

## Pressmud: A Useful By-Product

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India's Green Revolution has undeniably transformed the country's food grain production from a "ship-to-mouth" situation to one of self-sufficiency and surplus. The food grain production in India has been doubled during the post green revolution period with virtually no increase in net cultivated area. Chemical fertilizers play a very important role for this marvellous achievement in agricultural production. Over time, the heavy reliance on chemical farming has revealed its negative consequences. Several soil test experiments reported that organic matter of soil is declining continuously therefore the land is losing its fertility. Recycling of by-product of agricultural industry in agriculture brings in the much-needed organic and mineral to the soils and helps in bridging the gap between supply and demand for plant nutrients. Since most recyclable by-products are organic, they directly add organic matter and the plant nutrients contained in it. Pressmud is a by-product obtained during sugar production. Sugarcane industry by-product "Pressmud" as a potential source of nutrients, amendment and wax. In India, the total production of pressmud is 6.4 million tonnes. The raw sugarcane juice obtained during milling contains 77 to 88% water, 8 to 20% sucrose, 0.3 to 3.0% reducing sugars, 0.5 to 1.0% organic compounds and 0.2 to 0.6% inorganic compounds. The suspended impurities in raw juice include the dispersed soil, bagasse particles, wax, fats, proteins, gums, pectin, tannins, etc. The dissolved impurities present in the cane juice are glucose, fructose and inorganic salts of Na, K and P, etc. The suspended and dissolved impurities are removed from the juice to obtain sugar crystals. Sulphitation and carbonation processes are commonly used to purify the cane juice. The clarification of cane juice in the sulphitation process is carried out with the help of lime and sulphur dioxide (SO<sub>2</sub>). CaSO<sub>3</sub> is precipitated along with other impurities in the form of sulphitation pressmud (SPM). In the carbonation process, lime and CO<sub>2</sub> are used to get the clear cane juice. Here, calcium carbonate along with impurities is precipitated which is known as carbonation pressmud (CPM). The production of sulphitation and carbonation pressmud is about 3% and 7%, respectively, of the quantity of cane crushed in a sugar factory.

## Characteristics of Pressmud

Pressmud is a soft, spongy, amorphous and brownish white to dark brown material containing sugar, fibre, coagulated colloids including wax, albuminoids, inorganic salts and soil particles. The composition and properties of pressmud, however, vary depending upon the quality of cane and the process followed for the clarification of cane juice. In general, SPM is more useful for crop production as compared to CPM.

**Table 1. Chemical Composition of Pressmud**

Parameters	SPM	CPM
<b>pH</b>	Acidic (6.5-7.5%)	Alkaline (8-8.5%)
<b>EC (dsm<sup>-1</sup>)</b>	2.5-3.0	2.0-2.5
<b>OC (%)</b>	26.0-43.0	13-15
<b>N (%)</b>	1.0-3.0	0.5-0.9
<b>P (%)</b>	0.5-3.5	0.5-2.5
<b>K (%)</b>	1.5-2.0	1.4-1.8
<b>S (%)</b>	2.0-2.5	Traces
<b>Fe (ppm)</b>	2000-2500	1800-2200
<b>Mn (ppm)</b>	1250-1600	1800-2200
<b>Cu (ppm)</b>	126-211	200-300
<b>Zn (ppm)</b>	248-211	275-345
<b>CaCO<sub>3</sub> (%)</b>	Traces	60
<b>CaSO<sub>4</sub> (%)</b>	9.4	Traces

**Note:- It is a general composition of pressmud. Its composition depends upon the quality of cane and the process followed for the clarification of cane juice.**

## Uses of Pressmud

- Pressmud contains several macro and micro-nutrients. All these nutrients become available to the growing plants after the degradation of pressmud added to the soil.
- Pressmud improves the physical, chemical and biological properties of soil.
- The presence of large amounts of organic matter, calcium carbonate, Ca and S in pressmud suggests that it may serve as an ameliorant for acidic and saline-sodic soils.
- Composted dewaxed filter cake is an excellent source of humic material to the soil.
- Dried pressmud can be used in combination with cane molasses and tops, as an animal feed.
- The wax obtained from pressmud is used as an excellent electric insulator.

Filter cake is used to produce clean and cheap biogas. The biogas contains 65-75% methane, which is combustible and it is produced by digestion. The fertilizer value of filter cake does not diminish but rather enhances during the digestion process. Thus, filter cake converted into two useful products, fuel and fertilizer by digestion process.