Effective Utilization of Agricultural Waste: Review

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Abstract
Agricultural substances are those substances that are produce on earth with the change of seasons. Basically these substances are produce in the nature and are very important for survival of animals and human beings who are consumers. These substances are widely available on earth can be a good source of energy or can be converted into useful products. The wastes generated from crop have a good potential to convert in energy in related energy sector. The waste produce from animal waste or from crop residues called biomass which has an interdependent relationship with ecosystem from production to disposal and has physicochemical properties. The present paper deals with the research work carried out in the past related to conversion of biomass and agricultural waste. An attempt is carried out to increase the economic values of agricultural waste into useful product.

Keywords: Biomass; Anaerobic digestion

Introduction
Agricultural waste is the material obtained due to crop production or from plant growth. In the past this biomass and agricultural waste were either burnt or naturally converted into organic fertilizer under favorable condition. But now in these days biomass produced from agricultural waste are used to generate energy because it carries great potential to convert into energy. Since the biomass is available throughout the world in abundant quantity so it is necessary to use alternate energy resources to fulfill our needs of energy consumption. The effective utilization of agricultural waste is a good option to convert these wastes in energy. For this efforts have been made and many more are under way, it requires guidelines concerning the utilization of agricultural biomass for energy purposes and optimal production. Production of energy from biomass can provide farmers with new prospects and possibilities to diversify agricultural activities. Some of these crops may compete for land and other resources with traditional crops, while other crops may be grown on marginal lands or even ecologically degraded areas and thus have a positive effect on the environment. In view of the circumstances described above, there has been growing interest in studies that present future energy scenarios and conversion of biomass into useful products. The primary aim of this paper is to analysis in detail the various application and research work carried out in the past related to conversion of biomass and agricultural waste. An attempt is carried out to increase the economic values of agricultural waste into useful product.

In the year 2016, studies shows that the feasibility of utilizing the coffee waste in the production of bricks. The parameter of the study was CW (coffee waste) ratio and temperature. The properties like shrinking density and compressive strength were considered. In this methodology, control brick and three different percentage of coffee waste brick (CWB) (1%, 3%, 5%) were manufactured and fired at 1050°C. Apart from main properties like physical, shrinkage, density and compressive strength were reported and discussed additionally leaching of heavy metals from manufactured clay brick was tested by using toxicity characteristics leaching procedure. It was noted that with the addition of CW, the shrinkage increased linearly but still comply with minimum standard below 8% and good quality of brick was manufactured. Hence coffee waste can be utilized in the production of fire clay bricks with the different proportion of CW in addition it gives alternate solutions on disposing the coffee waste. The CW could also have a potential low cost waste additive for production of bricks [1].

In the year 2016, studies the utilization of waste sawdust for the removal of basic dye “methylene blue” that describes as methyl blue which has adverse impact on photosynthesis in aquatic environment and many other complications. sawdust is a low cost agro waste and have tremendous capacity to absorb the dye on the surface. The study involves the comparison of dye removal capacity of raw saw dust and NAOH plus enzymatically treated sawdust Various parameters like substrate concentration, contact time and dye adsorption which having initial concentration of 100 mg/L was known to increase for both treated and untreated sawdust at 30°C and 120 rpm [2].

Maximum adsorption observed at concentration of 2.5 g% was 97.47% and 70% for treated and untreated sawdust respectively for contact time of 6h and initial concentration of 100 mg/L. When adsorption property of sawdust was checked for different concentration

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of the dye concentration rate of adsorption was decreased. Maximum dye removal was noticed to be 99.16% and 85.54% for treated and untreated saw dust respectively for the dye concentration of 25 mg/L and substrate concentration of 2.5% at 30°C and 120 rpm [2].

In the year 2016, it was mentioned that the properties of agricultural waste as soil stabilizer and found that agricultural waste in India is not disposed properly. The aim of this research was to utilize it in pure form hence ashes of these waste materials separately at 3%, 6%, 9%, 12% and 15% were used. Tests such as CBR and standard proctor tests were conducted. The parameter of study was specific gravity (2.662), liquid limit(66), plastic limit(26.62), plasticity index(39.99), free well index(23.08), optimum moist content(26.11), maximum dry density(1.445). During milling of paddy about 78% of weight is received as rice broken rice and bran, rest 22% of the weight of paddy is received as husk. This husk is used as fuel in the rice mills to generate steam for the parboiling process. This husk contain about 75% organic volatile matter and the balance 25% of the weight of this husk is converted into ash during firing process, known as rice husk (RHA). This RHA in turn contains around 85% to 90% amorphous silica, hence there is a addition of ash and substrate concentration of 2.5% at 30°C and 120 rpm [2].

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advantages of using POFA and RHA and similar industrial by-products to achieve sustainable infrastructure development with near zero industrial waste [8].

In the year 2014, it was shown that the effective way to remove iron from drinking ground water with help of agricultural waste used as a natural adsorbents and area of study was typically associated in Chennai where the concentration of iron was 0.3 mg/L. The removal of iron was calculated by using sugarcane bagasse and coconut coir selected as solid phase extra coir for removal total iron. It was noted that these products exhibits remarkable characteristics and ability to remove total iron. The parameters such as effect of pH, adsorbent dosage, contact time, initial concentration etc. were studied. The highest percentage removal of total iron was observed at coconut coir than sugarcane bagasse [9].

In the year 2014, studies shows that the feasibility of utilizing fly ash and rice husk in stabilization of soil. Black cotton soil was mixed with fly ash at (5%, 10%, 15%, 20% and 25%) while Rice husk ash was treated with (10%, 15%, 20%, 25% and 30%) and examined after 28 days of curing. It was observed that Liquid limit was reduced to 55% for (20% fly ash and 25% RHA mixed with soil sample. Plasticity index was reduced to 86% for 20% Fly ash and 25% RHA mixed with soil, differential free swell reduced to 75% for 15% fly ash and 20% RHA mixed with soil, specific gravity reduced significantly as well [10].

In the year 2013, studies shows that the use of lignocelluloses rich agricultural waste. Cellulases are capable of the extensive solubilisation of highly ordered form of cellulose and are reported to be produced from well-known microbial sources such as aerobic and anaerobic fungi and anaerobic fungus. The cost of enzyme production can be significantly reduced if low value biological substrates like fruit processing waste are used [11].

In the year 2013, studies proved that the agro waste as an innovative material in Indian context by using agro waste characteristics with clay or calcium bicarbonate. Groundnut husk, jute fibre, rice husk, rice straw, balke, saw dust, and coconut fibre and other fibrous material have been identified as most economically important wastes for building industry. It is estimated that in India nearly 700 million tonnes of organic waste is generated annually which is either burned or land filled. The large amount of the agro waste generated from the market area has created major environmental problems. Earthworms have ability to convert organic waste into valuable resources containing plant nutrients and organic matter, which are essential for maintaining soil productivity. The parameter of study includes density, average particle size, specific surface area, minerology, non-crystalline shape and texture irregularity [12].

In the year 2013, studies conducted on growth medium for lactobacillus species by fermentation. The commercial probiotics lactobacillus which is a friendly bacterium with the help of fermentation addition to the ability of probiotics strains to grow in pineapple waste was investigated. The parameters which affect the reaction rate of microorganism activity are temperature, pH, and culture media. It was noted that pineapple wastes from these processing industries can be utilized to produce culture medium for cultivation of probiotics bacteria as compared to MRS (De Man, Rogosa and Sharpe agar) medium which is an expensive medium for cultivating probiotics [13].

Conclusion

As seen from the research literature related to the utilization of biomass and agricultural waste, newer development in technology in process development and in product development is necessary to increase the economic values of products. As seen from the literature, number of uses of biomass is being observed in the manufacture of brick making, as filler in asphalt mixing, as an adsorbent in biogas production etc. More conversion of this waste requires more research and renovation in the existing technologies.

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