Review on Human Liquid Waste, Composition and its Application

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Abstract- **Human liquid waste is the nature source of generation. Urine and feces source of generation are both from humans and animals.it is one of natural source. This source can be used in different aspect such as a source of medications, fertilizer, cleaning, gunpowder, tanning etc. This source are cheaply and large available.**

Index Terms- **urine, feces, reuse, applications, natural sources.**

INTRODUCTION

The byproduct of all chemical reactions in the body that needs to be excrete or else the buildup of these Compounds will sicken and eventually kill the person. A liquid containing different waste products of metabolism, especially urea and different nitrogenous Compounds that are filtered from the blood by the Kidneys. Urine is stored in the urinary bladder and is Excreted from the body through the urethra. The Kidneys extract the soluble wastes from the bloodstream, excess water, sugars, and a variety of other compounds. The urine contains high concentrations of urea from amino acid, inorganic salts and organic acids, various water-soluble toxins and hemoglobin breakdown, including urobilin, which gives urine its characteristic color. Urination is the route by which the body excrete water-soluble waste products. The rate of generation of urine in adult between 1.5–2.0 liters of urine per day.

The management of human excreta is importance for the health and welfare of populations living in low income countries as well as the prevention of pollution to the environment. On-site sanitation systems are the most important means of treating excreta in low income countries, these facilities aim at treating human waste at source and can provide a hygienic and low cost method of waste disposal, current on site sanitation systems need improvement and require further research and development.

COMPOSITION OF FECES

Fecal wet mass values were increased by a factor of 2 in low income countries (high fiber intakes) in comparison to values found in high income countries (low fiber intakes). Feces had a median pH of 6.64 and were composed of 74.6% water. Bacterial biomass is the major component (25–54% of dry solids) of the organic fraction of the feces. Undigested carbohydrate, fiber, protein, and fat comprise the remainder and the amounts depend on diet and diarrhea prevalence in the population. The inorganic component of the feces is primarily undigested dietary elements that also depend on dietary supply.

COMPOSITION OF URINE

Composition of urine is caused by differences in physical exertion, environmental conditions, as well as water, salt, and high protein intakes. Urine has a pH 6.2 and contains the largest fractions of nitrogen, phosphorus, and potassium released from the body. The urinary excretion of nitrogen was significant (10.98 g/cap/day) with urea the most predominant constituent making up over 50% of total organic solids. The intake of food and fluid in our diet is the major cause for variation fecal and urine composition and these variables should always be considered for the generation rate, physical, chemical composition of feces and urine for to be accurately predicted.

THE LIKN BETWEEN SANITATION AND AGRICULTURE

The aspect of growing food is historically strongly linked with the idea of reusing nutrient and organic matter-rich human waste from households in agriculture. In the past, human and animal excreta played a crucial role in maintaining soil fertility and providing essential plant nutrients for food production. The loss of soil fertility is inherent in all agricultural systems. Nutrients are taken up from the soil through the plants that are harvested, then transported, eaten, and finally excreted. In former centuries, it was therefore a common practice to compensate the nutrient loss by returning the consumed nutrients through the application of animal manure, human excreta, and compost. In modern agriculture, however, the loss of the most important macronutrients has been partly compensated through application of synthetic fertilizers. However, despite of the fertilizer use, a negative nutrient balance in most soils is observed. Beyond that, the production of the most important and commonly used synthetic fertilizer ingredients - Nitrogen (N), Phosphorus (P), and Potassium (K) - relies on non-renewable resources and its supply is finite, particularly for phosphorus and potassium. Synthetic fertilizers are expensive commodities and their prices are expected to increase in the coming years due to their declining availability and rising fuel prices. Even now, many small-scale farmers cannot afford to buy fertilizers in quantities needed to maintain soil fertility. At the same time, the flow of plant nutrients in commonly used sanitation systems is predominantly linear where landfills and water bodies are used as a sink for nutrients, organic matter and pathogens. The vast majority of excreta and wastewater do not receive adequate treatment, leading to large-scale environmental pollution, biodiversity degradation, through eutrophication and soil degradation and severe health risks, while losing valuable resources that could have been used in agriculture. The idea that human residues including excreta are wastes with no useful purpose can be seen as a modern misconception

Application Techniques

For best fertilizing effect and to avoid ammonia losses, urine should always be applied close to the ground and be incorporated into the soil as soon as possible after application, instantly if possible. Equipment that can be used for the application comprises watering cans, dippers, empty water bottles cut into half, empty sardine cans, etc. Some plants in their early stages are sensitive to having their roots exposed to urine (e.g. tomatoes), while for many crops no negative effect is seen at all. Therefore, before the sensitivity of a crop is known, it is wise not to simultaneously expose all the roots of the plant to urine, be it neat or diluted. Instead, urine can be applied either prior to sowing/planting or at such a distance from the plants (about 10 cm) that the nutrients are within reach of the roots. When spreading urine, it should not be applied to leaves or other parts of the plants, as this can cause foliar burning. Spraying urine in the air should also be avoided due to the risk of Nitrogen loss through gaseous emissions of ammonia and the hygiene risk through aerosols. The above mentioned application recommendations are also beneficial from a health perspective since they avoid direct contact of urine with the planted crops (RICHERT et al., 2010). A shallow incorporation of urine into the soil is usually enough, and different methods are possible. The choice of application technique varies for different types of crops. Potential application techniques include (1) application in furrows, (2) application in dug holes, (3) application on trees, and (4) urine application using drip irrigation systems. The different application techniques are described as follows.

Application Technique 1: Urine Application in Furrows

For crops that are grown in rows, urine can be applied in small furrows along one (or both) side(s) of the planting row. Furrows should be dug at a distance of around 10 cm away from the plants. Urine should then be applied according to the plant requirements (see also chapter on application rates above) with subsequent application of water and covering of the furrows after urine and water application.

Application Technique 2: Urine Application in Holes

For crops with spacing between the plants, urine can also be applied in small dug holes next to the crop. The holes should be dug at a distance of around 10 cm away from the plants and around 10 cm deep without hurting the roots of the plants. Urine can then again be applied according to the plant requirements with subsequent application of water and covering of the holes after urine and water application.

Application Technique 3: Application on Trees
For trees (e.g. banana, mango or coconut), urine should be spread in a circle around the tree that corresponds to the circumference of the branches. A small circular furrow should be dug around the tree with subsequent application of urine and water and closing of the furrow afterwards.

Application Technique 4: Drip Irrigation
Drip irrigation with urine is another possible application technique. However, when this technique is used, measures must be taken to avoid clogging of emitters. Subsequent use of water to 'clean' the pipes is a recommended option here.

Adding of Urine to the Compost
Urine can be added to regular compost heaps as an additional source of Nitrogen (as well as other macro- and micronutrients). For compost heaps with a high carbon/Nitrogen (C/N) ratio, the urine helps to add the missing Nitrogen element and can therefore be considered a good compost activator. During the composting process, however, considerable amounts of Nitrogen might get lost through volatile Ammonia in the composting process. The adding of urine usually increases the temperature in the compost, which is also beneficial to destroy any remaining pathogens and unwanted seeds in the heap.

Urine Composting
The urine together with a microbial solution is added to a mix of around 10% of garden soil, around 10% of ground charcoal, and around 80% of a finely sliced wood source (e.g. woodchips) and left for composting for a period of 1-2 months with occasional watering of the compost heap (based on RECKIN, 2010). The final composted product is a nutrient-rich, humus-like substance with a high organic carbon content that allows for improved water retention and a longer lasting fixation of essential nutrients.

Use of Human Urine Fertilizer in Cultivation of Cabbage and cucumber
The growth of cabbage yields indicates that urine can be used as a good fertilizer for cabbage and could represent a feasible alternative to industrial fertilizers. The initial growth rate of cabbage plants in industrial-fertilized was higher than that in urine-fertilized because of the larger amount of fertilizer applied at the beginning, but later, the growth rate was better in urine-fertilized when equal amounts of fertilizer were applied. The growth rate of urine-fertilized cabbage could have been better if an equal amount of fertilizer had been applied, the amounts at each interval from the very beginning. Although the initial growth rate of industrial-fertilized cabbages was better, their growth possibly because of N deficiency, whereas the urine-fertilized cabbages continued to grow; this is similar to the situation with cucumber growth.

CONCLUSION

The reuse sustainable sanitation approach and the consideration of urine and feces as valuable resources that can be productively used as fertilizers and soil conditioners in agriculture. Human waste can be turned into effective community assets. Particularly the easy-to-treat and nutrient-rich human urine has a high potential to provide a continuous liquid fertilizer source that is freely and immediately available. It can help reduce the dependence on expensive synthetic fertilizer resources and can have a considerable impact on the mitigation of poverty, malnutrition and food insecurity.

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