

Water hyacinth (eichhornia crassipes) essay sample

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A. BACKGROUND OF THE STUDY

Water Hyacinth (*Eichhornia crassipes*) plants grow abundantly here in the Philippines. They can be easily found on the bodies of water like rivers and lakes. They are problems in our community because they clog our rivers resulting to flood. They also block the sunlight, killing our aquatic animals. Thus, the researchers thought of discovering helpful products of the said plant. For the time being, ropes are being used by other people in their jobs. Take for instance in construction sites – synthetic ropes are in demand. But synthetic ropes are not environment-friendly and when disposed are not easily decomposed. Thereafter, the researchers thought of using the stalk of water hyacinth in producing an environment-friendly rope. In this way, people will not only appreciate the existence of the water hyacinths but will also help save the environment as well as make a living.

B. STATEMENT OF THE PROBLEM

General: Will the researchers be able to produce a rope out of a stalk of a plant?

Specific: Will the researchers be able to utilize the stalk of water hyacinth in the production of an affordable and environment-friendly rope that can be use by people every day? C. STATEMENT OF THE OBJECTIVE

General: The researchers will manufacture a rope made from stalk of plants.

Specific: The researchers will start the production of rope out of the stalk of water hyacinth to be used in different aspects of our everyday lives.

D. SIGNIFICANCE OF THE STUDY

Rope is a flexible line made of fibers or wires twisted or braided together for

tensile strength. Ropes may be made of natural fibers, such as cotton, hemp, jute, flax or sisal; of synthetic filaments, such as nylon, polyester or glass fibers; or of metallic wire. It is used for hauling heavy objects. Climbers also use ropes to belay or secure one another – one climbs while another holds the rope to prevent any fall or slip. There are more uses of rope. Hence, the researchers conducted a study on how to make a rope that is more practical and feasible. E. SCOPE AND LIMITATION

This study deals only on the production of rope out of the stalks of water hyacinth and it covers the properties of water hyacinth stalks, the extraction of fibers and the process of making a rope. The researchers were not able to construct a simple rope machine that will help them construct a rope. However, they were still able to produce the product which was made manually. F. REVIEW OF RELATED LITERATURE

Water Hyacinth

The seven species of water hyacinth comprise the genus *Eichhornia*. Water hyacinth is a free-floating perennial aquatic plant native to tropical and sub-tropical South America. With broad, thick, glossy, ovate leaves, water hyacinth may rise above the surface of the water as much as 1 meter in height. The leaves are 10–20 cm across, and float above the water surface. They have long, spongy and bulbous stalks. The feathery, freely hanging roots are purple-black. An erect stalk supports a single spike of 8-15 conspicuously attractive flowers, mostly lavender to pink in colour with six petals. When not in bloom, water hyacinth may be mistaken for frog's-bit (*Limnobium spongia*). One of the fastest growing plants known, water hyacinth reproduces primarily by way of runners or stolons, which eventually

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form daughter plants. It also produces large quantities of seeds, and these are viable up to thirty years. The common water hyacinth (*Eichhornia crassipes*) is a vigorous grower known to double their population in two weeks. In Assamese they are known as Meteka.

In Sinhala they are known as Japan Jabara due to their use in World War II to fool Japanese pilots into thinking lakes were fields usable to land their aircraft, leading to crashes. In Burmese they are known as Baydar. In Southern Pakistan, they are the provincial flower of Sindh. In the Philippines, they use some of the water hyacinth's stems and dry it to take its fibers and take them to form strands of string each. These pieces of string are woven or interlinked together to form hemp used for making bags, footwear, wreaths, hats, vases, Christmas lanterns, and more decorative materials. Because water lilies are prolific to the point of being a nuisance, this lets the people earn money by selling these products for a living while cleaning up the overpopulated bodies of water that are full of water hyacinths.

Water hyacinth has been widely introduced throughout North America, Asia, Australia and Africa. They can be found in large water areas such as Louisiana, or in the Kerala Backwaters in India. In many areas it, particularly *E. crassipes*, is an important and pernicious invasive species. First introduced to North America in 1884, an estimated 50 kilograms per square metre of hyacinth once choked Florida's waterways, although the problem there has since been mitigated. When not controlled, water hyacinth will cover lakes and ponds entirely; this dramatically impacts water flow, blocks sunlight from reaching native aquatic plants, and starves the water of oxygen, often killing fish (or turtles). The plants also create a prime habitat for mosquitos, <https://assignbuster.com/water-hyacinth-eichhornia-crassipes-essay-sample/>

the classic vectors of disease, and a species of snail known to host a parasitic flatworm which causes schistosomiasis (snail fever). Directly blamed for starving subsistence farmers in Papua New Guinea, water hyacinth remains a major problem where effective control programs are not in place. Water hyacinth is often problematic in man-made ponds if uncontrolled, but can also provide a food source for gold fish, keep water clean and help to provide oxygen to man-made ponds. Water hyacinth often invades bodies of water that have been impacted by human activities.

For example, the plants can unbalance natural lifecycles in artificial reservoirs or in eutrophied lakes that receive large amounts of nutrients. There are other uses being found for the abundant plants, such as for cattle food and in biogas production. Recently, they have also begun to be used in wastewater treatment due to their fast growth and ability to tolerate high levels of pollution. Parts of the plant are also used in the production of traditional handicrafts in Southeast Asia. In Bangladesh, farmers have started producing fertilizer using Water Hyacinth or Kochuripana as it is known there locally. As chemical and mechanical removal is often too expensive and ineffective, researchers have turned to biological control agents to deal with water hyacinth. The effort began in the 1970s when USDA researchers released three species of weevil known to feed on water hyacinth into the United States, *Neochetina bruchi*, *N. eichhorniae*, and the water hyacinth borer *Sameodes albiguttalis*. Although meeting with limited success, the weevils have since been released in more than 20 other countries. However, the most effective control method remains the control of excessive nutrients and prevention of the spread of this species.

In 2010 the insect *Megamelus scutellaris* was released by the Agricultural Research Service as a biological control for the invasive species *Eichhornia crassipes*, more commonly known as waterhyacinth. (United States Department of Agriculture, Agricultural Research Service,) May 2010 the USDA's Agricultural Research Service released *Megamelus scutellaris* as a biological control insect for the invasive waterhyacinth species. *Megamelus scutellaris* is a smallplanthopper insect native to Argentina. Researchers have been studying the effects of the biological control agent in extensive host-range studies since 2006 and concluded that the insect is highly host-specific and will not pose a threat to any other plant population other than the targeted water hyacinth. Researchers also hope that the biological control will be more resilient than existing biological controls to the herbicides that are already in place to combat the invasive (http://en.wikipedia.org/wiki/Water_hyacinth)

Rope

A rope is a length of fibres, twisted or braided together to improve strength for pulling and connecting. It has tensile strength but is too flexible to provide compressive strength (i. e. it can be used for pulling, but not pushing). Rope is thicker and stronger than similarly constructed cord, line, string, and twine. (<http://en.wikipedia.org/wiki/Rope>)

History of Rope

The use of ropes for hunting, pulling, fastening, attaching, carrying, lifting, and climbing dates back to prehistoric times. It is likely that the earliest “ropes” were naturally occurring lengths of plant fibre, such as vines, followed soon by the first attempts at twisting and braiding these strands together to <https://assignbuster.com/water-hyacinth-eichhornia-crassipes-essay-sample/>

form the first proper ropes in the modern sense of the word. Impressions of cordage found on fired clay provide evidence of string and rope-making technology in Europe dating back 28, 000 years. Fossilized fragments of “probably two-ply laid rope of about 7 mm diameter” were found in one of the caves at Lascaux, dating to approximately 15, 000 BC. The ancient Egyptians were probably the first civilization to develop special tools to make rope.

Egyptian rope dates back to 4000 to 3500 B. C. and was generally made of water reed fibres. Other rope in antiquity was made from the fibres of date palms, flax, grass, papyrus, leather, or animal hair. The use of such ropes pulled by thousands of workers allowed the Egyptians to move the heavy stones required to build their monuments. Starting from approximately 2800 B. C., rope made of hemp fibres was in use in China. Rope and the craft of rope making spread throughout Asia, India, and Europe over the next several thousand years. In the Middle Ages (from the 13th to the 18th centuries), from the British Isles to Italy, ropes were constructed in so-called Ropewalks, very long buildings where strands the full length of the rope were spread out and then laid up or twisted together to form the rope. The cable length was thus set by the length of the available rope walk. This is related to the unit of length termed cable length. This allowed for long ropes of up to 300 yards long or longer to be made. These long ropes were necessary in shipping as short ropes would require splicing to make them long enough to use for sheets and halyards. The strongest form of splicing is the short splice, which doubles the diameter of the rope at the area of the splice, which would cause problems in running the line through pulleys. Any splices narrow enough to maintain smooth running would be unable to support the required weight.

Leonardo da Vinci drew sketches of a concept for a ropemaking machine, but just like many other of his inventions, it was never built. Nevertheless, remarkable feats of construction were accomplished without advanced technology: In 1586, Domenico Fontana erected the 327 ton obelisk on Rome's Saint Peter's Square with a concerted effort of 900 men, 75 horses, and countless pulleys and meters of rope. By the late 18th century several working machines had been built and patented. Some rope continues to be made from natural fibres such as coir and sisal, despite the dominance of synthetic fibres such as nylon and polypropylene which have become popular since the 1950s. (<http://en.wikipedia.org/wiki/Rope#History>)

Construction of Rope

Common materials for rope include natural fibres such as manila hemp, hemp, linen, cotton, coir, jute, and sisal. Ropes have been constructed of other fibrous materials such as silk, wool, and hair, but such ropes are not generally available. Rayon is a regenerated fibre used to make decorative rope (<http://en.wikipedia.org/wiki/Rope#Construction>)

Uses of Rope

Rope is of paramount importance in fields as diverse as construction, seafaring, exploration, sports and communications and has been since prehistoric times. In order to fasten rope, a large number of knots have been invented for countless uses. Pulleys are used to redirect the pulling force to another direction, and may be used to create mechanical advantage, allowing multiple strands of rope to share a load and multiply the force applied to the end. Winches and capstans are machines designed to pull ropes. (<http://en.wikipedia.org/wiki/Rope#Usage>)

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Fiber

Fiber (also spelled fibre) is a class of materials that are continuous filaments or are in discrete elongated pieces, similar to lengths of thread. They are very important in the biology of both plants and animals, for holding tissues together. Human uses for fibers are diverse. They can be spun into filaments, string or rope, used as a component of composite materials, or matted into sheets to make products such as paper or felt. Fibers are often used in the manufacture of other materials. The strongest engineering materials are generally made as fibers, for example carbon fiber and Ultra-high-molecular-weight polyethylene. Synthetic fibers can often be produced very cheaply and in large amounts compared to natural fibers, but for clothing natural fibers can give some benefits, such as comfort, over their man-made counterparts. (<http://en.wikipedia.org/wiki/Fiber>)

Synthetic Fibers

Synthetic fibers are the result of extensive research by scientists to improve on naturally occurring animal and plant fibers. In general, synthetic fibers are created by forcing, usually through extrusion, fiber forming materials through holes (called spinnerets) into the air, forming a thread. Before synthetic fibers were developed, artificially manufactured fibers were made from cellulose, which comes from plants. These fibers are called cellulose fibers. Synthetic fibers account for about half of all fiber usage, with applications in every field of fiber and textile technology. Although many classes of fiber based on synthetic polymers have been evaluated as potentially valuable commercial products, four of them – nylon, polyester, acrylic and polyolefin – dominate the market. These four account for

approximately 98 per cent by volume of synthetic fiber production, with polyester alone accounting for around 60 per cent. (http://en.wikipedia.org/wiki/Synthetic_fiber)

Dye

A dye is a colored substance that has an affinity to the substrate to which it is being applied. The dye is generally applied in an aqueous solution, and may require amordant to improve the fastness of the dye on the fiber. Both dyes and pigments appear to be colored because they absorb some wavelengths of light more than others. In contrast with a dye, a pigment generally is insoluble, and has no affinity for the substrate. Some dyes can be precipitated with an inert salt to produce a lake pigment, and based on the salt used they could be aluminum lake, calcium lake or barium lake pigments. Dyed flax fibers have been found in the Republic of Georgia dated back in a prehistoric cave to 36, 000 BP. Archaeological evidence shows that, particularly in India and Phoenicia, dyeing has been widely carried out for over 5000 years. The dyes were obtained from animal, vegetable or mineral origin, with no or very little processing. By far the greatest source of dyes has been from the plant kingdom, notably roots, berries, bark, leaves and wood, but only a few have ever been used on a commercial scale. (<http://en.wikipedia.org/wiki/Dye>)

* METHODOLOGY –

A. TREATMENT

1. Gathering of Materials

The researchers gathered the materials such as glue, pail or basin, craft

knife or scissors, candle, matches, spoons, water (6000mL), vinegar (1000mL), coloring dye, graduated cylinder and the stalks of the water hyacinth. 2. Preparation of Materials

First, the leaves and the roots of water hyacinth were cut off from the stalks. The stalks are then washed with running water. Then, the stalks were cut into halves (lengthwise) and were again washed. They were pressed and mounded to remove excess water. After that, the fibers were extracted from the stem with the use of spoon and finger. The extracted fiber strands were cleaned or furnished by a comb. To strengthen the extracted fiber strands, they were soaked overnight in 6000mL water and 1000mL vinegar solution to eliminate the bacteria left in the fiber that may affect the odor of the fiber. After soaking, they were washed in running water for at least 15 minutes and dried under the sun for two days. When they have been dried up, they are ready to be process for the fabrication of ropes.

B. GENERAL PROCEDURE

The researchers started constructing the rope by following the traditional way of rope making. First, they take three small bunches of fiber and twisted each. They applied small amount of glue to make the twisted fibers more compact and tight. After the first bunch of fiber is twisted, another bunch is connected at the end. They twist the two bunches together. They continue this process until they attained the desired thickness of the rope. After the completion of the structure of the rope, glue was applied entirely on the structure to become stronger and better. It is then passed over the fire. The excess fibers and the loose ends are burned off. This makes the rope smooth

and polished. Finally, the finished rope was colored with dye so it may look professionally well and presentable.

* INTERPRETATION OF DATA AND RESULTS –

Production of Rope out of the Stalk of Eichhornia Crassipes

Table A

TRIAL	DIAMETER	LENGTH	NO. OF DAYS DRIED	AMOUNT OF GLUE WITH WATER APPLIED	OUTPUT
1	1. 50 cm	35 cm	not dried	15 mL	Soft and breakable rope
2	1. 50 cm	75 cm	2 days	15 mL	Hard, firm and unbreakable rope
3	1. 50 cm	35 cm	1 day	15 mL	Firm and unbreakable rope

Strength Test (A)

The researchers requested two members, weighing approximately 50 kilograms each, to hold the rope at both ends and pull them on opposite directions. The result was: First Rope = the rope broke

Second rope = the rope did not break

Third rope = the rope broke

Table B

KIND OF ROPE	DIAMETER	LENGTH	AMOUNT OF WEIGHT APPLIED TO THE ROPE	OUTPUT
Water Hyacinth	1. 50 cm	75cm	3 hollow blocks	Hard, firm and unbreakable
Synthetic Rope	1. 60 cm.	80 cm	Cannot be broken by 7 hollow blocks	Flexible and unbreakable rope

*Assuming a hollow block weighs 23 lbs.

Strength Test (B)

The researchers tied the maximum number of hollow blocks on each kind of

rope to determine the utmost weight or force that each rope can withstand. The results are shown on the table above.

Acceptability

Based on the strength test completed by the researchers, the rope that they produced manually is durable as the other kinds of ropes that are manufactured by rope factories through the use of rope machines. It is also environment-friendly since it can help diminish the use of synthetic ropes that have undergone chemical processes. Moreover, in view of the fact that water hyacinth grow in abundance here in the Philippines, it is trouble-free to produce the rope specially that the procedure is simple.

* CONCLUSION –

The researchers were able to manufacture rope out of the stalks of water hyacinth plants. The rope was well built and was able to pass different strength tests that examined its strength as expected. Therefore, the researchers conclude that utilization of the stalk of water hyacinth as the raw material in the production of environment friendly rope is feasible.

* RECOMMENDATION –

The researchers were able to produce only short rope. They suggest other researchers who are interested in their project to look for other elements that will give the rope extra strength and they also suggest that before conducting the experiment, they can try to possibly build a simple rope machine. They also recommend that the rope should be treated with sodium metabisulphite to prevent it from rotting. Further study about their project is necessary so that better results will be obtained.

* BIBLIOGRAPHY

A. Internet

http://practicalaction.org/practicalanswers/product_info.php?products_id=189

(June 29, 2011 9: 40 pm)

<http://www.madehow.com/Volume-2/Rope.html>

(June 29, 2011 9: 46 pm)

<http://www.britannica.com/EBchecked/topic/509538/rope/6244/Manufacturing-process>

(June 29, 2011 9: 58pm)

http://en.wikipedia.org/wiki/Water_hyacinth

(August 4, 2011 3: 38pm)

(<http://en.wikipedia.org/wiki/Dye>)

(August 4, 2011 3: 45pm)

(http://en.wikipedia.org/wiki/Synthetic_fiber)

(August 4, 2011 3: 50pm)

(<http://en.wikipedia.org/wiki/Fiber>)

(August 4, 2011 3: 52pm)

(<http://en.wikipedia.org/wiki/Rope#Usage>) (August 4, 2011 3: 55pm)

<https://assignbuster.com/water-hyacinth-eichhornia-crassipes-essay-sample/>

(<http://en.wikipedia.org/wiki/Rope#Construction>) (August 4, 2011 3: 57pm)

(<http://en.wikipedia.org/wiki/Rope#History>)

(August 4, 2011 4: 02pm)

B. Write Ups

A Research paper about Rope Construction

By: SSC Students

(Pampanga High School S. Y. 2006-2007)

– APPENDIX –

Methodology in Action

2. Cutting off the stalks

1. Gathering of materials

4. Washing thoroughly

3. Cutting the stalks lengthwise

5. Extracting fibers from the stem

6. Soaking overnight in 6000mL water and 1000 mL vinegar solution

8. Drying up (under the sun)

7. Washing for 15 minutes

10. Applying glue in the process

9. Twisting the fibers together

12. Applying glue entirely

11. Twisting the twisted bunches

(Achieving the desired thickness)

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15. Finished product (colored with dye)
14. Passing over the fire
13. Drying the bunches with glue