



Simple Farm Techniques for Preservation of “*Maranta arundinacea*” Rhizomes

Padma Harshan^{1*}, Geeta Sukumaran² and Uttam Nagwanshi³

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Society for Human Welfare & Environmental Furtherance (SHWEF), (NGO), Bhopal, M.P., India

² Ayurveda Medical Officer, Pt. Kushilal Sharma Govt. Ayurved Chikitsalaya, Bhopal, M.P., India

Received: 27th June 2014 / Accepted 5th July 2014 / Published: 8th August 2014



Greentree Group

©International Journal of Ayurveda and Pharmaceutical Chemistry, 2014

Padma et al

shwef267@gmail.com, shwef17@rediffmail.com

Int J Ayu Pharm Chem Vol. 1, Issue 1, 2014

Abstract

Maranta arundinacea (Arrowroot or West Indian Arrowroot) is indigenous to the West Indies, where native people, use the powder. The Arawaks used the substance to draw out toxins from people wounded by poisoned arrows. Its name is thought to be derived from that practice. The name may also come from the native Caribbean Arawak people's aru-aru (meal of meals), for which the plant is a staple.

Arrowroot has been used as an infant formula in place of breast milk or to help the baby adjust after weaning believed to be the easiest to digest. Because of its demulcent properties it has been used for various bowel complaints. Also, it is believed to be useful against poisoned wounds, including scorpion stings, snake bites, and spider bites and gangrene. Consuming fresh arrowroot juice mixed with water is said to be an antidote to vegetable poisons. Arrowroot is used as a herbal remedy to alleviate nausea and to replenish nutrients lost through diarrhea and vomiting. It's a nutritious diet for people with certain chronic diseases, during recovery from an illness or for certain internal irritations including bladder irritation. The results of non-chemically grown arrowroots have been encouraging with a good production in less than a quarter acre of land that depicts a high economic viability with such practices. It can prove to be a remunerative medicinal plant with semi-processing to small and marginal farmers. Another very important feature observed was that the seeds were not treated with any fungicide or chemicals during preservation thus avoiding use of chemicals and keeping it healthy.

Keywords

Arrowroot (West Indian arrowroot), diarrhea, preservation, remunerative

INTRODUCTION

Roots and tuber crops occupy a remarkable position in the food security [1, 2] of the developing world due to their high calorific value and carbohydrate content. Some of them are already cultivated, but others are grown wild as a neglected group of economic plants. Many wild plants form an

important starchy food [3] for the tribal inhabits near the forest tracts. Some are important due to their medicinal as well as industrial applications. Many of these crops have not spread farther than their native habitat due to physiological constraints or lack of adaptability. In order to explore the potentialities of these unutilized and

underutilized minor tuber crops, an intensive research programme was initiated at the Central Tuber Crops Research Institute, Thiruvananthapuram. In the present study, an attempt was made to evaluate the non chemical farming practices and seed preservation techniques for Arrowroot tubers. Arrowroot [4] is indigenous to tropical America and has long been cultivated in the West Indies, particularly St. Vincent, [5, 6] which produces about 95% of the world's commercial supply. Cultivation has spread too many other tropical countries, including Brazil, India, Sri Lanka, Indonesia and the Philippines. Globally, organic foods are in great demand under the changing lifestyle. By building an efficient and effective supply chain using state of the art techniques it is possible to serve the population with value added food while simultaneously ensuring remunerative prices to the farmers. Model estimates indicate that organic methods could produce enough food on a global per capita basis to sustain the current human population and potentially an even larger population without increasing the agricultural land base. *Maranta arundinacea* (Arrowroot) is used externally as well as internally; the powdered rhizome with honey is applied on the mucous membrane of the oral cavity in stomatitis. It

also promotes the healing of stomach ulcers. [7] Internally it is extremely beneficial in diarrhea, dysentery and colitis as it is astringent. [8] The rhizome powder cooked in milk is given along with sugar, in irritable bowel syndrome and ulcerative colitis to alleviate the irritation and facilitate the healing of ulcers.

Table 1 Preparation method of neem bio-pesticide

Ingredients	Procedure
(i) 10 to 15 liter water	i. Mix 1kg fresh neem leaves in an earthen pot and then covered with a thick cloth. (Cotton)
(ii) 1kg Neem leaves	ii. On the 3 rd day stir the solution clockwise & anticlockwise properly.
	iii. Leave the solution for 15 days undisturbed.
	iv. The filtered solution is ready for application with sprayer or any other applicator (1 liter in 10 liter water) with sprayer or any other applicator..

The SHWEP is working with rural folks on various issues of livelihood, organic farming, sanitation, education at various places (rural and urban) of the State since past 12-14 years. One such project catalyzed

by the Ministry of Science & Technology, Science and Society Division (SSD), New Delhi, has helped SHWEF to work closer with the farmers on non chemical farming methods and introduction of new crops other than the regular crops. A pilot effort resulted in good response and encouraging results in preserving the seeds in the seed bank in a pit dug up to a size of 4 x 3 ft. (depending on the harvest obtained), spraying the pit with neem biopesticide and then layers of sand, ash, soil and finally the outer most layer of dried leaves. Hence no extra cost was involved in preservation during the experimental period and prompted us to share as a research paper.

MATERIALS AND METHODS

Our results in the village Dehrikalan of Phanda block of Bhopal district of the State of M.P, targeted SC communities with a population of about 1545 people covering about 8-10 villages, has been encouraging.

The demonstration land area of approximately 18000 square feet was prepared by plowing and harrowing more than one time with all fertilization techniques. We used ridge and furrow method with a length of beds of about 60-75 ft and 1ft width of the beds with spacing between each sapling of about 1ft. for the

tubers of arrowroot .No fungicide or chemicals has been used to treat the rhizome for preservation after harvest. The damaged rhizomes were taken for semi processing and rest were kept as seeds to be sown in the next season.

Table 2 Preparation method of amrit jal

Ingredients	Procedure
(i) 1 liter cow dung (ii) 1 liter cow urine (iii) 50 gm black jaggery (iv) 10 liters water	i. Mix all the above together in an earthen pot of 15liter capacity and keep for 3 days. ii. Stir the mixture 2, 3 times in a day, clock wise and anticlockwise. iii. 4 th day, take 1 liter of this concentrate mixture & mix it with 10 liter of water. iv. The filtered solution is ready for application in the soil little away from the root.

RESULTS AND DISCUSSION

The apparent contradiction of our necessity for nutritional security on the one hand and environmental sustainability on the other makes it inevitable to resort to the organic or eco-farming system as it appears to be a possible option to meet both these objectives. Selection of organically grown Arrowroot plant is taken up not only for crop diversification, but for value added products. Resolving problems through operation research ^[9] has been very

successful hence an effort to see the results of this unutilized and underutilized minor tuber crop on pilot basis was taken up. The arrowroot plant is resistant to pests and

Table 3 Preparation method of amrit mitti (soil)

Ingredients	Procedure
(i) 30-50dry leaves	i. Soak these leaves in Amrit Jal for 24 hrs.
(ii) 20 lt. Amruth jal	ii. Make a pit of (6X3ft.) broadcast with 1-inch topsoil.
(iii) 200 lt. water	iii. Spread the soaked leaves the next day on the top soil and spray with amrit jal.
	iv. Apply 1 inch sand and top soil on it, again spray with amrit jal
(iv) 100gm any dicot seed(we used black gram)	v. Again put a 2 nd layer of leaves on the bed, spray with jal ,in the same manner prepare up to 4layers and then add the sprouted gram, covering with soil sprayed with jal.*

**When the sprouts shoot up to a height of 0.5ft.the leaves are cut and put on the bed, this method is continued for a period of 100day (3months), the rich soil is ready for application on the bed/ fields*

diseases. While arrowroot is native to Central America and widely cultivated in the West Indies, it can also be found growing in many places because of its fine, light texture, and also as a component of sweets

and ice creams and in the fabrication of tablets. Arrowroot is easily digested and is used in diets requiring bland, low-salt, and low-protein foods. Traditional ethnic uses of arrowroot are; as a thickening agent for sauces, fruit pie fillings and glazes, and puddings. Starchy carbohydrates together with beta-carotene, niacin and thiamine are present in the mature rhizomes, so that when they are peeled and cooked they become very digestible, nutritious food. The extracted rhizome starch is used commercially as a rubifacient and emollient, and it is listed in "Martindale, The Extra Pharmacopoeia", 1993 U.K. The powdered rhizome is also used as a body powder. Arrowroot is valued by herbalists primarily for its demulcent and anti-diarrheal properties. [10] Periodic and regular prolonged interactions/ visits to the villages have borne fruits in terms of the participation during discussions. With predetermined dates, the demonstrations with crucial inputs of neem leaves, bio control agents such as *Trichoderma viride*, farm yard manures, neem biopesticide (Table 1), amrit jal (water) (Table 2), amrit mitti (soil) (Table 3), and growth promoters, preparation methods were imparted to the farmers in their own prepared lands

exclusively demarcated for non-chemical farming.

Looking to the results, the production per acre for arrowroot in 270 days is coming to 5292 kg and the revenue at the lowest cost quoted is of Rs.100/-per kg depicts a good income of Rs.2,27,130/- which is a substantial one thereby proving to be a remunerative medicinal plant for the marginal and small farmers of the area. In less than a quarter acre of land a high economic viability exist for arrowroot with the packages of non- chemical practices and the seeds did not require any kind of chemical treatment during preservation, thus assuming that the crop grown becomes

healthy in itself to fight against natural diseases and pests in this part of India. The method followed for preservation of the seeds was placing the seeds in the pits half feet deep of size 4 x 3 ft. (depending on the harvest obtained) sprayed with neem biopesticide and left for a day, on second day a layer of sand was placed along with ash (obtained by burnt cow dung cakes/ wood/twigs/) the rhizomes were kept in layers that was covered again with layers of sand, soil and finally by dried leaves. Each year from 2010 onwards it has been observed that seeds preserved in this manner was not attacked by pest and remained healthy during transplantation and harvesting too.

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Padma et al *Int J Ayu Pharm Chem Vol. 1, Issue 1, 2014*

shwef267@gmail.com, shwef17@rediffmail.com

Web: www.shwef267@org.in