vegetarian nutrition.

Carol Zeuschner is an APD with an interest in vegetarian nutrition and is the Nutrition & Dietetics Manager at the Sydney Adventist Hospital.

Rebecca Prior is an APD and at the time of writing this article was working as a clinical dietitian at Sydney Adventist Hospital. She is currently working in the UK.

Healthy Vegetarian Eating for Infants and Young Children

A vegetarian diet can provide all of the nutrients required for good health, growth and development of infants and young children. While there are many types of vegetarian diets (see Table 1), a well planned vegetarian diet emphasising a variety of plant foods and including some milk and eggs can satisfy all nutritional needs.

Nutritional adequacy of breast milk from vegetarian mums

Breastmilk is the ideal food for nearly all infants but its composition can vary with maternal diet. The breastmilk of

vegetarian mothers is generally nutritionally adequate, however mothers following a vegan or macrobiotic diet often have breast milk which is low in vitamin B12 (1). Vegan diets must include vitamin B12 fortified foods such as fortified soy milk or meat analogues (some vegetarian burgers, vegetarian sausages and slices), or include a B12 supplement. Tempeh, miso and seaweed are not reliable sources of vitamin B12. Lacto-ovo vegetarians obtain vitamin B12 from dairy foods and/or eggs.

If an infant is not breast fed, a commercial infant formula must be used. Soy infant formula is the only choice for ovo-vegetarian and vegan infants not breast fed.

Table 1. Types of Vegetarian Diets.

Vegetarian Diet	Excludes	Includes
Lacto-ovo vegetarian	Meat, poultry, fish	Dairy foods, eggs, plant foods
Ovo-vegetarian	Meat, poultry, fish, dairy	Eggs and plant foods
Vegan	All animal derived foods	Only plant foods
Macrobiotic	All animal foods	Wholegrain cereals supplemented with locally grown fruits, vegetables, seaweed

Growth differences

Growth is faster during the first six months of life than at any other time in the life cycle. During this time an infant's weight generally doubles (2). Breast-fed infants of vegetarians thrive in early infancy and then often grow at a slightly slower rate. One reason for this may be that vegetarian mothers are more likely to breast feed and breast-fed infants grow more slowly than formula fed infants (3).

Introducing solids – first foods

Exclusive breastfeeding is recommended for the first 6 months. Guidelines for introducing solids are similar to non-vegetarian children with solids introduced at around 6 months when the infant shows signs of readiness. Iron fortified infant rice cereal such as Heinz® Organic Rice or Farex® Rice Cereal is introduced first followed by pureed fruits and vegetables. Breastmilk or infant formula at this stage is always given before solids. One new food should be trialled for up to a week before introducing another new food.



7-9 months

Breastmilk or infant formula should be given after solids. Mashed/minced legumes or beans, tofu and cooked egg yolk can be introduced along with dairy (or soy) foods such as yoghurts, custard, ricotta and cottage cheese. Iron fortified infant mixed cereals with wheat and other grains, couscous, pasta and rice can also be introduced. At 8-9 months of age, cows milk and fortified soy milk may be used in the preparation of cereals and other recipes. However they should not be offered as a main drink until the age of 12 months.

9-12 months

By 9 months babies will be having 'finger foods' such as sandwich fingers, bite size pieces of soy burger, soy cheese or tofu and should be drinking from a cup rather than a bottle. A starchy food such as cereal, potato, pasta or bread, should be included with a protein food such as legumes, dairy, or whole egg (provided there is no allergy), along with some fruit or vegetables at each meal.

12 months and beyond

Many vegetarian mothers continue to breast feed beyond 12 months. However at 12 months, whole cows milk or full fat fortified soy milk (containing calcium and Vitamin B12) can replace breast milk or infant formula. Vegan children will need a full fat fortified soy milk. Rice, oat and other cereal based milks are not recommended for children under 5 years of age as they are too low in protein and do not contain many other nutrients that children need for optimal growth and development (4). Low fat milks must not be used until after 2 years of age and skim milks not till after 5 years of age. After 12 months, most children are eating family foods.

Nut pastes and nut spreads are nutritious foods for vegetarian children. However, for the small number of children who are at high risk of food allergy or who already have an existing food allergy or sensitivity, it has been common clinical practice to recommend avoiding nut pastes and spreads till age 2-4 years because they are potentially allergenic. While the evidence is not strong that delaying their introduction will protect the developing immune system in these children, avoiding nuts till this age is unlikely to cause any harm (5).

Nutrients of Interest for Vegetarian Infants and Young Children

Calcium

An adequate calcium intake is essential for bone health. Dairy products are good sources of calcium for lacto-ovo vegetarians.

However for families following a vegan diet or those avoiding dairy foods, greater attention to dietary intake is required. Check labels to ensure that soy milk, custard or yoghurt is fortified with calcium. Other foods such as soybeans, tofu set with calcium sulphate and Asian greens (eg. bok choy) can contribute smaller, but important amounts of calcium to vegetarian diets. While some nuts (such as almonds and brazil nuts) are good sources of calcium, caution is recommended as they are an allergy and choking risk.

Vitamin B12

Vitamin B12 is not naturally found in plant foods. If detected in plant foods, it is likely to be an inactive analogue which is of no use to the body and can interfere with the absorption of the active form of the vitamin (6). Vegans need to consume foods fortified with vitamin B12 (sometimes called cyanocobalamin on food labels) such as some soy milks, meat analogues (some vegetarian burgers, vegetarian sausages and slices), or take a vitamin B12 supplement (1,2). Soy milk does not naturally contain vitamin B12, and while many brands of soy milk are now fortified with calcium, very few brands have B12 added (Sanitarium® So Good is currently the only Australian brand with added vitamin B12). Children following a vegan diet, who do not consume foods with added vitamin B12 **must have a B12 supplement from a reputable source** (such as *Blackmores, Natures Own or Thompson's*).

Iron

Research has shown that while vegetarians often have lower iron stores, they are no more likely to suffer from iron deficiency anaemia than non-vegetarians (6,7,8). Adding vitamin C-rich foods at the same meal as foods containing iron can increase non-haem iron absorption in the body by at least two to three times. Good combinations of iron-rich and vitamin C-rich foods are wholemeal spaghetti with tomato sauce, iron-fortified cereals and orange juice, or mashed baked beans with tomato sauce.

Iodine

In Australia and New Zealand, there is some concern that iodine levels in the soil are declining (9,10). Most plant foods are low in iodine, a result of the low/variable iodine content of our soils and water supplies. Vegans are at high risk of iodine deficiency and vegan families should be encouraged to use iodised salt in cooking or include sea vegetables (kelp or nori) on a regular basis to ensure adequate iodine status. Other plant sources of iodine such as pineapple, raisins, seaweed, green capsicum and spinach may assist with adequate iodine intake.

Omega-3 Fatty Acids

A number of studies have found lower levels of the longer chain polyunsaturated fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in vegetarians, particularly those following a vegan diet (11,12). The best source of these fatty acids is oily fish such as salmon and sardines. Vegetarian families can optimise their omega-3 fatty acid status by (13):-

1. Maximising the conversion of alpha linolenic acid (ALA) to EPA and DHA
 - ensuring a balanced diet with sufficient energy and protein derived from a wide variety of plant foods
 - avoiding trans fatty acids
 - limiting alcohol intake
 - avoiding excess omega-6 fatty acids (eg sunflower oil, safflower oil, grapeseed oil and margarines made from these oils)
 - including linseeds and canola oil, walnuts and pecans which are sources of ALA.
2. Provide a direct source of EPA and DHA.
 - As the primary sources of EPA and DHA are fish and seafood this is a challenge for vegetarians. Eggs will provide some DHA with more in omega-rich eggs. Supplements of DHA (derived from microalgae) are available.

Table 2. Requirements and sources of important nutrients in an infant and young child's diet.

Nutrient	How much is needed daily (14)	Vegetarian food sources	Quantity of nutrient per serve (15)
Iron	0-6 months – 0.2mg 7-12 months – 7mg 1-3 years – 9mg	Small can (130g) baked beans	2.1mg
		100g cooked broccoli	0.8mg
		Iron fortified infant rice cereal (5g dry weight)	1.0mg ❖
		Iron fortified infant mixed cereal (15g dry weight)	3.1mg ❖
		1 egg (50g)	0.8mg
		80g canned soybeans	1.4mg
Calcium	0-6 months – 210mg 7-12 months – 270mg 1-3 years – 500mg	200g yoghurt	340mg
		20g cheese	143mg
		1 cup milk	292mg
		80g cooked soybeans	42mg
Omega-3	No NRVs for < 12months 1-3 years - 40mg/day	10g canola oil	1.0g ✱
		10g soybean oil	0.8g ✱
		10g Flaxseed oil	5.5g ✱
		Tofu (75g)	26mg
		50g egg	137mg
Vitamin B12	0-6 months – 0.4ug 7-12 months – 0.5ug 1-3 years – 0.9ug	Sanitarium Original soy sausage (60g)	0.9ug †
		Milk, 250ml	1.0ug
		Sanitarium regular soymilk, 250ml	1.0ug †
		Whole egg, 50g	0.6ug
		Cheddar cheese, 30g	0.3ug
		Toddler Milk (230ml)	0.5ug ❖

NRV's = Nutrient Reference Values

✱ Ogilvie D. *Dietary omega-3 fatty acids: Are they "essential"?* <http://www.vnv.org.au/Nutrition/Omega3.htm>

† Sanitarium product label

❖ Heinz product label

Protein complementation

Some experts still believe there is an advantage in combining proteins for young children even though this principal is no longer recognised for adults. This is because children have much higher needs for specific amino acids (2). However, it is not necessary to measure foods and analyse each meal for protein complementation. Most children will consume some type of grain (bread, cereal, rice, pasta) at most meals and snacks. If that meal also includes a legume (soybeans, tahini or lentils), nuts or seeds (such as peanut butter) or dairy products, a child is receiving complementary proteins.

Plant sources of protein include legumes (baked beans, lentils, chickpeas), nuts, and most soy products such as soy milk, soy yoghurt, tofu, tempeh, soy burgers and soy fillets. Grains and vegetables also contain protein, but in smaller amounts.

Too much fibre? Too much bulk?

A vegetarian diet can be very high in fibre and satisfy a child before energy and nutrient needs are met.

The *Age Plus 5 rule* is used to estimate the daily fibre needs of children from age 2 to 18 years (16). Using this rule a 2 year old requires 7 grams of fibre per day while a 5 year old, 10g.

Bran should never be added to an infant's diet (6). Using a mix of white and wholemeal breads and white and brown rice and pasta will help reduce fibre load. Peeling fruit and vegetables and alternating canned or stewed fruits with fresh will also cut back on fibre.

Conclusion

There is now a significant amount of research demonstrating the health benefits of a vegetarian diet, particularly in the prevention of chronic disease. While potentially lower in some nutrients, a well-planned vegetarian diet can easily meet the nutritional needs of infants and children as well as maximising the intake of protective components widely available in plant foods.

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Small Talk



1. Obesity in childhood as a predictor of obesity in adults.

Do overweight and obese children become overweight and obese adults? Can healthy weight children become overweight adults? A recent study¹ followed up 4571 children who had participated in the 1985 Australian Schools Health and Fitness Survey when aged 7-15 years. The children now aged

between 24-34 years were asked about their current height and weight. While these were measured in the 1985 survey, a self reported questionnaire was used for the follow up study.

In 1985 the prevalence of overweight and obesity was 8.3% and 1.5% in boys and 9.7% and 1.4% in girls. The follow up findings revealed 40% and 13% of men and 19.7% and 11.7% of women were overweight and obese. Obesity in childhood was shown to be very predictive of obesity in adulthood. Of concern was the number of healthy weight children, 50% of boys and more than 25% of girls, who became overweight or obese as adults. This study reminds us that adolescence, not just childhood, is also a trigger for the beginning of overweight and obesity.

2. The effects of iodine fortification of bread on the iodine status of pregnant women in Tasmania.

Food Standards Australia New Zealand (FSANZ) is currently considering the mandatory fortification of certain foods with iodine as a way of alleviating the recent re-emergence of mild to moderate iodine deficiency in children, pregnant and postpartum women. One option is the mandatory addition of iodised salt to bread, breakfast cereals and biscuits². Mild iodine deficiency is linked to maternal goitre and decreased intellectual function in children³.

Tasmania has a well documented history of iodine deficiency. To increase iodine intake the State Government introduced the iodine supplementation program, which requires that bread be produced using iodised salt. A recent study³ investigating the effect of iodine fortification in bread on the iodine status

of pregnant women found no significant difference between the mean urinary iodine concentration pre fortification (2000-2001) and post fortification (2003-2006). This indicated that bread fortified with iodine is not a suitable vehicle to increase the iodine status of pregnant women. One possible reason is that pregnant women do not eat enough bread to obtain any benefit. The authors suggest all salt used in foods be fortified with iodine. Until this occurs, they recommend that pregnant and lactating women and those wanting to become pregnant take an iodine supplement of 150ug daily.

3. Allergen Information Cards

The Australia New Zealand Food Standard Code requires all foods, food ingredients, or components of an ingredient that can cause an allergic reaction be declared on the food label. To further assist those with allergies, Anaphylaxis Australia in conjunction with Food Standards Australia New Zealand (FSANZ) and the NSW Food Authority has produced a series of easy to read and easy to carry allergen information cards. These cards list the ingredients in foods which are derived from the common food allergens such as egg, soy, wheat, peanuts, sesame, tree nuts, fish, shellfish and milk. The cards can be ordered from Anaphylaxis Australia at coordinator@allergyfacts.org.au or downloaded from: www.foodstandards.gov.au/newsroom/publications/allergencards

4. Healthy Family Cookbook

Nutritionist Catherine Saxelby has teamed with home economist Jennene Plummer to produce **Zest- the Nutrition for Life Cookbook**, (Hardie Grant Publishers, RRP \$34.95) This book puts into practise the latest nutrition recommendations to assist families with shopping and cooking healthy meals at home. There are over 120 quick and easy to prepare recipes using fresh wholesome ingredients. Recipes are flagged low fat, high fibre, low GI, low salt and gluten free. Information is given on portion sizes, adapting recipes, beverage guidelines and shopping lists. It's a welcome addition for families looking for healthy food ideas and those trying to tempt fussy eaters with more interesting foods.

Penelope Stone
Editor

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Heinz Update



New Heinz Infant/Toddler Recipe Book

I am thrilled to launch our fabulous new recipe book, a brand new version of our most loved HIFAS resource!

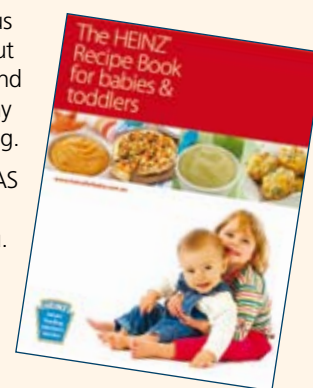
What to feed and how much are the most pressing questions that mums face everyday and this new recipe book provides them with some answers. It features recipes that every parent and

carer can prepare and cook, from how to mix baby's very first rice cereal to savoury lamb with sweet potato and lentils. All the recipes have been developed and tested by our home economists,

so we know they work, are delicious and nutritious. Scattered throughout the book are also helpful feeding and nutrition tips to encourage a healthy start to life and healthy family eating.

For copies, please contact your HIFAS representative or check out our website www.heinzforbaby.com.au.

Heather Ferguson APD
Dietitian/Nutritionist
HJ Heinz Co. Australia Ltd



The Heinz Product Info Line 1800 633 333 provides information to callers on Heinz Baby Food products.

All callers are asked to contact the child health service in their state or territory for individual advice.

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