AgriCos e-Newsletter
ISSN: 2582-7049
www.agricosemagazine.com
Volume: 01 Issue: 02 June 2020 Article No: 07

Utilization of Vegetable Waste

Raut A. U.[1*], Ghawade S. M.[2] and Mali V.V.[3]
[1]M.Sc. Student, Department of Vegetable Science, PDKV, Akola, (MS.)
[2]Associate Professor of Horticulture, Junior Breeder cum Horticulturist, Chilli and Vegetable Research Unit, PDKV, Akola, (MS.)
[3]Ph.D. Scholar, Department of Vegetable Science, PDKV, Akola, (MS.)
Corresponding Author*: raditya0143@gmail.com

SUMMARY

Industrialization and urbanization has increased the pollution. The pollution load on environment is unmanageable and dangerous to human being the vegetable waste dumped in open areas alarming nearby residential areas. The dumped vegetable waste is used to making compost as well as energy resources which used in small scale industries and domestic level. Different compounds also extract from vegetable wastes (ethanol, phenolic compounds etc.). Vegetable waste is also good feed for animals.

INTRODUCTION

India is the second largest producer of vegetables in the world next only to China with an estimated production of about 125.9 million tonnes from an area of 7.8 million hectares at an average yield of 16.1 tonnes per hectare. In other terms, India shares about 13.6% of the world output of vegetables from about 2.0% of cropped area in the country (Shummu Slathia, 2017). The human population across the globe is increasingly getting oriented toward healthy and processed food products. It has been observed that of the enormous supply of food for human consumption, about one-third gets wasted globally (FAO 2011). India, with rich agricultural resources, accounts for 50 MT of vegetable waste, which is about 30 % of its total production (Verma 2011). Hence, utilization of these wastes generated at different levels of delivery starting from the agricultural farm, post-harvest handling, storage, processing, and from distribution to consumption would be economically highly beneficial.

The raw green vegetable market waste gave about 15-20% dry matter after open sun drying. The dried mass of vegetable waste management was converted into a pulverized form and subsequently into briquettes without using external binding agent. Although lignin content is also low as compared to another lingo-cellulosic biomass (Srivastava, 2014). It is an important fact, that waste of vegetable is a potential energy source, methane. Up to 50% of vegetable waste could be potentially converted to this fuel. The anaerobic digestion of vegetable by-products has the potential to produce both energy (methane) and heat. Anaerobic digestion is completed by heating materials to a temperature between 35 to 50 degrees °C in an oxygen free environment. Most agricultural anaerobic digestion systems will use manure as a primary component and add materials such as vegetable waste. Vegetable by-products may hold more than 8 million cubic meters of methane that could produce 35 million kilowatt/hours of electricity and 28 million kilowatt/hours of heat.

The vegetable processing industry includes both fresh and processing value-adding activities. The major waste streams are organic waste; including fruit and vegetable peel, other waste parts and other raw material wastes which utilized in different way to produce the by-products.

Utilization of Vegetable Waste

Energy from Vegetable Waste

Now a days energy from vegetable waste is one of the trending industry in the world and also in India. Vegetable waste is utilized in the biogas plant which gives better result in

production of energy. Production of biogas from vegetable wastes mixed with cow manure in an anaerobic digester. The total solid, volatile solids, moisture content and ash content of the wastes were examined. The materials used as feed were tomato, various vegetable peel, and cow manure. Varying volumes of digesters were employed for biogas generation. The combustibility of the gas so generated was tested. The anaerobic digestion of vegetable wastes mixed with different waste took 55 days to produce biogas (for complete digestion). Anaerobic digestion is very sensitive to change in pH and it is important to maintain pH of 6.7-7.4 for healthy system. The temperature of the digester and the environment also affects the anaerobic digestion process. Upon adjustment of the factors affecting anaerobic digestion, it is felt that co-digestion between FVW and CM produces biogas without need of nutrient or chemical addition to the system. The search for alternative source of energy such as biogas should be intensified so that ecological disasters like environmental pollution, deforestation, desertification and erosion can be arrested.

From the vegetable waste also briquettes are prepare which used in domestic as well as small industry level for production of energy. Transforming vegetable market waste (VMW) into an energy-briquette. The raw green vegetable market waste gave about 15–20% dry matter after open sun drying. The dried mass of the VMW was converted into a pulverized form and subsequently into briquettes without using any external binding agent. Although the lignin contents of the VMW were low (3.23–5.51%) as compared to other lingo-cellulosic biomass, good quality briquettes were produced without using any binding agent.

Nutrient recycling from Vegetable Waste

Compost is oldest and simplest method of organic waste stabilization. It is natural process of rotting or decomposition of organic matter by microbes. Compost is organic matter that has been decomposed and recycled as a fertilizer and soil amendment. Valuable resource for farmers. Along with N, P, K; it also contains micronutrients such as Fe, Cu, Zn and Mn. Vegetable waste is good compost for plants. Vegetable and fruit wastes can be composted and used to replace a significant part of the mineral nitrogen fertilization with nitrogen recovery of 6−22 percent. The plots fertilized according to the nitrogen recommendations had comparable yields. Mainly due to increase of the more resistant carbon fractions. The long-term compost applications improved the nitrogen status of the soil over the years.

Power Alcohol from Vegetable Waste

Power alcohol is the combination of 20% ethyl alcohol and 80% petrol with adding small quantity of benzene. Raw material used for the manufacture of the power alcohol or the ethyl alcohol are saccharine materials (such as Sugarcane, molasses), starchy materials (potatoes, cereal grain etc), cellulose materials, and hydrocarbons. Ethyl alcohol is prepared from agricultural waste. Among most of the nonconventional renewable sources of energy, biogas and bioethanol production are considered as the most favoured and trouble-free methods of energy production from vegetable wastes. There are some advantages of using power alcohol i.e. Power Alcohol has high octane number which possess better antiknock properties. There are no starting difficulties with power alcohol. Air required for complete combustion is less. It has the ability to absorb trace of moisture. Ability to burn completely

Recovery of Different Compounds

Vegetable waste is rich source of antioxidant compound i.e. phenolics, flavonoids, ferulic acid, chlorogenic acid, glucosinolates, carotenoids etc. Different compounds present in the peel of onion, garlic, cauliflower and potato. Also from broccoli leaves, artichoke internal and external bracts and tomato wastes.

Processing of Vegetable Waste

Tomato wastes, the peel can be utilized for the preparation of varnishes and resins. The vines and pea hulls can be dehydrated and used in the preparation of stock feeds by suitable blending with other minerals as is being done in Tasmania and some other countries. After extraction of juice from carrot, approximately one-third of the raw material remains as pomace. It is a rich source of total sugars (64.3 percent) and contains about 4.3 percent total phenolics. It is rich in albumin, followed by glutelin, globulin and prolamin. The residue after juice extraction from beet, known as sugar beet pulp, is dried and sold as dried sugar beet pulp or mixed with molasses to form dried molasses beet pulp. Vegetable wastes/by-products such as artichoke, asparagus, onion and carrot pomace, and cauliflower trimmings are used as sources of dietary fiber supplements (gelling and thickening agents) in refined food. Cucumber peel chutney is also prepared from the cucumber vegetable waste.

CONCLUSION

Waste management is the biggest problem in today's world. Vegetable waste contribute large amount of GHG (Green House Gases) emission. Conversion of vegetable wastes into bioenergy and by-products can generate revenue from the wastes of food processing facilities. Vegetable wastes are rich in vitamins and minerals. Suitable as raw materials for the production of high-value chemicals or metabolites.

REFRENCES

FAO (2011) Global food losses and food waste: extent, causes and prevention. FAO, Rome.

Shummu Slathia, (2017), Post-harvest loss of fruits and vegetables and their management by biological approaches: A review article. *International Journal of Advanced Science and Engineering*, **6**(1):957-966.

Srivastava N. S. L., (2014) Investigating the energy use of vegetable market waste by briquetting. *Elsevier*, **68**(C): 270-275.

Verma N., Bansal N.C., Kumar V. 2011, Pea peel waste: a lignocellulosic waste and its utility in cellulose production by Trichoderma reesei under solid state cultivation. *Bioresources* **6**:1505–1519

www.clarke-energy.com