Review Article

BIOPROSPECTING OF BAMBOO: A REVIEW

Abstract

The main objective of this review is to describe the bioprospecting and other benefit of the bamboo. Bamboo is the fastest growing plant belongs to poaceae family. Totally 1600 species (114 Genera) are spread all over the world including India. As per recent worldwide suvey, 33.1 billion metric tons/year of carbon produces and 238 million tons of carbon sink by the total bamboo forest. In India, 50% of the bamboo species are cultivated and increases maximum revenue of the country. Bamboo has vital role in carbon sequestration it estimated upto 40 – 45 % of carbon sequest and produces 35 % of oxygen to reduce the global warming. And its has trementous application like soil carbon storage, biofuel production, construction and production of edible products etc,. Bamboo is also one of the important species has applications like anti oxidant properties, anti inflammatory properties etc. This review mainly describes the carbon sequestration, oxygen production, bamboo health benefits. And this article will be an important evidence for the future bamboo research.

Keywords: Bamboo, Carbon Sequestration, Global Warming, Oxygen, India, World, Medicinal benefits.

1. INTRODUCTION:

Nowadays,greenhouse gases such as carbon dioxide, methane were increasing carbon rate and by increasing global warming in the earth's environment. Air pollution, climate changes, and soil condition changes were gradually increasing year by year. Carbon sequestration is the long-term removal of carbon-related matters like carbon, carbon dioxide, methane, and other harmfull emissions matters from the ecosystem (**Sedjo et al . (2012); Hodrien et al. (2010,11)**. Tropical forests, mangrove forests, mixed forest,

bamboo forest, and other types of forests are majorly helping to control climate changes and air pollutions. Mangrove forest contains well-adapted plant species that are grown in fresh, brackish and saltwater wetlands. The mangrove forest takes a major role in controlling air pollution and climate-changing. At the assessment of 1980, 15.6 million hectares of mangrove forests were elaborate in the world **(FAO .1981a, 1981b, 1981c**). In another forest type, Bamboo forest is the best source to control the carbon and other matters in the environment.

1.1 Bamboo:

Bamboo is the fastest-growing grass family. Compare to woody plants, bamboo has unique features present in culms and easy propagation methods with high commercial species (Isagi et al 1997). The unique features in the bamboo species as it involves in the Land rehabilitation, carbon sequestration, soil erosion, and water conversion compared to the other woody plants (**Zhou et al. 2005**). Bamboo has been classified into 114 genera and 1600 species varieties of bamboo are in the world. It is a grass family of *Poaceae* in the subfamily of *Bambusoideae* evergreen perennial flowering plant. In specific, some species of bamboo can grow 36 inches in 24 hours cycle. Therefore, they grow 1 inch every 40 minutes in the life cycle with their suitable climatic conditions. Bamboos are of cultural significance in South Africa and South Asian countries in the regions like India, Bhutan, Maldives, Nepal, and Sri Lanka (Farrelly et al 1984). Bamboo forests are highly used for potential carbon fixing and also 5 times more fixing the ecosystem compared to other forests (3). China is the first country in the cultivation of bamboo resources and cultivates around 500 species in 39 genera (**Jiang et al. 2009**). India is the second-largest in the cultivation of bamboo resources. In 50 % of species of bamboo are cultivated in eastern india regions are Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, and West Bengal. In various parts of india like Andaman and

Nicobar Islands, Chhattisgarh, Madhya Pradesh, and the Western Ghats are other areas rich in bamboo cultivation resources (**Chandrashekara Viswanath, 2019**). In India, Assam cultivates the highest tonnes of bamboo compared to other Indian states. In recent research reported on approximately 40 – 50% of carbon stores 2 times faster by the bamboo forest (**Chandrashekara Viswanath, 2019**). In yearly, the single bamboo species can averagely absorb 15.6kg of carbon dioxide.

2. Importance of bamboo

Bamboos are one of the most importantly renewable, easily obtained, and the valuable of all forest resource. This species were containing biologically active components and secondary plant metabolites were treats many diseases like hypertension, arteriosclerosis, cardiovascular diseases, and cancer [50-52]. In the secondary metabolites, the biologically active extracts like peptides and polysaccharides in the many bamboo species having many biological activities like 1) Anti-oxidant studies, 2) Anti-microbial activities and 3) Miscellaneous activities like free-radicals, anticancer activities, and many other activities (citation).

2.1 Medicinal Importance of Bamboo:

2.1.1. Antioxident properties:

It is a chemical substance found in terms of food, in high dietary intake to cures chronic diseases like cancer, cardiac related problems. In the 1990's Ishii and Hiroi (1990) invented a Diferuloyl arabinoxylan Compound, the compound that contains 5-5 linkage diferuloyl isolated from bamboo shoots and is named as a ferulic acid (**Chogtham Nirmala, 2018**). Some studies shows Dendrocalamus, Bambusa, Phyllostachys species having more antioxidant properties in their shoots. (**Park & Jhon, 2010; Andras Nemenyl et al. 2015**).

2.1.2 Dietary Fiber:

Bamboo shoots having more dietary fiber content with the low amount of calories and mineral nutrients. By analyzing 2.23g – 4.23 grams of dietary fiber present in the 100 gm of bamboo shoots (**Nirmala et al. 2009**). Mature shoots having more fiber content compared to young shoots. Bambusa, Dendrocalamus, Gigantochloa species of bamboo having more dietary fiber contents. By serving, bamboo shoots having more dietary fibers compounds compared to daily intake of common vegetables (**Nirmala et al. 2011**).

2.1.3 Anti-diabetic Property:

Diabetes is the world's 2nd largest disease in population and majorly growing health problem. Several chemical based Medicines and Natural herbal medicines are using as a remedy for diabetes (**Verma et al. 2010; Sikarwar et al. 2010**). Majorly bamboo species of *(Bambusa vulgaris*) resulting to lower the diabetes from the range of 250.14 mg/Dl to 144.75 mg/Dl with in 20 days treatment time (**Senthilkumar et al. 2011**).

2.1.4 Anti-Ulcer Activity:

Ulcer is the discontinuation of the gastrointestinal tract's inner lining because of the secretion of gastric acid. Stomach pain is the most common symptom of the ulcer. By experimenting, the extracts were prepared from *Bambusa balcooa* leaves and testing as an oral medicine to ulcer created mice. The bamboo leaves shows 14.44% protective ratio compared to the standard ranitidine show a 60% protective ratio (**Anil Upreti et al. 2016**).

2.1.5 Anti- Cancer Activity:

Cancer term refers to uncontrollable & abnormal cell growth. In recent years, Chemotherapy is used to treat cancer with side effects. Minimal side effects chemotherapy medicines are very cost-effective. In current research, *Phyllostachys bambusoides* shows 31.52% and

Phyllostachys pubescens show 33.13% more powerful chemotherapeutic against PC-3 cell line (**Ji-Su Kim et al. 2014**).

2.1.6 Bamboo in Body Weight Loss:

Body Obesity is one of the major diseases that leads to many body problems like Stroke, Cardiac Arrest, Kidney problems, and Diabetic problems and leads to death. As a result of dieting and Exercises, obesity can control. In dieting, bamboo is one of the medicinal sources with low calories, to control obesity. Bamboo leaf and shoots are the remedies to increase the metabolism rate and improves weight loss (**ChangjiangYing et al. 2017**).

2.2 Industrial products from Bamboo:

2.2.1 Cellulose production from bamboo:

Bamboo cellulose is the reinforcing material, mainly it has high strength and stiffness, low weight and biodegradability habit. Dewaxing, delignification and mercerization are the chemical treatments that have been followed to produce the cellulose from the raw bamboo. β - glycosidic linkages are present in the anhydroglucose of cellulose. Bamboo cellulose compared to commercial cellulose shows the equivalent peak between C – C and C – H (**Fui Kiew Liew, 2015**).

2.2.2 Bambo Salt:

Jugyeom is another name for Bamboo salt. In high temperature, the salt neutralized the inorganic contents such as calcium, potassium, iron, copper and zinc are increased. Bamboo salt having huge medicinal applications and cures traditionally, the inflammation diseases, ulcer, and other chronic diseases like, indigestion, dysentery (blood flux),dysentery with diarrhea, mouth tumor, tongue tumor and skin diseases (**In-san Kim (1981); Bitterman & Mark (2018**)).

2.2.3 Bamboo Cotton:

Bamboo cotton is an ecofirendly produced cotton fiber material. The cotton are extracted by Mechanical method, chemical method or combined mechanical and chemical method. (**Afrin et al. 2012; Afrin et al. 2009; Mishra et al. 2012; Witayakran et al. 2013**). Bamboo cotton is an unique, more strength, antibacterial property, and also weight less material (**Free Fly, n.d.**; **Rodie, 2010; Zhou et al. 2015**). By research production, 3000 mg of cotton was produced from 110gm of bamboo by the combined process (**Bahrum Prang Rocky, 2018**).

2.2.4 Bamboo Bio-ethanol:

The production of ethanol from biological matters and plants, is called Bioethanol. In the optimized conditions, the alkali pretreated bamboo biomass are hydrolate and saccirificed and forms 6.68% of a glucose molecule and the innoculam of *Saccharomyces cerevisae* are introduced to the optimized condition the ethanol is produced (**Soto et al. 2005**). Finally, 25.28 milliliters of ethanol were produced by spending 10gm of bamboo strips. By theoretical experiment, 1 ton of bamboo can produce 143L of Bio-ethanol (**Wayman, 1996; Kuttiraja, 2014)**.

2.2.5 Bamboo vinegar:

Bamboo vinegar is one of the by-product of bamboo. It having more environmental and agricultural applications. Pyrolysis of bamboo vinegar is collected by the condensation of vapour of bamboo (**Uchendra et al. 1993; Yatagai, 1987**). The bamboo vinegar are supports bowl health, liver health, combats diarrhea, combats vomiting, promotes oral health, etc., (**Edward, 2014**).

2.2.6 Bamboo Charcoal:

Bamboo charcoal is made from low ash bamboo pieces. The bamboo charcoals is 10 times stronger and 4 times more absorbent rate. It absorbs toxic gases, harmful chemicals, absorb and eliminates the bacterias, virus, fungi and molds, filters waters, treats diarrhea, increases oral health and tooth gums, used as a deodrant, treats skin infections, increases kidney function, reduces gastrointestinal damage, reduces the kidney chronic inflammation diseases, etc. (**Nosratola et al. 2013**).

2.3 Environmental Aspect in Bamboo:

2.3.1 Bamboo Oxygen Park:

Bamboo oxygen park was established in the year 2019 by Tamilnadu Agricultural University, Coimbatore. The university planting more than 590 species of Bheema Bamboo in 1.45 Acres around the TNAU campus, Coiambatore. Every Mature bamboo produces 300kg of Oxygen per year, this amount is enough for a single person and also they absorb and sequester 400kg of Carbon dioxide (TNAU, 2019).

3. CARBON SEQUESTRATION BY BAMBOO

3.1 Carbon sequestration:

Carbon sequestration is the process of long-term removal, capture, or sequestration of carbon dioxide from the ecosystem. it's the replacement of depository to the CO_2, not released back to the ecological system. Reduction of air pollutions from the air and improving the soil carbon content. Carbon sequestration is classified by the basis of carbon sequestered methods. 1) Geological sequestration – it sequestered the carbon Yetground. 2) Ocean Sequestration – it sequestered the carbon from the deep ocean. 3) terrestrial Sequestration – it sequestered the carbon from the plant and soil. By the carbon dioxide

capture technology, they are classified into three types 1) Pre-combustion, 2) Post-combustion and 3) Oxyfuel combustion (**Karthik Patil, 2017**).

3.2 Total Carbon Emission:

The USGS survey, 33.6 billion metric tonnes of carbon dioxide emitted globally in the year 2019. China shares 28% of carbon dioxide emissions in the total global emissions. Next, the USA shares 15% of carbon dioxide emissions in the total global emissions. India shares 7 % of carbon dioxide emission in the total global emissions. (2019).

3.3 Bamboo Forest in Carbon control:

Bamboos forest are one of the main sources to control the global carbon emissions. Mainly, the bamboo zones are Asia, America, Pacific and Africa having 14 millions hectares of bamboo forest. In world wide, East Asia and Southeast Asia having 80% varieties of bamboo species. They are doing their responsible work of Carbon sink and help to environment pollution free for socioeconomic development. One hectare of bamboo can sink the carbon stocks around the 17 tonnes per year cycle. Therefore, 238 millions tonnes of carbon can sink by the total world bamboo forest areas (**Yang Yuming et al.**).

3.4 Bamboo Forest Diversity in India:

Conservation of bamboo area in India having 9.57 m hectares of bamboo surrounding areas. Nearly 12.8% of bamboo forests are in India. West Bengal, Sikkim, Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Mizoram, Tripura are the states having 50% more varieties species of bamboo in the Indian floristic region. Mostly Bambusa, D.Dinohloa,

Gigantochloa, Melocanna, Schizotachyum, Thamnocalamus etc are the 339 various Species (20 genera) of the bamboo present in 12 Indian states. (Sas Biswas).

3.5 Carbon Sequestration In Bamboo Species:

The Bamboo culms, twings, and leaves are the components for biomass allocation and their percentage contribution to the total biomass estimation for the locations. The species viz., carbon storage amounts by each species data were shown in **Table 1.** below.

Table – 1: Carbon Sequestration studied bamboo:

S. No	Bamboo species	Carbon Sequestration (T/Ha/year)
1	*Arundinaria appalachiana*	16.84
2	*Yushania alpina*	67.7
3	*A. pusilla*	15.2
4	*Acidosasa edulis*	7
5	*Bambusa balcooa*	65.40
6	*B. arundinacea*	50.9
7	*B. bambos*	148.9
8	*B. cacharensis*	6.51 -8.9
9	*B. multiplex*	2.4
10	*B. fangiana*	5.5
11	*Bashania fargesii*	4.5
12	*B. nutans*	89 -96
13	*B. polymorpha*	77.67
14	*B. oldhamii*	74.4
15	*B. arundinacea*	50.9
16	*B. blumeana*	93
17	*B. burmanica*	30.8
18	*B. chungii*	37.7
19	*B. dolichomerithalla*	49.1
20	*B. pachinensis*	50.5
21	*B. rigida*	41.5
22	*B. stenostachya*	273.9
23	*Bambusa textilis*	26.2
24	*B. tulda*	53
25	*B. oldhamii*	51.5
26	*B.vulgaris*	77.67
27	*Chimonobambusa quadrangularis*	11.1
28	*Chusquea culeou*	80.8
29	*C. tenuiflora*	6.5

30	*Cephalostachyum virgatum*	11.54
31	*Dendrocalamus asper*	108.1
32	*D. barbatus*	44.6
33	*D. giganteus*	47.8
34	*D. hamiltonii*	70.8
35	*D. latiflorus*	40.8
36	*D. membranaceus*	23.8
37	*D. strictus*	49.1
38	*Fargesia denudate*	113.5
39	*F. scabrida*	4.4
40	*F. spathacea*	10.9
41	*Guadua angustifolia*	80.8
42	*G. weberbaueri*	155.5
43	*Gigantochloa levis*	72
44	*G. apus*	29.7
45	*Gigantochloa atter*	37
46	*G. Verticillata*	37
47	*G. scortechinii*	36
48	*Gelidocalamus stellatus*	8.0
49	*Melocanna baccifera*	58
50	*Neosinocalamus affinis*	78.2
51	*Oligostachys atroviginiata*	35.4
52	*Phyllostachys atroviginata*	148.3
53	*P. bambusoides*	73.1
54	*P. edulis*	286.1
55	*P. pubscens*	41
56	*P. heteroclada*	69
57	*P. bambusoides*	41.8
59	*P. makinoi*	128.2
60	*P. meyeri*	101.2
61	*P. nidularia*	47
62	*P. nigra*	43.2
63	*P. praecox*	12.1
64	*P. rutila*	185.2
65	*P. viridis*	57.4
66	*Pleioblastus amarus*	16.1
68	*P. amabilis*	48.10
69	*P. usawai*	16.1
70	*Qiongzhuea tumidinoda*	8.5
71	*Sasa kurilensis*	16.1
72	*S. dullooa*	34
73	*S. nikkoensis*	8.5
74	*S. nipponica*	16.1
75	*S. senanensis*	25.7
76	*Schizostachum lumampao*	42.9
77	*Sinarundinaria fangiana*	3.7
78	*Thyrsostachys siamensis*	26.9
79	*Thyrsostachys oliveri*	21.15
80	*Ochlandra setigera*	73.4

81	*O. travancorica*	3.23

Ref: Jia Qi Yuen et al. 2017; Lei Gu et al. 2019; Md. Shawkat islam Sohel et al. 2015; Chuanbao Yang et al. 2021); Kavita Tariyal et al 2013; Mukta Chandra Das et al. 2019.

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YET TO STUDY BAMBOO SPECIES IN CARBON SEQUESTRATION:

There are 1662 variety spceies of bamboo around in earth. Only 81 species of bamboo are studied about the carbon sink. 1583 species are yet to studied. The following bamboo species are, *Acidosasa viclavata, A. brilletii, A. acarinata, A. chienouensis, A.chinensis, A.guangxiensis, A.lingchuanensis, A.nanunica, A.notate, A.purpurea, A.venusta, Actinocladum verticillatum, Agnesia lanciflia, Alvimia auriculata, A. gracilis, A. lancifolia, Ampelocalamus actinotrichus, A. reviligulatus, A. alcareus, A. hirsutissimus, A. luodianensis, A. melicoideu,s A. mianningensis, A. microphyllus, A. naibunensis, A. patellaris, A. saxatilis, A. scandens, A. yongshanensis, A. kontumensis, Apoclada simplex, A. bahiensis, A. costaricensis, A. dressleri, A. flaccid, A. grayumii, A. lancifolia, A. venezuelae, Aethrostylidium angustifolium, A. auriculatum, A. banaoense, A. berryi, A. canaliculatum, A. chiribiquetense, A. cubense, A. distichum, A. ecuadorense, A. ekmanii, A. excelsum, A. farctum, A. fimbriatum, A. fimbrinodum, A. grandifolium, A. haitiense, A. judiziewiczii, A. longiflorum, A. merostachyoides, A. multispicatum, A. mobtusatum, A. pubescens, A. punctulatum, A. reflexum, A. sarmentosum, A. scandens, A. schomburgkii, A. simpliciusculum, A. urbanii, A. venezuelae, A. virolinense, A. youngianum Arundinaria gigantean, A. tecta, A. capitata, Atractantha amazonica, A. aureolanta, A. cardinalis, A. falcata, A. radiata, A. shepherdiana, Aulomenia amplissima, A. aristulata, A. bogotensis, A. boliviana, A. bromoides, A. chimantaensis, A. cincta, A. cochabambensis, A. adavid-smithii, A. deflexa, A. dinirensis, A. effuse, A. fuentesii, A. glaziovii, A. goyazensis, A. haenkei, A.*

herzogiana, A. hirtula, A. humillima, A. insignis, A. jauaensis, A. laxa, A. longiaristata, A. longipedicellata, A. madidiensis, A. nitida, A. notate, A. parviflora, A. patriae, A. patula, A. prolifera, A. pumila, A. purpurata, A. queko, A. radiate, A. ramosissima A. robusta, A. rubraligulata, A. scripta, A. setigera, A. setose, A. oderstromii, A. ubpectinata A. tremula, A. trianae, A. verrucose, A. viscose, A. xerophylla, A. ximenae, A. yanachagensis, Bambusa affinis, Bambusa alamii, B. albolineata, B. alemtemshii, B. amahussana, B. amplexicaulis, B. angustiaurita, B. angustissima, B. aristate, B. arnhemica, B. assamica, B. aurinuda, B. australis, B. barpatharica, B. basihirsuta, B. basihirsutoides, B. beecheyana, B. bicicatricata, B. binghamii, B. blumeana, B. boniopsis, B. brevispicula, B. brunneociculia, B. burmanica, B. cerosissima, B. chunii, B. clavate, B. comillensis, B. contracta, B. copelandii, B. corniculate, B. corniculate, B. crispiaurita, B. adampaeana, B. diaoluoshanensis, B. dissimulator, B. distegia, B. adolichoclada, B. duriuscula, B. emeiensis, B. eutuldoides, B. farinacea, B. fimbriligulata, B. flexuosa, B. fruticose, B. funghomii, B. garuchokua, B. gibba, B. gibboides, B. glabrovagina, B. glaucophylla, B. grandis, B. griffithiana, B. guangxiensis, B. hainanensis, B. heterostachya, B. inaurita, B. indigena, B. insularis, B. intermedia, B. jacobsii, B. khasiana, B. kingiana, B. kyathaungtu, B. salako, B. salapidea, B. latideltata, B. salaxa, B. salenta, B. salineata, B. longipalea, B. longisipiculata, B. macrolemma, B. macrotis, B. maculate, B. majumdarii, B. malingensis, B. manipureana, B. marginata B. merrillii, B. mitis, B. mizorameana, B. mohanramii, B. mollis, B. multiplex, B. mutabilis, B. nagalandiana, B. nairiana, B. nepalensis, B. nutans, B. odashimae, B. oldamii, B. oliveriana, B. ooh, B. apachinensis, B. pallid, B. papillate, B. papillatodies, B. apervariabilis, B. pierreana, B. piscatorum, B. polumorpha, B. procera, B. promines, B. ramispinosa, B. rangaensis, B. rectocuneata, B. remotiflora, B. riauensis, B. riparia, B. rongchengensis, B. arugata, B. rutila, B. salarkhanii, B. semitecta, B. sequiflora, B. sinospinosa, B. sinthana, B. salomonensis, B. tenaaurita, B. subaequalis, B. subtruncata, B. surrecta, B. teres, B.

thalawwa, B. thorelii ,B. transvenula, B. truncate, B. tsangii, B. tulda, B. tuldoides,B.utilis,B. valida, B. variostriata, B. villosula, B. vinhphuensis, B. virginalis, B. viridis, B. vulgaris B. wenchouensis, B. wiesneri, B. xiashanensis, B. xueana, Bashania fargesii, B. qingchengshane, Bergbam bostessellata, Boniaam plexicaulis, Bonia levigate, B. parvifloscula, B. solida, B.tonikinensis, Buergersiochloa bambusoides, Camba juvaulei, Cathariostachys capitata, C. madagascariensis, Cephalostachyum burmanicum, C. capitatum, C. chapelieri, C. chevalieri, C. flavescens, C. langbianense, C. latifolium, C. manii, C. mindorense, C. pallidum, C. pergracile, C. perrieri, C. scandens, C. viguieri, Chimonobambusa angustifolia, C. armata, C. arunachalensis, C. abrevinoda, C. callosa, C. communis, C. convolute, C. damingshanensis, C. fansipanensis, C. gracilis, C. grandifolia, C. hejiangensis, C. hirtinoda, C. hsuehiana, C. jainii, C. lactistriata, C. leishanensis, C. luzhiensis, C. macrophylla, C. marmoreal, C. metuoensis, C. microfloscula, C. montigena, C. ningnanica, C. opienensis, C. pachystachys, C. paucispinosa, C. puberula, C. pubescens, C. purpurea, C. busarigidula, C. sichuanensis, C. szechuanensis, C. tuberculate, C. tumidisinoda, C. unifolia, C. utilis, C. verruculosa, Chimonocalamus baviensis, C. burmaensis, C. cibarius, C. delicates, C. dumosus, C. fimbriatus, C. gallatlyi, C. griffithianus, C. longiligulatus, C. longispiculatus, C. longiusculus, C. lushaiensis, C. makuanus, C. montanus, C. nagaiandianus, C. pallens, C. peregrines, C. tortuosus, Chusquea abietifolia C. acuminate, C. acuminatissima, C. abilanata, C. amistadensis, C. andina,C. nelytra, C. anelytroides, C. angusta, C. angustifolia, C. annagardneriae, C. antioquensis, C. aperta, C. arachinformis, C. argentina, C. aristata, C. aspera, C. asymmetrica, C. attenuate, C. aurea, C. bauclifera, C. bahiana, C. bambusoides, C. barbata, C. bilimekii, C. bardei, C. amanoi, C. caparaoensis, C. capitata, C. capitulifolia, C. ciliata, C. ciliatifolia, C. ircinata, C. clarkiae, C. aclemirae, C. acoronalis, C. cortesii, C. costaricensis, C. uleou, C. cumingii, C. cylindrical, C. adecolorata, C. deficiens, C. adeflexa, C. delicatula, C. depauperate, C.

adiversiglumis, C. dombeyana, C. egluma, C. elata, C. enigmatica, C. aerecta, C. exasperate, C. falcate, C. fasciculate, C. fendleri, C. fernandezia, C. fimbriligulata, C. floribunda, C. foliosa, C. galeottiana, C. gigantean, C. glauca, C. glomerata, C. gracilis, C. grandiflora, C. guirigayensis, C. hatschbachii, C. heterophylla, C. huantensis, C. ibiramae, C. inamoena, C. juergensii, C. laegaaedii, C. lanceolata, C. latifolia, C. lehmanii, C. leonardiorum, C. leptophylla, C. liebmanii, C. ligulata, C. linearis, C. londiniae, C. longifolia, C. longiligulata, C. longipendula, C. longiprophylla, C. longipiculata, C. lorentziana, C. loxensis, C. maclurei, C. macrostachya, C. maculate, C. magnifolia, C. matlazinca, C. mayrae, C. meyeriana, C. microphylla, C. mimosa, C. mirabilis, C. mollis, C. Montana, C. mulleri, C. multiramea, C. nana, C. nelsonii, C.neurophylla, C. nobilis, C. nudiramae, C. nutans, C. oligophylla, C. oxylepis, C. pallid, C. paludicola, C. patens, C. perligulata, C. perotensis, C. peruviana, C. petiolate, C. apicta, C. pinifolia, C. pittieri, C. pohii, C. polyclados, C. pubispicula, C. pulchella, C. purdieana, C. Aquila, C. mosissima, C. renoizei, C. repens, C. rigida, C. riosaltensis, C. robusta, C. scabra, C. scandens, C. sclerophylla, C. sellowii, C. serpens, C. serrulate, C. silverstonii,C. simpliciflora, C. smithii, C. sneidernii, C. spadicea, C. spanthacea, C. spectabilis, C. spencei, C. spicata, C. straminea, C. stubelii, C. subtesssellata, C. subtilis, C. subulata, C. sulcata, C. talamancensis, C. tarmensis, C. tenella, C. tenuiglumis, C. tomentosa, C. tonduzii, C. tessellata, C. tavari, C. tuberculosa, C. uliginosa, C. uniflora, C. urelytra, C. valdiviensis, C. villosa, C. virgata, C. vulcanalis, C. wilkesii, C. windischii, C. yungasensis, Calanthelia nurchellii, C. cingulate, C. distans, C. intermedia, C. lanciflora, C. macrostachya, C. rhizantha, C. capillata, Crytochloa cancinna C. decumbens, C. dressleri, C. saderstromii, C. strictiflora, C. unispiculata, C. variana, C. fenixii, C. hisuta, C. luzonica, C. major, C. mindoroensis, C. puser, C. toppingii, Davidsea attenuata, Decaryochloa diadelpha, Dendrocalamus bactthaiensis, D. bambusoides, D. barbatus, D. bengkalisensis, D. birmanicus, D. brandisii, D. buar, D. calostachyus, D.

cauhaiensis, D. cinctus, D. collettianus, D. detinens, D. dumosus, D. elegans, D. sexauritus, D. farinosus, D. fugongensis, D. hait, D. hirtellus, D. hookeri, D. jianshuiensis, D. khoonmengii, D. liboensis, D. longispathus, D. macroculmis, D. maiensis, D. manipureanus, D. menglongensis, D. merrillianus, D. messeri, D. minor, D. multiflosculus, D. hatrangensis, D. nianheii, D. nudus, D. pachystachyus, D. parishii, D. parvigema, D. peculiaris, D. pendulus, D. polianei, D. pulverulentus, D. rugosiglumis, D. sahhnii, D. sang, D. semiscandens, D. sericeus, D. sikkimensis, D. sinicus, D. sinuatus, D. somdevae, D. suberosus, D. taybacen, D. tibeticus, D. tomentosus, D. striramus, D. tsiangii, D. velutinus, D. wabo, D. xishuang bannaensis, D. yentuensis, D. yunnanicus, Diandrolyra bicolor, D. pygmaea, D. tatianae, Didymongonyx geminatum, D. longispiculatum, Dinochloa actiflora, D. alata, D. albociliata, D. andamannica, D. aopaensis, D. barbata, D. cordata, D. darvelana, D. dielsiana, D. diffusa, D. aelmeri, D. erecta, D. glabrescens, D. hirsute, D. kostermansiana, D. luconiae, D. macclellandii, D. malayana, D. matmat, D. morowaliensis, D. nicobariana, D. obclavate, D. oblonga, D. orenuda, D. palawanensis, D. petasiensis, D. prunifera, D. pubiramea, D. robusta, D. scabrida, D. scandens, D. sepang, D. sipitangensis, D. sublaevigata, D. trichogona, D. truncate, D. utilis, Drepanostachyum ampullare, D. annulatum, D. falcatum, D. fractiflexum, D. intermedium, D. khasianum, D. kurzii, D. membranaceum, D. merretii, D. polystachyum, D. semiorbiculatum, D. stoloniforme, Ekmanochloa aristata, E. subsphylla, Elytostachys clavigera, E. typica, Eremitis afimbriata E. magnifica, E. parviflora, Eremocaulona mazonicum, E. symmetricum, E. ureofimbriatum, E. captitatum, Fargesia acuticontracta, F. adpressa, F. albocerea, F. altior, F. angustissima, F. apicirubens, F. boliana, F. abrevipes, F. brevissima, F. caduca, F. canaliculate, F. circinata, F. communis, F. concinna, F. conferta, F. contracta, F. cuspidate, F. adaminiu, F. declivis, F. decurvata, F. denudate, F. dracocephala, F. adulcicula, F. dura, F. edulis, F. elegans, F. maculate, F. emeryi, F. exposita, F. extensa, F. fansipanensis, F. farcta, F. ferax,

F. frigid, F. fungosa, F. funishanensis, F. labrifolia, F. gongshanensis, F. grossa, F. hackelii, F. hainanensis, F. hsuehiana, F. huizensis, F. hygrophila, F. jiulongensis, F. lincangensis, F. longiuscula, F. lushuiensis, F. macclureana, F. mairei, F. mali, F. melanostachys, F. murielae, F. nitida, F. nujiamgensis, F. oblique, F. orbiculata, F. papyrifera, F. pauciflora, F. perlonga, F. pleniculmis, F. plurisetosa, F. pleniculmis, F. plurisetosa, F. porphyria, F. praecipua, F. qinlingensis, F. robustaF. Aurfa, F. sagittatinea,F. cabrida, F. schmidiana, F. semicoriacea, F. similaris,F. solida, F. spathacea, F. stenoclada, F. strigose, F. subflexuosa, F. sylvestris, F. tenuilignea, F. ungulate, F. utilis, F. vicina, F. weiningensis F. wuliangshanensis, F. yajiangensis, F. yuanjiangensis, F. yulongshanensis, F. yunnanensis, F. zayuensis, F. fibrillosus, F. rimosivaginus, F. strictus, Filgueirasia Arenicola, F. cannavieira, F. horsfieldii, F. microcephala, F. boutelouoides, Gaoligongshaniame galothyrsa, Gelidocalamus albopubescens, G. anulatus, G. dongdingensis, G. kunishii, G. latifolius, G. longiinternodus, G. multifolius, G. rutilans, G. solidus, G. stellatus, G. subsolidus, G. tessellates, G. velutinus, Gigantochloa achmadii, G. albociliata, G. albopilosa, G. albovestita, G. atroviolacea, G. aya, G. baliana, G. balui, G. bastareana, G. calcicola, G. cochinchinensis, G. compressa, G. densa, G. dinhensis, G. felix, G. hasskarliana, G. hayatae, G. hirtinoda, G. holttumiana, G. hosseusii, G. kuring, G. latifolia, G. lingulata, G. longiprophylla, G. luteostriata, G. macrostachya, G. magentea, G. manggong, G. membranoidea, G. multiclumis, G. multifloscula, G. nigrociliata, G. papyracea, G. parvifolia, G. polianei, G. pruriens, G. pubinervis, G. pubipetiolata, G. robusta, G. rostrata, G. serik, G. taluh, G. tenuispiculata, G. thoi, G. tomentosa, G. velutina, G. verticillata, G. vietnamica, G. vinhphuica, G. wallichiana, G. wrayi, G. mirabile, Greslania circinate, G. Montana, G. multiflora, G. rivularis, Guadua aculeate G. amplexifolia, G. calderoiana, G. chacoensis, G. chaparensis, G. ciliate, G. glomerata, G. incana, G. inermis, G. latifolia, G. lindmanii, G. longifolia, G. lynnclarkiae, G. macclurei, G.

macrospiculata, G. macrostachya, G. maculosa, G. magna, G. paniculate, G. paraguayana, G. polyclados, G. refracta, G. sarcocarpa, G. superb, G. tagora, G. takahashiae, G. trinii, G. uncinata, G. variegate, G. velutina, G. venezuelae, G. virgata, Hickelia Africana, H. alaotrensis, H. madagascariensis, H. perrieri, Himalayacalamus asper, H. brevinodus, H. collaris, H. cupreus, H. falconeri, H. fimbriatus, H. hookerianus, H. planatus, H. porcatus, Hitchockella baronii, Holttumochloa korbuensis, H. magica, H. pubescens, Indocalamus amplexicaulis, I. barbatus, I. bashanensis, I. chishuiensis, I. confertus, I. cordatus, I. decorus, I. emeiensis, I. guangdongensis, I. herklotsii, I. hirsutissimus, I. hirtivaginatus, I. hispidus, I. hunanensis, I. inaequilaterus, I. jinpingensis, I. latifolius, I. longiauritus, I. macrophyllus, I. multinervis, I. pedalis, I. petelotii, I. pseudosinicus, I. pumilus, I. quadrates, I. suichuanensis, I. tessellattus, I. tongchuensis, I. victorialis, I. youxiuensis, Indosasa angustata, I. bacquangensis, I. crassiflora, I. gigantean, I. glabrata, I. hisppida, I. ingens, I. laotica, I. lipoensis, I. longispicata, I. lunata, I. parvifolia, I. patens, I. hibataeaoides, I. singulispicula, I. sinica, I. sondongensis, I. spongiosa, I. triangulate, Kinabaluchloa nebulosa, K. wrayi, Kuruna debilis, K. densifolia, K. floribunda, K. scandens, K. walkeriana, K. wightiana, Lithache horizontalis, L. humilis, L. pauciflora, L. pinetii, Maclurochloa moontana, M. tonkinensis, M. tecta, Melocalamus compactiflorus, M. blaoensis, M. arrectus, M. blaoensis, M. compactiflorus, M. cucphuongensis, M. elevatissimus, M. indicus, M. kbangensis, M. mastersii, M. ningmingensis, M. pacoensis, M. scandens, M. truongsonensis, M. yenbaiensis, M. yunnanensis, M. baccifera, M. humilis, Merostachys abadiana, M.annulifera, M.argentea, M.argyronema, M.bifurcate, M.brevigluma, M.brevispica, M.burmanii, M.calderoniana, M.caucaiana, M.ciliate, M.claussenii, M.sexserta, M.filgueirasii, M.fimbriata, M.fischeriana, M.fistulosa, M.glauca, M.kleinii, M.kunthii, M.lanata, M.latifolia, M.leptophylla, M.magellanica, M.magnispicula, M.maguireorum, M.medullosa, M.multiramea, M.neesii, M.pauciflora, M.petiolata, M.pilifera, M.pluriflora, M.polyantha, M.procerrima,

M.ramosissima, M.retrorsa, M.riedeliana, M.rondoniensis, M.scandens, M.sellovii, M.skvortzovii, M.sparsiflora, M.speciosa, M.tatianae, M.ternate, M.vestita, M.yungasensis, Mniochloa pulchella, M. cardonae, M. cardonae, M. hurunensis, M. distantiflora, M. sexsertus, M. grandifolius, M. involutus, M. longiramosus, M. neblinaensis, M. paludicola, M. simplex, M. steyermarkii, M. virgatus, Nastus ambrensis, N. aristatus, N. borbonicus, N. decaryanus, N. latoides, N. elatus, N. elegantissimus, N. elongates, N. mirnensis,N.glaucus, N. holttumianus, N. hooglandii, N. humbertianus, N. humilus, N. lokohoensis, N. longispicula, N. madagascariensis, N. manogarivensis, N. obtusus, N. perrieri, N. productus, N. reholttumianus, N. rudimentifer, N. aratananensis, Neohouzeaua coradata, N. fimbriata, N. helferi, N. kerriana, N. mekongensis, N. puberula, N. stricta, N. tavoyana, Neolole baamahussana, N. atra, N. glabra, N. hirsute, N. inaurita, Neomicrocalamus andropogonifolius, N. clarkei, N. dongvanensis, N. prainii, N. yunnanensis, Nianhochloa bidoupensis, Ochlandra beddomei, O. ebracteate, O. keralensis, O. scriptoria, O. setigera, O. sivagiriana, O. soderstromiana, O. aspirostylis, O. stridula, O. travancorica, O. albotii, O. wightii, Oldeania alpine, Olingostachyum bilobum, O. exauriculatum, O. glabresenscens, O. hupehense, O.gracilies, O. lubricum, O.nuspiculum, O.oedoonata, O. paniculum, O.puberulum, O. scarbiflorum, O. scopulum, O.shiuyingianum, O. spongiosum, O. sulcatum, O.wuyishanicum, O. yngangense, Olemeca clarkiae, O. fulgor, O. recta, O. flexa, O. zapotecorum, Olyra amapana, O. buchtienii, O. caudate, O. iliatifolia, O. davidseana,O. ecaudata, O. fasiculata, O. filiformis, O. glaberrima, O. holttumiana, O. humilis, O. juruana, O. latifolia, O. latispicula, O. longifolia, O. loretensis, O. maranonensis, O. bilquiflolia, O. retrorsa, O. standleyii, O. tamanquareana, O. taquara, O. wurdackii, Oreobambis buchwaldii, Otatea acuminate, O. carrilloi, O. fimbriata, O. glauca, O. ramirzii, O. reynosoana, O. transvolcanica, O. ximenae, Oxytenanthera abyssinica, parabambusa kainii, Pariana argentea, P. aurita, P. bicolor, P. campestris, P. campestris, P. cocinna, P. distans,

P. ecuadorensis, P. gracilis, P. lanceolata, P. lingulata, P. maynensis, P. modesta, P. multiflora, P. nervata, P. obtuse, P. ovalifolia, P. pallid, P. parvispica, P. radiciflora, P. pallid, P. simulans, P. sociata, P. stenolemma, P. strigose, P. wallenii, P. tenuis, P. trichosticha, P. trichosticha, P. velutina, Parodiolyra aratitiyopensis, P. colombiensis, P. lateralis, P. luetzelburgii, P. micrantha, P. ramosissima, Perrierbambus madagascariensis, Phuphanochloa speciosa, Phyllosa satransuillans, Phyllostachys acuta, P. acutiligula P. angusta, P. arcane, P. aurea, P. aureosulcata, P. carnea, P. circumpilis, P. compressus, P. corrugate, P. dulcis, P. elegans, P. fimbriligula, P. flexuosa, P. glabrata, P. glauca, P. guizhouensis, P. hirtivagina, P. incarnate, P. iridescens, P. kwangiensis, P. lafuhanensis, P. manii, P. mirabilis, P. nidularia, P. nigella, P. nuda, P. parvifolia, P. pierreana, P. platyglossa, P. promines, P. propinqua, P. purpurociliata, P. reticulate, P. rivalis, P. robustriamea, P. rubicund, P. rubromarginata, P. shuchengensis, P. stimulosa, P. sulphurea, P. tianmuensis, P. varioauriculata, P. vetichiana, P. verrucose, P. violascens, P. virella, P. viridiglaucescens, P. vivax, P. yunhoensis, Pingamae ginata, Piresia goeldii, P. leptophylla, P. macrophylla, P. palmula, P. sympodica, Piresiella strephioides, Pleioblastus albosericeus P. altiliglatus, P. argenteostriatus, P. chino, Pseudosasa distichus, Pleioblastus gozadakensis, P. gramineus, P. guilongshanensis, P. hattorianus, P. sienchuensis, P. humilis, Pleioblastus incarnatus, P. intermedius, P. juxianensis, P. kodzumae, P. kongosanensis, P. matsunoi, P. nagashuma, P. oleosus, P. patellaris, P. spseudoxommunis, P. pseudosasaoides, P. rugatus, P. sanmingensis, P. simonii, P. solidus, P. truncatus, P. variegatus, P. wuyishanensis, P. yamadorianus, P. yixingensis, Pseudobambusa chizostachyoides, Pseudosa sasaaeria, P. smplexicaulis, P. brevivaginata, P. cantorii, P. gracilis, P. hindsii, P. japonica, P. jiangleensis, P. longiligula, P. maculifera P. membraniligulata P. nabeshimana P. orthotropa, P. watarii, P. pubiflora P. subsolida P. viridula, P. wuyiensis P. zhongyanensis, Pseudostachyum polymorphum, P. wakha, Pseudoxytenanthera bourdillonii, P. parvifolia, P.

monadelpha, P. ritcheyi, P. stocksii, Racemobambos celebica, R. ceramic, R. congesta, R. gibbsiae, R. glabra, R. shepburnii, R. shirsuta, R. hirta, R. holttumii, R. kutaiensis, R. multiramosa, R. novohibernica, R. pairinii, R. raynalii, R. rigidifolia, R. rupicola, R. schultzei, R. sessilis, R. setifera, Raddia angusifolia, R. brasiliensis, R. distichophylla, R. guianensis, R. lancifolia, R. megaphylla, R. portoi, R.soderstromii, R. stolonifera, Raddiella senbeckii, R. kaieteurana, R. lunata, R. malmeana, R. minima, R. molliculma, R. potaroensiis, R. vanessiae, Rehianer vata Reitziamithii, Rhipidocladum bregoense, R. ampliflorum, R. angustiflorum, R. Arenicola, R. bartlettii, R. clarkiae, R. cordatum, R. martinezii, R. maxonii, R. neumannii, R. pacuarense, R. panamense, R. parviflorum, R. pittieri, R. prestoei, R. racemiflorum, R. harmonicum, R. rubrofimbriatum, R.sibilans, Sarocalamus faberi, S. racemosus S. spanostachyus, Sasa bitchuensis, S. cernua, S. chartacea, S. elegantissima S. fugeshiensis S. gracillima, S. guangdongensis, S. guangxiensis, S. hainanensis, S. hayatae, S. heterotricha S. hibaconuca, S. hidaensis, S. hisauchii, S. kagamiana, S. kanayamensis, S. kogasensis, S. kurilensis, S. kurokawana, S. longiligulata, S. magnifica, S. magnonoda, S. masamuneana, S. megalogluma, S. megalophylla, S. miakeana, S. minensis, S. oblongula, S. occidentalis, S. oshidensis, S. palmata, S. pubens, S. pubiculmis, S. pulcherrima, S.quelpaertensis, S. ramose, S. rubrovaginata, S. sadoensis, S. samaniana, S. scytophylla, S. septentrionalis, S. shimidzuana, S. sirakurensi, S. subglabra, S. subvillosa, S. suzukii, S. takizawana, S. tatewakiana, S. tenuifolia, S. tokugawana, S. tomentosa, S. tsuboiana, S. tsukubensis, S. veitchii, S. yahikoensis, Sasaella bitchuensis, S. caudiceps, S. hidaensis, S. hisauchii, S. iwatekensis, S. kogasensis, S. leucorhoda, S. masamuneana, S. ovarifolia, S. ramose, S. sadoensis, S. shiobarensis Sasamorpha borealis, S. hubeiensis, S. oshidensis, S. qingyuanensis, S. sinica, Schizostachyum aciculare, S. aequiramosum, S. Alopecurus, S. andamanicum, S. atrocingulare, S. auriculatum, S. bamban, S. blumei, S. brachycladum, S. brachythyrsus, S. castaneum, S. caudatum, S. chinense, S. copelandii, S. cornutum, S.

curranii, S. cuspidatum, S. diaoluoshanense, S. distans, S. dullooa, S. dumetorum, S. flexuosum, S. funghomii, S. glaucifolium, S. glaucocladum, S. gracile, S. grande, S. hainanense, S. hantu, S. insulare, S. iraten, S. jaculans. S. kalpongianum, S. khoonmengii, S. latifolium, S. lengguanii, S. lima, S. lumampao, S. lutescens, S. mampouw, S. mannii, S. nghianum, S. ninhthuanense, S. perrieri, S. pilosum, S. pingbianense, S. pleianthemum, S. pseudolima, S. rogersii, S. sanguineum, S. seshagirianum, S. silicatum, S. terminale, S. tessellatum, S. textorium, S. undulatum, S. wanshishanense, S. whitei, S. yalyense, S. zollingeri, Shibatae eachiang shanensis, S. chinensis, S. ahispida, S. akumasasa, S. alancifolia, S. ananpingensis, S. astrigosa, Sinobambusa baccanensis, S. farinose, S.glabrata, S. henryi, S. humila, S. incana, S. intermedia, S. nephroaurita, S. rubroligula, S. sat, S. seminuda, S. solearis, S. tootsik, S. yixingensis, Sirochloaparv ifolia, Soejatmia ridleyi, Sphaerobambos hirsute, S. philippinensis, S. subtilis, Stapletonia arunachalensis, Sucream aculata, S. onophylla, Sucream sampaiana, Teinostachyum beddomei, T. griffithii, Temburongia simplex, Temochloa liliana, Thamnocalamus chigar, T. spathiflorus T. unispiculatus, Valiha diffusa, V. perrieri, Vietnamocalamus catbaensis, Vietnamosasa ciliata, V. darlacensis, V. pusilla, Yushania addingtonii, Y. ailuropodina, Y. anceps, Y. andropogonoides, Y. angustifolia, Y. auctiaurita, Y. baishanzuensis, Y. basihirsuta, Y. bojieiana, Y. brevipaniculata, Y. brevis, Y. burmanica, Y. canoviridis, Y. cartilaginea, Y. cava, Y. chingii, Y. collina, Y. complanate, Y. confuse, Y. crassicollis, Y. crispate, Y. dafengdingensis, Y. donganensis, Y. elegans, Y. elevate, Y. exilis, Y. falcatiaurita, Y. farcticaulis, Y. farinose, Y. flexa, Y. glandulosa, Y. glauca, Y. grammata, Y. hirsute, Y. hirticaulis, Y. humbertii, Y. lacera, Y. laetevirens, Y. levigata, Y. linearis, Y. lineolate, Y. longiaurita, Y. longissima, Y. longiuscula, Y. mabianensis, Y. maculate, Y. madagascariensis, Y. maling, Y. menghaiensis, Y. microphylla, Y. mitis, Y. multiramea, Y. niitakayamensis, Y. oblonga, Y. pachyclada, Y. pantlingii, Y. pauciramificans, Y. perrieri, Y. polytricha, Y.

punctulata, Y. qiaojiaensis, Y. rigidula, Y. rolloana, Y. rugosa, Y. shangrilaensis, Y. straminea, Y. suijiangensis, Y. tenuicaulis, Y. tessellata, Y. uniramosa, Y. varians, Y. velutina,Y. vigens, Y. violascens, Y. wardii, Y. weixiensis, Y. wuyishanensis, Y. xizangensis, Y. yadongensis, Y. yongdeensis. **(Kellogg EA, 2015)**

CONCLUSION:

Bamboo is the most powerful and commercially important plant. It is an easy and fastest growing grass family. It grows around 1.5 meters in 24 hours cycle. It has a many unique properties and remedies for both environment and humans. The unique advantage of bamboo are the propagation methods, easy to propagates from the clumps, Plant Tissue Culture method and Rhizomal method. It has long term control of air pollutions by carbon sequestration and absorbs 33.1% of carbon from the environment. Around 1600 species of bamboo in the world, but only 71 species of bamboo are studied in the carbon sink, other 1590 species of bamboo are yet studied. Around 33.1 billions of carbon emissions till 2019, total 17 millions carbon sink per year by the bamboo forest compared to the Mangrove forest and Tropical forest. Another Unique property is the medicinal remedy for humans from bamboo species. The bamboo species having anti oxidant property, 2.23 to 4.22 gm of Dietary fiber content in the 100gm of bamboo. It helps to reduce the diabetes complaint range from 250mg/Dl to 140.75 mg/Dl after took the 20 days treatment. Bamboo leaves can help to cures the gastrointestinal Ulcer 14.44 % compared to Standard Rantidine medicine. It can also be having a 31.52% -33.13% of anti-cancer activity experiment. Bamboo leaves can increase the metabolic rate in the human body, which helps to weight loss from the obesity. Bamboo leaves and shoots having many beneficial properties with minerals, fibers and ions. The bamboo shoots having many healthy properties. One of these, bamboo salt can cures the

chronic diseases, skin diseases, and inflammation diseases. Bamboo shoots also have produced high strength, Durable, low weight, Biodegrabale, stiffness and also have antimicrobial activities of bamboo cellulose. The bamboo shoots and leaves also have a raw material for the production of bioethanol and bamboo vinegar. One of the byproducts of bamboo also having ~~a~~ huge important benefits, it is bamboo charcoal. It has a 10 times more stronger and 4 times absorption rate compared to other charcoals. It absorbs toxic chemicals like, Benzene, formaldehyde., Harmful microbes like bacteria, virus, and molds., and also eliminates the bad Odors from the substances. It can also be used of the treatment for kidney chronic diseases, Skin diseases, gastrointestinal damages and etc.

SINGNIFICANCE OF STUDY

The bamboo plants are the most important and required plant in the whole environement. Peoples having less awareness about bamboo. This study clears the knowledge about the 1600 bamboo species how they help-the environmemt and Humans.

COMPETING INTERESTS

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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