



BENEFITS OF TEA AND REUTILIZATION OF WASTE TEA POWDER

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ABSTRACT

Tea is the most common beverage after water. It is extracted from the leaves of *Camellia sinensis* (family: *Theaceae*). It is consumed in different forms, namely, green, black tea depending on post-harvest treatment and chemical components. Tea is rich in natural antioxidants; tea is reported to be used in the management of colon, esophageal, and lung cancers, as well as urinary stone, dental caries, etc. Waste Tea powder can be a great source of biodegradable garbage but it can make a good source of compost as well. Tea waste powder can be used as a natural fertilizer; increase agricultural yields. The present review focuses on the beneficial effects of tea and ways of reutilizing the waste tea powder.

Key words: Tea, *Camellia sinensis* and Fertilizer.

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I. INTRODUCTION

Tea is an aromatic beverage commonly prepared by pouring hot or boiling water over cured or fresh leaves of the, *Camellia sinensis*, an evergreen shrub (bush) native to East Asia. After water, it is the most widely consumed drink in the world. There are many different types of tea; some, like Darjiling and Chinese green, have a cooling, slightly bitter, and astringent flavor while others have vastly different profiles that include sweet, nutty, floral or grassy notes. Tea has a stimulating effect in humans primarily due to its caffeine content. Most of the tea factories do not obey the rules of Tea Board of India regarding the disposal of tea waste. Every tea factory produces a large amount of tea waste, but tea waste buyer is lesser in number in this region. This waste may be the alternative income source for the tea growers as well as the owners of tea factories. The wastes derived from tea factories are called tea waste. This waste includes discarded tea leaves, buds and tender stems of tea plants. If the tea waste is not disposed properly, it can pollute the environment like soil, water and air. There shall be a minimum volume of tea waste and made tea at the ratio of 2:100 kilograms. Before exporting, selling or holding stock of tea waste, it shall be denatured by the admixture of urea not less than five percent, cow dung, slack lime or such other denaturants as may be specified by the Tea Board of

India. Mainly the by-product of tea industry is treated as waste, sometimes it is used in caffeine industries for the extraction of caffeine. In some part of the Assam, tea wastes are sometimes used as poultry and piggery feed. In the present study, the various ways for utilization of tea wastes, alternative earning source through selling tea waste and their appropriate management were discussed [1].

The main aim of this article is to reveal the beneficial effects of tea and In India most of the population threw the waste tea without knowing that the waste can be reutilized in various forms like fertilizers, varnisher, get rid of bad smell etc.

II. BENEFITS OF TEA

Tea is the second most widely consumed beverage throughout the world, after water. "Tea" is referred to the aromatic beverage prepared by incubating cured leaves of the plant *Camelia sinensis* with hot or boiling water. Although tea in itself is presented in various forms throughout the world (white, yellow, green and black) but there are other variants like "herbal tea" which does not contain any *C. sinensis* leaves and is usually referred to the various infusions of herbs or fruits. All the variants of tea essentially originate from the same botanical source but differ in the type of processing done to obtain specific flavor and properties [2].

Following are the health benefits of Tea for humans:

1. Anti-Hypercholesterolemic Activity
2. Anti-Hyperglycemic Activity
3. Antioxidant property
4. Bowel Modulating Activity
5. Anticancer property
6. Ethanol intoxication.

Other general uses of Tea are as follows:

A. Soothing effect on Eyes:

The tannins in tea have anti-inflammatory effects, which is why cold tea is often applied on puffy eyes.

B. Get rid of bad smells:

Dry out your teabags or tea leaves and pop them in an open container, then place the container where the odour is worst. This can work in stinky freezers or stinky shoes (just leave the teabags in the shoes overnight), or even in your cat's litter box.

C. Tenderize meat:

Steep old black teabags until a strong tea is created, then pour over meat just before cooking to tenderize. The tannins in the tea will soften it.

D. Tame stings and burns:

Cool tea bags can bring relief when applied to bug bites and minor burns, including sunburn. For overall skin irritation, put spent tea leaves in a bath and soak.

E. Feed the garden:

Use tea leaves as food for garden plants green tea is high in nitrogen and as a bonus, the leaves can ward off pests and insects. This is also good for houseplants, so add old tea leaves while watering these plants.

F. Deodorize kitchen surfaces:

Rub wet tea leaves on cutting boards and counters to remove food odors.

G. Wash your hands:

Rid your hands of food odors (garlic, onions, etc.) by rubbing them with wet green tea leaves, an instant deodorizer.

III. INDUSTRIAL REUSE OF WASTE TEA POWDER

A. Waste tea as an adsorbent

About one-third of the net dry matter in tea leaves contains mainly carboxylate, aromatic, phenolic, hydroxyl and oxyl groups. This composition is responsible for its ion-exchange behavior which in turn improves its potential to be used as a metal scavenger from solutions and wastewaters [3].

B. Preparation of organic compost using waste tea powder

Tea powder can be a great source of biodegradable garbage but it can make a good source of compost as well. The research is about preparing compost using waste tea powder which is generally thrown away and analyzing the physico-chemical parameters of the compost.

The compost prepared by using waste tea powder has increased concentration of essential nutrients needed for plant growth and development as compared to the regular soil which are Chloride, Sulphate, Total Phosphorus, Available Phosphorus, Organic matter, Calcium and Magnesium. By using this compost, the plants grow very rapidly and there is increment in the leaf area, leaf density, height, and germination period and germination frequency of the plant. The use of this compost also reduces environmental pollution and also gives better yield of crops [4].

C. Efficiency of garden waste compost teas on tomato growth

The use of compost teas is of great interest to sustainable agriculture. Aerated compost tea (ACT) and aerated vermicompost tea (AVT) originating from garden waste have been analytically characterized and tested in vitro and in vivo on tomato plants to determine their suppressive effect on *Rhizoctonia solani* and *Fusarium oxysporum* f. sp. *lycopersici*. The nitrogen (N, 3840 ppm) and potassium superoxide (K₂O, 5800 ppm) contents were relevant in ACT. Both ACT and AVT were shown to contain indoleacetic acid IAA salicylic acid and humic acids. Direct confrontation assays against the pathogens showed that ACT had a high suppressive effect on *F. oxysporum* f. sp. *lycopersici* (relative growth of the pathogen [RG]: 12 %) and AVT had a high suppressive effect on *R. solani* (RG: 18 %).

These suppressive effects have been confirmed by tests performed in vitro and on potted tomato plants. Results of plants growth assays showed that tea powder can be applied, in their concentrated forms, to the growth medium. The analysis of the growth effect of the teas on tomato plants clearly indicated that both ACT and AVT, when applied weekly, produce a positive effect on shoot and root dry weight (dry weights were tripled), chlorophyll content and stem diameter compared to untreated plants. These results support the use of ACT and AVT as potential alternatives to the application of synthetic fungicides, and as plant promoters in crop production, for attaining environmental sustainability for farming and food safety [5].

D. Particle board from waste tea leaves and wood particles

The study investigated the use of waste tea *camellia sinensis* leaves mixed in various proportions with *Paraserianthes falcataria* (moluccan sau) wood particles for the manufacture of particleboard. Boards containing waste tea leaves alone showed low thickness swelling and water absorption after 24 h soaking in water. Addition of *P. falcataria* wood particles from 20% to 50% to waste tea leaves resulted in boards with satisfactory thickness swelling, water absorption, internal bond, stiffness, and strength well above the minimum requirements for general use particleboards set by EN 312-2 (1996). Results of the study showed that waste tea leaves can be used as an alternative material either alone or in combination with wood particles for the manufacture of particle board [6].

E. Tea Powder Waste as a Potential Co-substrate for Enhancing the Methane Production in Anaerobic Digestion of Carbon-Rich Organic Waste

Anaerobic co-digestion of solid wastes with activated sludge for biogas production is an alternative and effective cleaner process of energy production from waste matter. This study comprehensively evaluated the suitability of Tea Powder Waste as an alternative co-substrate for higher biogas production. Biochemical Methane Potential analyses were performed on the anaerobic co-digestion of carbon-rich organic solid waste and Tea Powder Waste with the presence of Methanogens in activated sludge. The process parameters for the co-digestion of organic waste with Tea Powder Waste were optimized in order to achieve higher biogas production. Biogas producing reactors, with the organic wastes and methanogens activated sludge, were maintained under a mesophilic temperature (35 ± 2 °C) for 60 days retention period. The influence of various process parameters on the production of biomethane was analyzed. The optimized feed ratio of 1:2:1 (FFV: TPW: MAS) showed higher methane yield. Nitrogenous compounds present in Tea Powder Waste increased the methane production by four folds. The co-digestion of wastes showed 65% yield when compared to 40% yield as in mono-digestion of wastes.

Tea waste is an important byproduct of different tea factories of this region. The huge amount of such byproduct should be utilized in various ways by arranging fruitful management program by factory owners. Tea Board of India also instructs the tea growers and factory owners to manage those byproducts and also trained the people towards alternative utilization of such good amount of tea waste for production of caffeine for pharmaceutical companies and after caffeine extraction as feed for domestic animals. Most of the effects of tea are associated with flavonoids and their antioxidant potential. These manifest counter acting power of body

towards naturally generated or externally invaded oxidizing species [7].

CONCLUSION

From the above information we can understand that tea consist of most if the important constituents and antioxidants which are very effective and beneficial for humans and the waste tea powder can be reuse in various forms like fertilizer, adsorbents, compost, particle board and can be used in methane production also so overall tea and its waste is very effective and beneficial.

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