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Dr. Richa Pyasi
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh, India

Corresponding Author:
Dr. Richa Pyasi
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh, India

Potential health benefits and industrial scope of arrowroot

Dr. Richa Pyasi

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Abstract
Maranta arundinacea or (Arrowroot) is an herbaceous, perennial tropical plant belonging to the family Marantaceae. It is a rich starchy medicinal herb used since ancient times & having vegetative propagation. This plant is derived from the tropical areas of South America and it appears in the Southeast region of brazil to till the Guianas. It is termed an 'arrowroot' maybe because it resembles the finger shape of rhizomes Arrowroot powder is rich in vitamins and minerals, including vitamin B6, iron, and calcium**.** The arrowroot plant is mainly found in the West Indies (Jamaica), Indonesia, Philippines, India, and Sri Lanka. The arrowroot is a high starch content rhizome. The extracted starch is known to be easily digested and it also has an excellent gelling property from the tropical areas of South America and it appears in the Southeast region of Brazil to till the Guianas. The medicinal value of plants is due to its various naturally derived biologically active components (phytochemicals) like flavonoids, alkaloids, phenols, tannins, saponins, and so on.
It is a perennial herbaceous plant of 0.5-1-meter height. Arrowroot is a perpetual plant with a height of 90–150 cm. It has white flowers, big green leaves with a length of 10–20 cm, and white fleshy cylindrically rhizomes with 2.5–3 cm width and 20–40 cm length. Usually, arrowroot rhizomes either are found in a bunch of two to three or single. The arrowroot rhizome is an important source of starch, bagasse fibre as well as husk fibre.

Keywords: Potential, health, scope, arrowroot, *Maranta arundinacea*

Introduction
Taxonomical Class
Binomial Name: *Maranta arundinacea* L. [7, 12].

Scientific classification
Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Division: Magnoliophyta
Class: Monocotyledonae
Order: Zingiberales
Family: Marantacea

Distribution
It is seen as developed in the North-Western part of South America and the Lesser Antilles. It has been extensively scattered throughout tropical countries like India, Sri Lanka, Indonesia, the Philippines, Australia, and West Indies. In India, it is distributed in Uttar Pradesh, Orissa Bihar, West Bengal, Assam, and Kerala.

- Several critical biological nutrients such as carbohydrates, fats, and proteins are found in arrowroot starch, which plays significant roles in nourishing the human body as well as in the development of life [7, 13].

As per studies, the arrowroot powder contains the following nutrients [4, 6, 7]:

Nutrients	Amount per 100 g
Protein	0.3 g
Fat	0.1 g
Carbohydrate	88.2 g
Fibre	3.4 g
Water	11.4 g
Energy	357 kcal
Iron	0.33 mg
Calcium	40 mg
Potassium	11 mg
Phosphorus	5 mg
Magnesium	3 mg
Manganese	0.47 mg
Zinc	0.07 mg
Copper	0.04 mg
Sodium	2 mg
Vitamin B1	0.001 mg
Vitamin B5	0.13 mg
Vitamin B6	0.005 mg
Vitamin B9	7 µg

Potential uses of arrowroot powder for human health are discussed below

Flour products

Flour products from arrowroot plant have special features, which are easy to digest because the content of the glycemic index is low so it is very good for health.

Uses of arrowroot powder for boosting immunity

Arrowroot may contain bioactive compounds like flavonoids that may help in boosting immunity. It may also increase the level of antioxidants and may help in fighting against diseases.

Uses of arrowroot powder for oral hygeine

Studies reported that arrowroot may be useful for relieving oral pain such as gum inflammation. Arrowroot may have anti-inflammatory properties that might be useful for inflammatory diseases of the mouth. It may also have antibacterial and antifungal properties.

Source of dietary fiber

Arrowroot flour is a good source of dietary fiber that may benefit the digestive and immune systems. Research indicates that arrowroot has fewer calories and more protein than other tuberous vegetables such as potatoes, yams, and cassava. Therefore, arrowroot may be beneficial in helping people to manage their weight and for those with digestive disorders.

Use in Gluten-free diet

Arrowroot is a naturally gluten-free food. Studies suggest that arrowroot flour may be helpful for those who are sensitive to gluten or people with celiac disease. People can make many food items & incorporate arrowroot flour into recipes for baked goods as an alternative to other flours, such as wheat, that contain gluten, the resistant starch in arrowroot may improve gluten-free products' texture, flavor, and mouthfeel.

Development of biodegradable products

Arrowroot (*Maranta arundinacea*) has a pivotal role in the development of biodegradable products such as biocomposites. The rhizome of arrowroot is the main origin of starch and fibre [3, 4]. It has long fibrous roots with tuberous rhizomes [5]. The arrowroot plant is mainly found in the West Indies (Jamaica), Indonesia, Philippines, India, and Sri Lanka [14]. About 95% of the world's demand for arrowroot is fulfilled by St. Vincent (West Indies) [6].

The arrowroot is a high starch content rhizome. The extracted starch is known to be easily digested [7] and it also has an excellent gelling property [18]. It has a high content of amylose (35.20%) which makes it suitable for the production of films [14]. The technical properties of films, in particular when it comes to mechanical strength and barrier properties, are usually stronger than those of amylopectin [14], [3], [1], [2].

Some other beneficial and industrial uses

In the Caribbean, Indonesia, Sri Lanka, and other areas in the tropics. People in the food industry use the starchy rhizomes of arrowroot to make thickeners and stabilizers. Additionally, manufacturers use the fibrous waste to make paper products and other items.

- Arrowroot powder has a potential role in cosmetics as it has the capability of absorbing extra oil from the skin which in turn enhances skin rejuvenation.
- Arrowroot powder is rich in vitamins and minerals, including vitamin B6, iron, and calcium**.** The arrowroot plant is mainly found in the West Indies (Jamaica), Indonesia, Philippines, India, and Sri Lanka [5, 6]. About 95% of the world's demand for arrowroot is fulfilled by St. Vincent (West Indies) [6]. The arrowroot is a high starch content rhizome. The extracted starch is known to be easily digested [7] and it also has an excellent gelling property [8].
- It has a high content of amylose (35.20%) which makes it suitable for the production of films [6]. The technical properties of films, in particular when it comes to mechanical strength and barrier properties, are usually stronger than those of amylopectin [6], [7], [8], [9]. Recently, there has been a growing interest in the use of rigid nanoscale particles as reinforcement materials in polymeric matrices, composites, and nanocomposites.

Conclusion

Arrowroot powder offers numerous potential health benefits and industrial uses. It serves as a low-glycemic index alternative in flour products, potentially boosting immunity and aiding oral health with its anti-inflammatory and antibacterial properties. Rich in dietary fiber, it aids digestion and weight management, especially in gluten-free diets for celiac patients. Arrowroot also plays a role in biodegradable product development due to its starch and fiber content. Beyond health, it finds applications in cosmetics, food industry thickeners, stabilizers, and even as reinforcement materials in nanocomposites, showcasing its versatility and significance in various sectors.

References

1. Vijay Tambe D, Rajendra Bhambar S. Estimation of Total Phenol, Tannin, Alkaloid, and Flavonoid in *Hibiscus tiliaceus* Linn. Wood Extracts. Research and Reviews: Journal of Pharmacognosy and Phytochemistry. 2014;2(4):41-47.
2. Dosso K, N'guessan BB, Bidie AP, Gnangoran BN, Méité S, N'guessan D, *et al*. Antidiarrhoeal Activity of an Ethanol Extract of the Stem Bark of *Piliostigma reticulatum* (Caesalpiniaceae) in Rats. 2012;9(2):242-249.

3. Md. Khalilur Rahman, Md. Ashraf Uddin Chowdhury, Mohammed Taufiqual Islam, Md. Anisuzzaman Chowdhury, Muhammad Erfan Uddin, Chandra Datta Sumi, *et al*. Evaluation of Antidiarrheal Activity of Methanolic Extract of *Maranta arundinacea* Linn. Leaves. Hindawi Publishing Corporation Advances in Pharmacological Sciences, 2015, 1-6.
4. Deswina P, Priadi D. Development of Arrowroot (*Maranta arundinacea* L.) as Functional Food-Based of Local Resource. IOP Conference Series Earth and Environmental Science, 2020, 439.
5. Shintu PV, Radhakrishnan VV, Mohanan KV. A study on the genetic control and potential of the important agronomic characters of *Maranta arundinacea* L. International Journal of Current Research. 2016;8(10):39756-39761.
6. Sumitra Chanda. Importance of the pharmacognostic study of medicinal plants: An overview. Journal of Pharmacognosy and Phytochemistry. 2014;2(5):69-73.
7. Priyadarshani Samal, Jyoti Ranjan Rout, Ritarani Das, Santi Lata Sahoo, Bijaya Kumar Padhi. Screening and evaluation of phytochemicals from *Maranta arundinacea* L. International Journal of Biological and Medical Research. 2018;9(1):6212-6217.
8. Nishaa S, Vishnupriya M, Sasikumar JM, Gopalakrishnan VK. Phytochemical Screening and GC-MS Analysis of Ethanolic Extract of Rhizomes of *Maranta arundinacea* L. Research Journal of Pharmaceutical, Biological, and Chemical Sciences. 2013;4(2):52-58.
9. Nishaa S, Vishnupriya M, Sasikumar JM, Hephzibah P, Christabel Gopalakrishnan VK, *et al*. Antioxidant Activity of Ethanolic Extract of *Maranta Arundinacea*. L Tuberous Rhizomes. Asian Journal of Pharmaceutical and Clinical Research. 2012:5(4):85-88.
10. Kumalasari ID, Harmayani E, Lestari LA, Raharjo S, Asmara W, Nishi K, *et al*. Evaluation of immunostimulatory effect of the arrowroot (*Maranta arundinacea* L.) *in vitro* and *in vivo*. Cytotechnology. 2012;64:131-137.
11. Jayakumar A, Suganthi A. Biochemical and phytochemical analysis of *Maranta arundinacea* (L.) Rhizome. International Journal of Research in Pharmacy and Pharmaceutical Sciences. 2017;2(3):26-30.
12. Samal P, Tripathy P, Das R, Sahoo SL, Pradhan C, Padhi BK, *et al*. Vibriocidal activity of leaf and rhizome extracts of *Maranta arundinacea* L. Journal of Applied Biology and Biotechnology. 2019;7(5):79-82.
13. Rajashekhara N, Ashok BK, Parmeshwar P, Sharma B, Ravishankar. The evaluation of anti-ulcerogenic effect of rhizome starch of two source plants of Tugaksheeree (*Curcuma angustifolia* Roxb. and *Maranta arundinacea* Linn.) on pyloric ligated rats. AYU journal. 2014;35(2):191-197.
14. Francis T, Rajeshkumar S, Roy A, Lakshmi T. Anti-inflammatory and Cytotoxic Effect of Arrow Root Mediated Selenium Nanoparticles. Pharmacognosy Journal. 2020;12(6):1363-1367.