

Green Leafy Vegetables

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Green leafy vegetables are an important source of vitamins and minerals. In areas where eating leaves is not part of the culture, leaf powder can be an important addition to the diet. We have written in the past about the positive difference that leaf powder can make in terms of nutrition. Here we share again the importance of leafy greens and of leaf powder, especially since many in our network may not have read early issues of *EDN*.

Last year's EIAC included a workshop led by Andrea Suarez, a Food Science student at Universidad Nacional de Agricultura (UNA, National Agriculture University) of Honduras. In her workshop, titled "Fortifying local foods with leaf powder to combat child micro-nutrient deficiencies," Suarez told participants about leaf powder, showed the steps used to dry and powder leaves, and prepared a green smoothie for participants to sample. She also shared some helpful tips for preparing and using leaf powder:

- Harvest leaves before a plant flowers, for highest nutrition.
- Before drying leaves, clean them by submerging them in clean, cooled water for about five minutes.
- Boil chaya leaves for 25 minutes before drying them, to remove the cyanogenic glycosides. [The same would be true of cassava leaves.]
- Smoothies are a good way to consume leaf powder. Bananas are a helpful addition to smoothies, both to add sweetness and to help keep leaf powder suspended.
- In recipes (e.g. for tortillas), up to 20% of flour can be replaced with leaf powder. This will maximize both nutrition and palatability.



Figure 12. Andrea Suarez, Kathy Bryson, and Cecilia Gonzalez (left to right) during the 2017 ECHO International conference workshop. *Source: Andrea Suarez*

Documents about Green Leafy Vegetables from Leaf for Life:

At her workshop, Suarez passed around several books written by David Kennedy from Leaf for Life (<https://www.leafforallife.org/>). These helpful resources are available for free online:

21st Century Greens: Leaf Vegetables in Nutrition and Sustainable Agriculture (<https://www.leafforallife.org/twenty-first-century-greens/tfcg-pdfs.html>). From the preface: "The premise of this book...is that everyone's health can benefit significantly from eating a serving of greens once a day instead of once a week. It's notoriously difficult to change your eating habits. This book offers practical help for making this change. You will find out how to eliminate tough textures and unlock the nutrients in leaf vegetables....You will discover some simple secrets to get vegetable avoiders, including children, to start happily eating greens. You will learn the best ways to preserve greens at the peak of their freshness for use the whole year. You will be introduced to some impressive new leaf crops from all over the world and to some new aspects of crops that are already familiar. You will be able to start producing an abundance of nutritious greens for your family, no matter where you live. What's more, you will learn ways to integrate edible greens into your homes and gardens in ways that are ecologically sound."

Leaf for Life Handbook: How to Combat Malnutrition and Improve Food Security with Green Leaf Crops ([https://www.leafforallife.org/assets/downloads/LFL_Handbook-
WEB.pdf](https://www.leafforallife.org/assets/downloads/LFL_Handbook-WEB.pdf)), (available in English, French (https://www.leafforallife.org/assets/downloads/FREN_LFL_Handbook_2015w.pdf) and Spanish (https://www.leafforallife.org/assets/downloads/SPAN_LFL_Handbook-r201609j.pdf)). From the Introduction: "This book is written mainly for people who work with low-income communities: agricultural extension workers, health care workers, teachers, development groups, students of agriculture and public health, farmers, and gardeners. The language is generally simple so that it can be easily understood and easily translated. Drawings help to describe the suggested techniques. This book is a practical companion to. This book is a practical companion to *21st Century Greens: Leaf Vegetables in Nutrition and Sustainable Agriculture*."

Drying Green Leaves in the Sun (<http://www.leafforallife.org/PDFS/english/Drynglvs.pdf>). From a review in *EDN 73*: "*Drying Green Leaves in the Sun* contains information about characteristics of the best leaves, the best plant families for leaves, and other leaf crops. The booklet also has information about how to grow leaves, basics of food drying, making a solar leaf dryer, how to dry leaves and how to use dried leaves. For example, if you are going to store leaf powder for a long time, you can blanch leaves for three minutes in steam or in a microwave oven before drying to improve flavor and to reduce the risk of spoilage."

Specifics about Choosing Green Leaves

We at ECHO are sometimes asked which leafy greens work well for drying into powder. Here are some tips to consider about leafy greens in general. Look for dark green leaves; generally, the darker green the leaves are, the more nutrients they will contain. Plant perennials like moringa and katuk, which can provide leaves for years after planting. Eat a variety of green leaves. Avoid leaves that are known to be poisonous/toxic, including tomato and rhubarb leaves. Leaf for Life has a list of 16 top-recommended leaf crops [here](https://www.leafforallife.org/PAGES/TOPINDEX.HTM) (<https://www.leafforallife.org/PAGES/TOPINDEX.HTM>), and a list of 50 “honorable mentions” [here](https://www.leafforallife.org/PAGES/HONORABL.HTM) (<https://www.leafforallife.org/PAGES/HONORABL.HTM>). The *Leaf for Life Handbook* has a chapter listing nutritious leaf crops; so does 21st Century Greens (starting on page 151). The Leaf for Life website lists some helpful tips for finding edible leaves: do not eat leaves from the side of the road [or from a location where plants may have been sprayed with chemicals]; avoid leaves with white milky sap, which might contain toxic alkaloids; and introduce leaves one at a time, in small quantities.

When it comes to leaf powder, the *Leaf for Life Handbook* suggests the following criteria:

1. **Leaves that are edible in large amounts.** Some leaves are safe to eat in small amounts but may not be safe to eat in large amounts. This is true of katuk. It is also true of *Leucaena leucocephala* leaves, which contain mimosine.
2. **Leaves with good flavor and texture.** Avoid leaves that have a very bitter taste. Also avoid leaves that are very dry and fibrous; according to Leaf for Life, “many leaves from trees have this limitation, as do the leaves from annual plants after they have flowered.”
3. **Highly nutritious leaves.** As mentioned, darker green leaves generally have more nutrients.
4. **Leaves that grow wild or that are easy to grow.** Many common wild plants and weeds don’t require planting or care. Examples include nettles and lambsquarters. Perennials like moringa are easy to grow.
5. **Leaves that are easy to harvest.** Leaves growing high in trees or on thorny plants will be difficult to harvest. Plants very near the ground may be difficult to clean. Some plants, like moringa, can be pruned to a height that makes the leaves easy to harvest.
6. **Leaves that are easy to dry.** Leaves that contain a lot of water will dry slowly and produce less dried leaf powder than leaves containing less water. Moringa leaves contain a relatively high amount of dry matter and are easy to dry. Leaf shape also impacts drying time; “leaves that are curly, like parsley, will allow air to pass through easily and as a result dry faster than leaves that lie nearly flat, such as Swiss chard.”
7. **Leaves that are free of contaminants.** Do not eat green leaves from plants grown where trash is dumped or burned, where there is sewage nearby, or where the soil contains paint scraped from buildings.

Other Helpful Resources about Green Leafy Vegetables (with brief excerpts from the articles):

Dark Green Leafy Vegetables of the Mustard Family

(<https://www.echocommunity.org/en/resources/211a4b81-a046-4d52-81da-9789b802f60a>) by Grace Ju (from *EDN* 87). This article focuses on leaves of plants in the mustard family, including collards, kale, pak choi, mustard greens, turnip greens, and Ethiopian kale. "Dark green leafy vegetables [DGLV] are good sources of vitamin A, vitamin C, riboflavin, folic acid, carotenes, iron, calcium, magnesium and potassium. DGLV are sources of trace minerals that take part in key enzymatic reactions in our body. They also are great sources of fiber. As a rule of thumb, the darker the leaves, the higher the nutrients."

Indigenous Leafy Vegetables

(<https://www.echocommunity.org/en/resources/1b4d91cf-9272-4442-a169-32802d94e2b6>) (*EDN* 103). "In recent years...organizations such as the Asian Vegetable Research and Development Center (AVRDC) [and] Bioversity International...have been influential in promoting [indigenous leafy vegetables (ILVs)]. Consequently, there may well be growing interest in and new opportunities to market ILVs. Resource-poor farmers can easily grow ILVs, as these plants are well-suited to local conditions and thrive with minimal inputs (e.g. water and fertilizer). Moreover, ILVs are important sources of vitamins A and C, iron and other nutrients. They are readily incorporated as supplements to carbohydrate-based staples."

A Second Look at Green Leafy Vegetables as a Source of Vitamins and Minerals

(<https://www.echocommunity.org/en/resources/31ff5ae6-0cbd-47d8-9126-30c4986d9fdc>) by Laura Meitzner Yoder (from *EDN* 62). "I made a survey of recent research reports on nutrition and leaf vegetables, and encountered some surprises. Many studies show that the amount of several important substances in leaves, both nutritional and harmful ones, varies greatly even within the same species and variety of plant. The amount of these substances can vary depending on such factors as season of growth and harvest, stage of maturity when harvested, storage time and conditions, whether the plants are grown in sun or shade, amount of rain, soil fertility, etc....What clearly is known is that the quality of leaves deteriorates very quickly after harvest. The reports can be summarized simply as follows: a variety of fresh greens should be eaten as soon after picking as possible, stored cool and moist or sealed in plastic bags, and cooked quickly for maximal retention of nutrients."

Baobab Gardens for Leaf Production

(<https://www.echocommunity.org/en/resources/825cb11b-4632-49d6-bccea30c8b208e1>) (from *EDN* 103). "Baobab (*Adansonia digitata*) leaves are also a kind of indigenous leafy vegetable. They are a staple food in the Sahel of West Africa. Baobab leaves are nutritious (particularly high in vitamin A) and are eaten almost daily in sauces....The World Agroforestry Center in Mali has experimented with and promoted baobab gardens. Tiny baobab plants produce tender leaves that can be harvested every two weeks....Jonathan and Ali Nichols tried the technique of baobab gardens in Burkina Faso. They contacted the World Agroforestry Center to learn specifics."

Advantages of Perennial Vegetables

(<https://www.echocommunity.org/en/resources/13af2319-1f17-4c34-be8c-c7944195bdd4>) (from *EDN* 107). "Perennial vegetables often have high nutritional value, high yields and provide food over an extended season. I am always struck by the enormous quantity of edible green leaves on a chaya bush, compared to the much smaller amount that can be harvested from an annual leafy vegetable like spinach or lettuce, which would take up the same space in the garden. I have seen chaya producing edible leaves in Haiti after four months without rain. An added benefit is that leaves of the perennial vegetables regrow soon after harvesting."

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