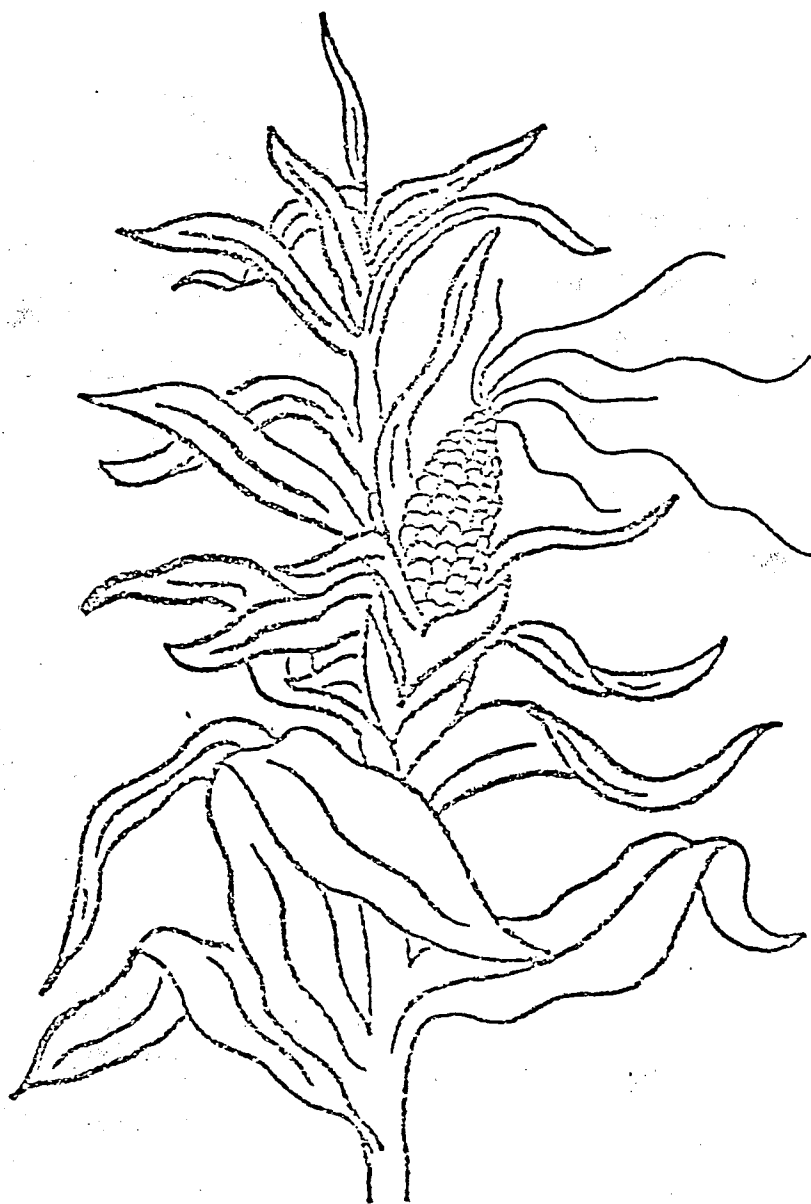


BLUE INDIAN CORN

A PATHWAY TO BETTER NUTRITION FROM ANTIQUITY

by

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BLUE INDIAN CORN (Zea Mays L.) has been eaten by the Indians living in North and North-Central New Mexico and Arizona for hundreds of centuries. It is recognized by the present-day Spanish American and Anglo population living in and around the area as a tasty, highly nutritious food. During the last two decades, tourists on vacation in New Mexico and Arizona have been introduced to Blue Indian Corn by friends and relatives. The visitors, who quickly become attracted to the flavor of the ancient food, buy it in bulk and carry it (along with a variety of red and/or green chili) back to their homes for continued later use. Therefore, it has attained a commercial value locally and can be found in markets and trading posts throughout the region. It is marketed in one-pound bags, or bulk in the whole kernel or flour forms. The flour, called HARINIA and ATOLE, is prepared by milling dry whole kernels or roasted whole kernels of corn, respectively. The flour, when baked in the form of a Blue Indian Corn tortilla, is considered by tourist and resident alike to be a highly nutritious and desirable delicacy. The Mexican-American enchillada, often prepared with Blue Indian Corn tortillas, is a favorite entrée at restaurants featuring Mexican-American cuisine. Except in these minor ways, this native, highly nutritious food source has gone unnoticed in a world dominated by hybridized, hard, yellow dent and yellow flint corn from the middle and eastern United States.

Since the first reported discovery of maize in 1492, by two explorers sent out by Columbus, the morphological peculiarities of the ear, tassel, and stalk have been of general and scientific interest. Because of its long association with man and with his conscious and unconscious alteration of its genetic architecture, maize is no longer capable of reproducing itself without being

cultivated. Since maize is an obligate cultigen with no clearly discernable wild form still in existence, it is not surprising that an aura of intrigue surrounds its origin.

The Indians' earliest concept of the origin of maize recognized that the plant did not grow wild in the countryside. Hence, the sometimes white, sometimes blue, sometimes brown, and sometimes red, life-giving kernels were given numerous divine origins and elevated to sacred prominence. In the Southwestern United States, the Hopi Indians of Arizona and their neighbors, the Pueblo Indians, liked the blue maize particularly well, and to this day center many religious ceremonies around their 'Sacred Blue Corn.' To these Indians, the blue corn is the most precious of the crops they cultivate.

In Hopi culture, the Blue Indian Maize is grown on semi-arid soil in small fields (less than 10 acres) below the mesas. Blue Indian Maize is well adapted for growth in dry areas and can be found under cultivation in the high (4,000- to 5,000-ft elevation) semi-arid valleys of the Hopi. The seed of the Blue Maize is planted in the soil after Mother Earth has gone through her ritual of warming the soil in preparation for the precious food. The maize grows swiftly in the hot southwestern sun, and in less than 90 days after planting, the full blue ears of maize are ready for harvesting and sun drying. The corn is picked and hung outside to dry in the hot autumn sun. A time for the giving of gratitude for an abundant crop is at hand, as well as a time for rest and family sharing. For, alas, the sun has begun to travel lower in the noonday sky and winter is soon to come.

What the Hopi and Pueblo Indians intuitively knew about the quality and nutritional value of Blue Indian Corn, science has gradually understood as we gained new methods for understanding the biochemical makeup of hybrid maize. Commercial classifications of maize are based mainly on kernel texture, including

dent, flint, flour, sweetcorn, and popcorn. Dent maize is characterized by a depression in the crown of the kernel caused by unequal drying of the hard and soft starches making up the kernel. Flint maize, which contains little soft starch, has no depression in the kernel. Flour corn, such as Blue Indian Corn, is composed largely of soft starch; it has soft, mealy, easily ground kernels. Sweetcorn has wrinkled, translucent seeds; the plant sugar is not converted to starch as in other types. Popcorn, an extreme type of flint corn, is characterized by small, hard kernels. The popcorn kernels contain no soft starch, and heating causes the moisture in the cells to expand, making the kernels explode.

Starch, whether it is classified as hard or soft, is composed of repeating molecules of glucose connected together so as to form a long-chain polymeric molecule. It is composed of both 1+4-bonded α -glucose units and 1+6-bonded α -glucose units arranged in a three-dimensional structure. The starch in maize is either amylose (no branching of chains) or amylopectin (branched chains). Since the widespread usability of maize increases as the ratio of amylose to amylopectin increases, most hybridization deals with enhancing the yield of amylose and the yield of maize per acre under cultivation. However, very little interest prevails in optimizing human digestibility of newly hybridized forms. It is clear that the molecules of starch, comprising part of the maize kernel, depend as much for their properties on a three-dimensional structure as do the proteins and nucleic acids. We take particular caution to avoid denaturation, loss of structure, and function when preparing proteins and nucleic acids. Yet, as Dr. W. J. Whelan, Prof. University of Miami, appropriately points out, "It is customary for the starch chemist to subject starch to measures beside which the excesses of the Spanish Inquisition pale

into insignificance." If native starch has a three-dimensional structure, which it surely does, we can be certain that nothing but vestigial and perhaps indigestible remains of that structure are left after processing at high temperature or unfavorable pH. Few starch technologists consider the effects of denaturation and destruction on digestibility. As hybridization continues and kernels of maize become harder and caustic processing methods prevail, the nutritive value of the product declines. In fact, many of today's corn products are just unpalatable. Native Blue Indian Corn offers a refreshing, tasty, and nutritious alternative to the familiar hybridized varieties of maize.

The chemical composition of Blue Indian Corn is shown in the table below.

COMPOSITION OF BLUE INDIAN CORN

<u>Constituent</u>	<u>% Dry Weight</u>
Carbohydrate	74
Lipid (fats)	4
Protein	9
Fiber	2
Ash	1
Moisture	10

Food energy is between 3.5 and 4 calories per gram.

The nutritional constituent in greatest abundance, as expected, is carbohydrate (starch) which is 74% of the dry weight. At 5% of protein in the diet of humans, the net protein utilization (NPU) for maize protein is 52, and at 9% of protein in the diet of humans, the NPU for maize protein is 37. The digestibility of maize protein varies inversely with the intake and although the nutritive value is not high, in subjects accustomed to eating large amounts of maize it now is apparent that it is much higher than once thought.

The minerals contained in Blue Indian Corn are shown to be superior when compared with those found in processed white rice (enriched) and white wheat flour (enriched).

MINERAL COMPOSITION OF BLUE INDIAN CORN

COMPARED WITH

WHITE RICE AND WHITE WHEAT FLOUR

Constituent	Grams per Kilogram		
	Hopi Blue Corn Meal	White Wheat Flour (enriched)	White Rice (enriched)
Nitrogen	17.14	19.22	10.01
Sodium	0.07	0.02	0.01
Potassium	4.21	1.03	1.15
Calcium	<0.05 ^a	0.20	0.04
Magnesium	1.46	0.27	0.26
Phosphorous	3.76	1.17	1.38
	Milligrams per Kilogram ^b (ppm)		
Manganese	8.0	6.0	12.0
Iron	55.0	26.0	31.0
Nickel	0.9	1.3	<1.4
Copper	2.3	2.2	2.7
Zinc	37.0	5.0	12.0

^a< = less than the number shown

^bppm = parts per million

The content of heavy toxic minerals such as lead, cadmium, and mercury are less than federal requirements. And, no radioactive metals have been detected in our Blue Indian Corn.

In addition to its superior mineral and starch composition, Blue Indian Corn contains Vitamins A, Thiamine, B₂, and niacin. The rich blue color is given to the material by phytochrome, a class of natural plant pigments contained in all corn colors and in other colored plants.

Fresh-milled Blue Indian Corn, when it is properly prepared, provides for a tasty meal and gives sustained energy to its consumer. A male (45 years of age) describes his satisfaction with the material:

"I have tried and lived on many diets for long periods of time, but I wish to share with you my excitement with an ancient food which is natural to the U.S.A.--Blue Indian Corn. I have used the corn in my diet for about two years and have experienced a definite large energy reserve which is lacking when I stop eating it. My diet consists of the Blue Indian Corn (for starch), meat (for protein), and potatoes (for starch), plus the wonderful 'Blue-Green Manna Algae.' With the algae, this simple diet provides me with the minerals, vitamins, lipids, and roughage I feel my body needs; of course, I get plenty of protein and carbohydrate.

"The dried Blue Indian Corn is usually toasted lightly, then ground and baked into muffins or bread using any number of various recipes. The freshly baked material gives me a well satisfied feeling. Eating baked Indian Corn is also quite an experience for my many guests, and I relish watching the happy smiles as they dig in for a second serving. I would like to thank you for introducing me first to Blue-Green Algae and then to the marvelous energy food, Blue Indian Corn. Thank you very much."

We have received numerous letters from women who now include Blue Indian Corn in their family dietary regime. A 35-year-old mother who has three children describes how she has incorporated Blue Indian Corn into her family's food intake.

"I am writing this letter to tell you how much we enjoy your Blue Indian Corn. The children just love it, and when I make fresh corn muffins, I can be sure everyone will ask for second and third servings. With butter and honey, the fresh hot muffins are a mouth-watering, after-dinner snack.

"The availability of Blue Indian Corn has brought many changes to my cooking habits. I have found that I can substitute the wheat flour called for in many recipes with the Indian corn. Thank you for introducing me to the wonderful native food."

And, we receive many letters from individuals who are eating Blue Indian Corn for breakfast. A retired couple describes their reaction to a hearty breakfast of Blue Corn:

"We have been eating Blue Indian Corn for almost two years, and we feel just wonderful. We particularly enjoy the corn cooked as a breakfast cereal. I cook it just like I used to cook oatmeal. It takes about 20 minutes to cook, and when I place it on the table, my husband comes running. We like to put milk and honey on the Blue Corn cereal--it's just great! Thank you so much for introducing us to it; it really works well with our age and digestion processes. The long-lasting strength we get from it really helps a lot."

Many new and innovative recipes have been received from people who are experiencing the many benefits of Blue Indian Corn. A few of these are given below to help you, the reader, get off to a successful start when you try this magnificent, wholesome, and unaltered food material:

PERFECT BLUE INDIAN CORN STICKS

Good Oil
1/4 cup butter or ~~margarine~~
2 eggs
1/4 teaspoon salt
1 cup whole sweet milk
2 cups sifted Blue Indian Corn flour
3-1/2 teaspoons baking powder (ALUMINUM Free)

Combine butter, and two well-beaten eggs and cream the ingredients. Add 1 cup milk, 2 cups Blue Corn flour (sifted), 3-1/2 tea-

spoons baking powder, and 1/4 teaspoon salt. Mix until well blended (but not in excess). Spoon batter into pregreased cast iron corn stick pan to about 2/3 full. Bake in preheated oven at 400°F for 15 minutes. If muffin tin is used, then bake at 325°F for 15 minutes. Before baking, the tops of the corn sticks can be brushed with soft butter, if desired. Makes 18 corn sticks.

FRYING PAN BLUE INDIAN CORN BREAD

1-1/2 cups wheat flour
1-1/2 cups Blue Corn flour
6 teaspoons baking powder
1 teaspoon salt

1/4 cup finely chopped green peppers
6 tablespoons grated cheese
1/4 cup chopped onion
6 tablespoons shortening or cooking oil
2 teaspoons chili powder
1-1/2 cups milk
2 eggs slightly beaten

Sift dry ingredients, except chili powder, into a large bowl. Add green pepper, onion, and cheese. In heavy skillet (preferably cast iron), melt shortening or heat cooking oil, mix in chili powder. Cool. Add milk and eggs. Stir mixture into dry ingredients until well blended. Return to skillet and bake in 400°F oven for 35 minutes. Cut in wedges and serve hot. Serves eight.

SOUR MILK BLUE INDIAN CORN GRIDDLE CAKES

1/2 cup sifted wheat flour
3/4 cup sifted Blue Corn flour

1/2 teaspoon soda
2 teaspoons baking powder
1/2 teaspoon salt
1 beaten egg
1 cup sour milk
2 tablespoons cooking oil

Sift both flours with soda, baking powder, and salt. Combine eggs, milk, and shortening. Add to dry ingredients, stirring just enough to moisten the flours. Batter will be slightly lumpy. Bake on ungreased griddle or in waffle iron. Makes 6 to 8 cakes, or 3 to 4 waffles.

HEARTY BLUE CORN BREAKFAST CEREAL

3 cups water
1/2 teaspoon salt
1 cup Blue Corn flour

Add 3 cups water to sauce pan. Add salt to water. Bring water almost to boiling and slowly add 1 cup of the Blue Corn flour to the water, stirring continuously while adding. Bring to a slow boil and cook for 15 to 20 minutes. Serve with and milk. Serves four.

We encourage all who read our article to raise their total energy by adding Blue Indian Corn and Blue-Green Manna Algae to their daily diet. The increased energy experienced when these foods are added is stable and enduring; this increased vigor cannot be likened in any way to the short-energy burst felt by consumption of processed SIMPLE SUGARS--glucose, fructose, sucrose, dextrin, etc. And, the long-lasting energy experienced when these two foods from antiquity are consumed cannot be equated to that from fruits, fruit juices, carrots, syrups, or any other natural products which contain large quantities of natural simple sugars. Now we understand what a Hopi grandfather, who was over 100 years of age, told us about the Sacred Blue Indian Corn concerning its prominence in Hopi culture when he said, "We find it without fault as a food."

To obtain your supply of Blue Indian Corn and/or Blue-Green Manna Algae, write or call KC Laboratories, 3460 Oak Glen Drive, Hollywood, CA 90058. Whole kernel corn - 69 cents per pound; Blue Corn flour - 75 cents per pound. Blue-Green Manna Algae, 120 count, 250-mg capsules - \$15.00; Blue-Green Manna Algae, 30-g powdered - \$14.00. Quantity prices upon request. Postage, shipping extra please.

Greetings from KC Laboratories. Thank you for requesting information on our products. We, the producers and suppliers of the rare and wonderful *Blue-Green Manna Algae*, are pleased to offer you the finest line of food supplements of the future. Articles explaining some of our products and their applications have appeared nationally in Let's Live magazine, December 1978, and Acres U.S.A. (a voice for Eco-Agriculture), June 1979. These and other publications are available upon request.†

Premium quality freeze-dried *Blue-Green Manna Algae* is available in attractively labeled bottles at the following prices:

Powder (30 grams per bottle)	- \$ 14.00 *
Powder (60 grams per bottle)	- \$ 25.00 *
Capsules - 250 mg (120 capsules per bottle)	- \$ 15.00 *

Two other fine *Blue-Green Manna Algae* products have recently been added to our growing line of algae food supplements of the future. They are available to you now at the following prices:

<i>Mannacol</i> (liquid extract) - 4-oz bottle	- \$ 3.75 *
<i>Mannapro</i> (protein powder) - 10-g bottle	- \$ 3.75 *

*(For the above products, add the following for mailing and handling: \$1.50 for 1 to 3 bottles, \$1.75 for 4 to 6 bottles, and \$2.25 for 6 to 12 bottles.)

We hope you try our *Blue-Green Manna Algae* products and experience the same benefits that people around the world are now enjoying. These fine-quality, concentrated, sun-energy food supplements are offered to you with pride. Order your supply today