Chemical Fertilizer Vs Organic Fertilizer from Biogas Plant

The Biogas can be generated from any kind of wet organic waste mainly from animal dung, food & kitchen waste, industrial organic waste. In anaerobic digester (biogas plant), due to the action of methanogenic microbes the complex organic molecules are break down in multiple steps and finally biogas & bio fertilizer is generated as the end product. There is significant difference in using the organic waste directly in the soil and using it after composted in the biogas plant. In raw organic waste, the nutrients are in complex form and so it is difficult for the soil microbes to act on it and convert it into crop/plant absorption form. But in the case of composted organic fertilizer from the Biogas plant, it is already broken into the simplest form so that the plant readily uses it without any further conversion. The composition of biogas slurry (Composted organic fertilizer) comprises of moisture content, organic carbon, potassium, nitrogen, phosphorus etc. in the percentage of 40.21, 11.77, 0.33, 0.71 and 0.43 respectively with the C:N ratio of 17:1. The organic waste without composting will have the C:N ratio in the range of 20:1.

Advantages of Bio- fertilizer from Biogas plant over non-composted organic waste directly used for crops/plant:

- Reduced volume
- Odour less
- Reduced pathogens and weed seeds
- Reduced spontaneous emissions of CH_4, NH_3 and N_2O on to the atmosphere

The characteristics of Bio fertilizer from biogas plant & chemical fertilizer are given below.

S no	Characteristic	Chemical Fertilizer	Organic Fertilizer from Biogas Plant
1	Source	Chemicals like rock phosphate, pyrite & gypsum deposits	Wet organic waste (Food waste, Vegetable waste or Animal dung)
2	Composition	The Chemical fertilizer mainly comprises of Sulphur, Potassium, Phosphorus, Nitrogen, Magnesium and Calcium.	Biogas slurry comprises of moisture content, organic carbon, potassium, nitrogen, phosphorus etc.

3	Effects on Soil fertility	The use of chemical fertilizer in the farm land will give instant result but reduces the soil fertility.	Its effect on restoring soil fertility is longer-lasting when compared to chemical fertilizer.
4	Ground Water Pollution	The persistent use of chemical fertilizers causes the pollution of ground water sources or leaching.	In no way the organic fertilizer will cause water pollution.
5	Destruction of Micro-Organisms	The synthetic chemicals in the chemical fertilizers adversely affects the naturally found soil micro-organisms by affecting the soil pH.	The use of organic slurry from biogas plant for gardening or farm land will increase the population of microbes like actinomycetes, azotobacter, phosphate solubilizing microorganisms, mesophilic cellulose decomposing microorganisms and spore-forming bacteria which are helpful in maintaining the soil fertility.
6	Manufacturing Process	It has very complex manufacturing process.	It is generated by simple and natural process (Anaerobic Digestion).
7	Air Pollution	While manufacturing the chemical fertilizer harmful gases are released into the atmosphere and thereby causing air pollution. Emission rate CO2 500 kg/MT of Ammonia, NOx 0.5-0.6 kg/MT of Ammonia.	It is 100% pollution free process. The greenhouse gases generated by anaerobic digestion are used for thermal or power generation.
8	Impact on Human Health	Chemical fertilizer enters the human body in three ways – passes through mouth, infiltrate through skin and while breathing. Moreover, chemical fertilizer causes critical health hazards to people such as skin cancer, effects on the growth of a baby.	Fertilizer from the biogas plant does not affect the nutrient value of the crops in any way. Hence, there are no chances of health hazards at all.
9	Cost	Expensive.	As long as you have wet organic waste you can generate your own bio fertilizer at your home easily absolutely free of cost.
10	Yield	Give instance result by increasing the yield. But on long run, it leads to soil infertility.	Gradual & sustainable increase in the yield is achieved by improving the soil fertility.

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