

BROWN MANURING

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Brown manuring is simply a ‘no-till’ version of green manuring, using a selective herbicide to desiccate the crop before flowering instead of using cultivation. According to this technique, green manure crops are grown along with the crop and killing them with the help of herbicide. The plant residues are left standing in the field along with the main crop without incorporation/in-situ ploughing until its residue decomposes itself in the soil. It helps to add organic manure besides weed suppression by its shade effect. The post-emergence herbicide spray on green manure leaves resulting in loss of chlorophyll in leaves showing brown in colour is referred to as brown manuring.

Crops Suitable for Brown Manuring (Chauhan and Rahevar, 2021)

Non-leguminous crops: The non-leguminous crops which provide only organic matter to the soil are used to a limited extent. Example: Niger, Wild indigo *etc.*

Leguminous crops: Crops provide organic matter along with nitrogen to the soils. The legumes are preferably used, and they can fix atmospheric nitrogen with the help of its nodule bacteria. Example: Sun hemp, Dhaincha, Mung, Cowpea, Lentil *etc.*

Generally, brown manuring in rice is the practice of growing *Sesbania spp.* and rice together, and when these dhaincha plants overtake the rice plants in height at about 25 days of co-culture, a weedicide 2, 4-D is applied to kill these *Sesbania* plants. After 4-5 days of spraying, *Sesbania* plants will appear brown and then start dying; leaves will fall on the ground and form mulch and help in smothering of weeds. As it is a selective herbicide, it kills only *Sesbania* plants and not the rice plants. This is called the down knocking effect.

Sesbania is a live cover that offers interference (at pre-killing period) with weed and later as a dead residue mulch offers stimulation by addition of organic matter (at post-killing period). As brown manure crops are grown between the lines of the major crop, so planting

density in the field was high, due to which there would be no free space available for weed for its spread resulting in a minimum weed population. In brown manuring, knocking down of *Sesbania* by 2,4 D application fasten the decomposition and release of nutrient present in *Sesbania* as compared to in-situ incorporation. *Sesbania* could add C and N into the soil, which facilitates favourable microbial action (Behera and Das, 2019). Also, during the decomposition of *Sesbania*, certain organic acids, allelochemicals are released, which might offer some depressive effect on the weed seed bank. Enhanced soil fertility as well as lesser weed competition under brown manuring treatment, leads to higher productivity of crops.

Benefits of Brown Manuring

- Soil organic carbon content is increased by brown manuring, thereby supplying the required nitrogen for the rice plants. Thus, a part of nitrogenous fertilizer (upto 25%) can be replaced by brown manuring.
- It also increases the crop yield
- Biomass of green manure conserves moisture
- It also improves the soil health parameters like organic carbon content and earthworm population of the soil.
- Brown manuring improves the physicochemical and biological properties of the soil.
- Brown manuring reduces the weed population in the early stage due to its high growth rate and competition with the weeds.
- Brown manuring increasing soil organic matter, which decreases the bulk density of the soil and acts as a buffer preventing or lessening the transmission of compaction to subsoil from external loads acting on the topsoil

Conclusion

As brown manuring is eco-friendly and helps to suppress weeds as well as add nutrition to the soil, it can be used as a good approach for higher production of crop and thereby leading to benefit for the farmers. It should thus be widely advocated by the extension agencies to realize its benefits for the farming community of the nation.

References

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