



The Role of Avocados in Complementary and Transitional Feeding*

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A publication, *The Role of Avocados in Complementary and Transitional Feeding*, funded by the Hass Avocado Board (HAB) and published in *Nutrients*¹, reports that the avocado, with its smooth texture, neutral flavor and nutrient-rich profile, appears to be one of the most ideal fruits—and possibly foods—for complementary and transitional feeding. This review, which includes more than 100 studies comprised of emerging and conclusive research, examined evidence for key nutrients and their food sources on potential early- and later-life health benefits, and explored the effects of consuming monounsaturated fatty acids and bioactive compounds for children 6-24 months of age.

KEY FINDINGS SUGGEST IDEAL COMPLEMENTARY AND TRANSITIONAL FOODS

As the review suggests, ideal complementary (6-12 months) and transitional (13-24 months) foods should have specific physical and nutritional attributes to encourage toddlers to develop familiarity and taste preferences.

NEUTRAL FLAVOR PROFILE:

In order to establish a varied eating pattern – which includes neutral, sour, and bitter taste acceptance – the ideal initial foods should be those that are both nutritious and have a low to moderate sweet and salty flavor profile.

Avocados have a mild, neutral flavor that is neither sweet, bitter, nor salty.

NUTRIENT DENSITY:

The first food exposures should meet the infant's or toddler's high nutritional requirements for energy, certain fatty acids, and key vitamins and minerals, such as vitamin A/provitamin A carotenoids, several B vitamins, iodine, iron, and zinc.

Avocados are a nutrient dense fruit that contain several key nutrients for infant health and development including fiber, unsaturated fatty acids, more than 20 vitamins and minerals and array of phytonutrients.

PROPER TEXTURE/CONSISTENCY:

It is important to provide a variety of soft textures – such as creamy, lumpy, tender, pureed, mashed or ground – in order to prevent choking and properly develop swallowing abilities.

Avocados have a smooth consistency and texture that is ideal as an early food for infants and toddlers. Avocados can be pureed, mashed, sliced or cubed as the infant or toddler develops.



FRUITS AND VEGETABLES:

Early Exposure Can Lead to Lifelong Benefits

Fruit and vegetable intake in children of all ages remains below recommendations in most countries worldwide. Observational studies have demonstrated later health benefits of early nutrition choices when infants consumed higher amounts of fruits and/or vegetables, such as better body weights,² lower blood pressure,³ lower risk of stroke⁴ and some cancers⁵ as well as overall higher fruit and vegetable intake.⁶

Avocados can be introduced in the early feeding stages as a low-sugar fruit option that can help avoid invoking an early preference for sweet foods, which may influence eating behavior over time.



MACRONUTRIENTS:

Amount and Specific Structural/Functional Characteristics are Key for Infant and Toddler Health

DIETARY FAT:

In infancy, research suggests fat should comprise about 50% of energy intake in order to provide adequate energy for rapid growth and the essential fatty acids for brain development. Specifically, monounsaturated fat (MUFA), such as oleic acid, has been shown to be important for normal growth and development of the central nervous system and brain, as well as beneficial for fat-soluble nutrient absorption; and, the Joint FAO/WHO Expert Consultation on Fats and Fatty Acids in Human Nutrition suggests that as little as 3-4.5% of total energy intake from linoleic acid (polyunsaturated fat [PUFA]) is associated with optimal growth and development for infants and toddlers.

A 50 g (1/3 medium fruit) serving of avocado contains approximately 5 g of MUFA and approximately 1 g of the PUFA linoleic acid (18:2n-6), which comprises roughly 10 - 15% of the fatty acid content in avocados.

FIBER:

Currently, there is no infant adequate intake (AI) established for fiber, but the American Academy of Pediatrics suggests roughly 5 g/d by the end of the first year. However, a prospectus study on children ranging from 8 months to 9 years suggests fiber intakes of about 4 g/d in infants at 8 months and 7 g/d in infants at 13 months of age were positively associated with energy intake and weight gain. Additionally, the study findings also showed higher dietary fiber intake in infancy was associated with higher intakes of vitamins and minerals compared to lower fiber intakes.

Avocados contribute total fiber and soluble fiber in amounts that are higher, per gram than almost all other complementary and transitional foods (approximately 3 g of fiber per 50 g serving).



MICRONUTRIENTS:

Avoiding Deficiencies during the Complementary and Transitional Feeding Periods

The selection of complementary foods to meet (and not exceed) the micronutrient needs of infants is challenging, for example essential nutrients like iron are present in low concentrations in typical infant foods, even in breast milk. Additionally, about 5–80% of toddlers exceed the recommended sodium intake levels, and only 5% of toddlers meet the recommended intake levels for potassium.


Avocados, while low in iron, contribute folate, vitamin C, riboflavin, and vitamin B6 that are all essential to various aspects of iron absorption, red blood cell formation and/or hemoglobin function. Additionally, a 50 g (1/3 medium fruit) serving of avocado contributes provitamin A in the form of carotenoids in amounts higher than almost all other fruits, as well as vitamin K (10% DV), folate (10% DV), potassium (6% DV) and vitamin E (6% DV).



MEETING THE DEVELOPMENTAL NEEDS OF INFANTS AND TODDLERS⁷

Comparison of nutrients found in 50 g (1/3 medium fruit) serving of avocado versus a serving of the most popular complementary and transitional fruits.

Per NLEA serving	Apples (242 g)	Avocados (50 g)	Bananas (126 g)	Grapes (126 g)	Peaches (147 g)	Pears (166 g)	Strawberries (147 g)
Potassium (>150 mg)	259	254	451	241	279	193	225
Folate (>25 mcg)	7	44	25	3	6	12	35
Lutein + zeaxanthin (>80 mcg)	70	136	28	91	134	73	38
Vitamin A (> 40 IU)	131	73	81	83	479	42	18
Vitamin K (> 6 mcg)	5.3	11	0.6	18.4	3.8	7.3	3.2
Vitamin E (>0.50 mg)	0.44	1	0.13	0.24	1.07	0.2	0.43
MUFA (>2.5 g)	0.017	5	0.04	0.009	0.098	0.139	0.063
Fiber (≥2 g)	5.8	3	3.3	1.1	2.2	5.1	2.9

 Green box indicates that the serving meets and exceeds the nutrients recommended by the NLEA.



AVOCADO DIETARY BIOACTIVE COMPONENTS:

Playing an Important Role in Infant Health

Carotenoids (beta-carotene, lutein and zeaxanthin) in fruits and vegetables not only provide the precursors for vitamin A (which is essential for proper growth, development, vision, immunity, hair and skin health, and mucous membrane formation), but may also act as free-radical scavenging antioxidants. Additionally, these carotenoids have functional roles in the tissues of the infant brain.

Avocados contain some of the highest levels of lutein + zeaxanthin (136 mcg) per serving of any fruit or vegetable. A study that looked at brain tissue samples of otherwise healthy infants who died during the first 18 months of life shows lutein may account for ~ 60% of total infant brain carotenoids.

FOOD PREFERENCES:

Early Exposure to Flavor and Texture Can Influence Acceptability

Food learning and flavor preferences start in utero and are heavily influenced by breastfeeding and the infant's complementary diet in the first year of life. In order to combat the overly sweet and salty flavors of the standard American diet without offending the child's innate dislikes for bitter and sour, some pediatricians recommend introducing mild foods (i.e., neither sweet, salty, sour, or bitter) with a neutral flavor profile and proper consistency. Additionally, infants who have positive early experiences with fruits and vegetables are significantly more likely to choose and consume those foods later in life.

The avocado – soft, neutrally-flavored and nutrient-dense – appears to be one of the most ideal complementary and transitional foods available, which can also serve as a gateway food to more nutritious eating patterns across the lifespan.

Reference:

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7. Data sourced from: USDA Agricultural Research Service, National Nutrient Database for Standard Reference Release 27. Basic Report: 09003, Apples, raw, with skin; 09038, Avocados, raw, California; 09040, Bananas, raw; 09131, Grapes, American type (slip skin) raw; 09236, Peaches, yellow, raw; 09252, Pears, raw; 09316, Strawberries, raw.

* The nutritional information throughout this summary has been updated to reflect changes by the FDA to the avocado serving size on 7/26/16 (more info at <https://loveonetoday.com/nutrition/avocado-nutrition-facts-label/>).