
A New Idea for an Emergency Milk Substitute in West Africa

Ken Flemmer with Adventist Relief and Development International sent us the following report from two of his staff, Jim and Yoko Rankin. It concerns a totally new use for egusi, a plant that we first featured in EDN 7 1.

During a training seminar in Ghana a local farmer stated "that his wife did not have sufficient milk to feed their 6 month old baby. Our first thoughts went to soy milk, but as they do not have soy beans it was not a practical solution. Also, soy milk is not easy to prepare and becomes acidulated very quickly."

"Someone suggested agushi melon seed [ED: this is surely a Ghanaian spelling of egusi.]. I set up the blender, took 100 grams dehulled agushi seed and blended it with two cups (400 ml) of water and tasted it, added another cup of water, 2 teaspoons of honey and ¼ teaspoon of salt and behold, we had a milk tastier and creamier than soy milk with a closer texture resemblance to real milk."

"The dry dehulled seeds resemble a large pumpkin seed. In the village every home has stone mills or small grinding plates. The seeds are easily crushed into a peanut butter consistency. Mixed with water, honey and salt instant raw milk. To make it equal to mother's milk we found that we must add 6/7 cup of water per 1 cup (100 g) dehulled seed. It does not form gas and the school children who have tasted it have not complained of any problems."

"The agushi melon grows throughout Togo, Ghana, Cote d'Ivoire and Benin [Ed: also Nigeria, Zaire and probably elsewhere.] One type has large seed and a very thin papery hull which slips off when seeds are rubbed between the palms of the hand. The other two types have a very hard shell on seeds that are slightly larger than cantaloupe seed. We have tried making milk from all three types, but the smaller varieties with hulls intact make a slightly bitter tasting milk. I presume that if the hulls can be removed the bitter taste would disappear."

I mentioned all this to gardener and ECHO supporter Glen Munroe in Indiana, lamenting that we had no idea how the "milk" tasted. Surprisingly, Glenn had grown egusi this summer and could do a few trials for us. Here are some highlights of his experience. Unlike in Ghana, he did not dehull the seeds.

"I blended 75 g seed, 1.5 cup water, 1/16 teaspoon salt and 1 teaspoon honey in our Osterizer blender at the 'liquefy' setting. After straining I had 1/3 cup of meal and 1.5 cup of what looked like milk. It had a subtle raw cucumber like taste. The

meal was similar to corn meal mush with a distinct feel of some additional fiber and a raw flavor. After boiling the flavor was unchanged, but good. The flavor a bit strong, but I believe I could adjust to eating it as a breakfast cereal.

"I repeated, using a VitaMix juice blender that more completely pulverized the seed, leaving out the honey. I then did a taste test with various additives, using 2% milk as a standard (rating of 5). The raw cucumber taste come through in all samples, but was hardly noticeable with Hershey chocolate syrup added (rating of 5). After drinking 2 ounces, though, I noticed an itchy feeling in my throat, I think due to the fine fiber. Adding honey or maple syrup gave drinks that I rated as 4+."

The variety of egusi that ECHO distributes is larger than a watermelon seed. Egusi, *Colocynthis citrullus* L., looks like a watermelon while growing, but the white flesh of the round, 6 inch diameter fruits is bitter and inedible.

Of course, just because something looks and tastes like milk does not mean it can be a milk replacement. We found no information comparing the nutritional value of egusi to milk, but did find a very helpful article Chemical, Functional and Nutritional Properties of Egusi Seed Protein Products (*J. Food Sci*, 47, 829-835, 1982). Dehulled seeds contain approximately 50% oil and 30% protein. They are good sources for the essential amino acids arginine, tryptophan and methionine, and vitamins B1, B2 and niacin and the elements sulfur, calcium, magnesium, manganese, potassium, phosphorous, iron and zinc. Egusi has potential as a source of calcium and niacin in low milk consuming regions.

Biological indices of protein quality were "lower than soybean but comparable to or higher than most oilseeds. "The most limiting amino acids are lysine followed by threonine. "Histidine has been known to be an essential amino acid for infants. ... Thus the low content of histidine in egusi seed should be considered in the use of this product in food formulations, especially if the foods are intended for infants."

Heating the "milk" is going to be a problem. Glen writes, "as soon as the liquid felt hot to my finger it began to curdle. By the time it boiled it was clumped into ¼ to ½ inch (0.6-1.2 cm) diameter particles that easily broke up when stirred."

One visitor from Africa told me that whenever a group of men were standing around talking, their hands were usually busy dehulling egusi seeds. It is ground into a paste and mixed with a variety of condiments to make stews, is made into a substance like peanut butter, roasted, cooked in soups, etc. The Paulsons in Central African Republic tell us that dry dehulled seeds can be placed on a skillet and popped like puffed rice. They add that egusi is one fruit that monkeys do not bother.

It is usually inter-cropped (see EDN 414), e. g. with corn, coffee and cotton. After 4 weeks of growth the plants completely cover the soil surface. Flowering occurs 45 weeks after planting and fruits mature at 78 weeks. Fruits are softened by beating with a club and allowed to rot for about a week to make the seeds easier to remove. Seeds are washed and dried for storage.

Since it is such an important crop in West and Central Africa, it is surprising that we have heard no reports of acceptance elsewhere from people to whom we have sent seed. Perhaps its possible use as an emergency milk will make a difference.

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