

Production of Organic Manure from Potato Peel Waste

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Abstract : Organic manures play an important role for supplementing the essential plant nutrients for sustainable agriculture, economy and eco-friendly environment. The potato peel waste contains high amount of starch, proteins which can be degraded by soil microbes to enrich the nitrogen content of manure. The physical and chemical characteristics of potato waste were analyzed. The changes in physical parameters and carbon nitrogen ratio were indicated the maturity of compost. The potato peel is used as alternate source of manure for plantation and reduce environmental pollution.

Keywords: Biofertilizers, potato peel, compost.

Introduction

Potato peel is not only a household waste and but also from small scale industries and fast food companies are dealing with an ever increasing number of potato peel waste. Sanitation and disposal of waste can be recycled in food and non food application[1,2]. The value added products of dietary fiber, antioxidants, biopolymers and food additives were in potato peel[3]. The potato peel also holds nutrients and enzymes extracted from them can be used in the manufacture of detergents [4]. It also contains antimicrobial properties that can help it function as a metal binder. It can be used large-scale for live stock feed[5]. Potato peels are rich in phytonutrients, phytoenzymes and antioxidants which can greatly add to the nutritional value of your diet[6]. They make soups creamier and tastier. Potato peel can be used in cosmetics in order to reduce oil, acne etc. This is also used for scrubbing and polishing the silverware. The potato peel is used as anticancer agent[7]. Potato peel was the best substrate for the production of industrial enzyme- α & β amylase[8]. This peel showed antibacterial activity against gram positive and gram negative bacteria[9].

Potato peel contains phenolic acids namely chlorogenic acid (CGA), gallic acid (GAC), caffeic acid (CFA) and protocatechuic acid (PCA), are present in low amounts [10]. In food potato industry a lot of potato mash is also formed which can be considered as raw material in bio-ethanol production. [11,12]. The present study deals with decomposition of potato peels and its features were analyzed.

Materials and Methods:

Potato peel was collected from chips manufacturing industry. This was subjected to be composting along soil. The compost pit was generated. its length 3m* breadth 3m and depth 6m in size. The supply of oxygen and water supply were carried out at regular intervals. Thus waste recycling of potato peel used as alternate source of nutrients for growth of plants in form of organic manure. The physical parameters of color pH, specific gravity, bulk density and turbidity of manure were analyzed at regular intervals. The main constituents of organic manure of nitrogen, phosphorus and potassium were also tested using testing kits. The carbon nitrogen ratio and cellulose determine the maturity of compost.

Results and Discussion

The potato peel was subjected to different stages of composting. The physical parameters of samples were analyzed in table1. The untreated waste showed highly acidic which is not suitable for plantation when peel waste was subjected to composting for two months the pH of manure was slightly neutral and attained pH7 for complete composting. The moisture content was gradually decreased to 16% rapidly increased up to 40% at the stage of maturing. Most of tubers showed acidity in pulp and turbidity especially sweet potato and cassava.

Table:1 Physical Characteristics of Potato manure

S.No	Samples	Ph	Turbidity (NTU)	Moisture(%)	Bulk Density(g/m ³)
1	Control	6.8	480	27	0.102
2	Premature compost	8.5	403	16	0.01578
3	Organic manure	7.0	189	40	0.06033

The bulk density of untreated sample showed 0.102g/m³.The bulk density of mature compost was 0.060g/m³.The specific gravity of mature compost was found to be more 2.34 when compared with premature compost and untreated sample (Table 1). The turbidity of mature compost was observed as 189 NTU. The untreated and pre mature compost showed 480 and 408 NTU .This sudden decline in turbidity implies the maturity of compost .Thus the physical parameters were gradually undergo changes in different stages of composting. The nitrogen and potassium content of manure were gradually increased from premature stage .The phosphorus content of sample was found to be changed from low to medium the mature compost showed high level of NPK. It gives nutrients to soil as well as plant growth.

Table2: Chemical composition of potato peel manure

S.No	Samples	Organic carbon(g)	Nitrogen(g)	C:N ratio	Cellulose (%)
1	Control	0.4	12.3	1	2.3
2	Premature compost	0.4	16.5	4	2.6
3	Organic manure	1.4	34.5	8	1.9

The maximum organic carbon 1.492 was observed in mature sample. The organic carbon was found to be gradually increased from initial stage of composting. Hamid reported that manually peeled potato contained 2.3% of cellulose. The cellulose content of sample was found to be 2.3% at early stage of composting in premature stage. Cellulose content was slowly reduced to 1.9% in last stage of composting.

Conclusion

Organic manuring play an important role in farming .In olden days vegetable waste can be used as manure for plantation in order to reduce the waste disposal from houses, Industries and reduce environmental pollution. Potato peel contains large amount of starch and nutrients which can be supplemented with microbes in soil for composting .The potato peel manure is very useful for farmers because NPK content was gradually increased in the soil.

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