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# Structural amelioration of virgin clay soils in Lusatia with flue gas desulphirization (FGD) gypsum under Poplar growth and soil physical aspects.

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Structural amelioration of virgin clay soils along with the growth of two Poplar clone (Hybrid 275 & Weser 6) have been evaluated with flue gas desulphurization (FGD) gypsum as a substitute for lime in Lusatia, Germany. Growths of two poplar clones at open mining field Nochten showed proportional growth. Specific differences in diameters and heights with respect to different variants are not observed. However differences with respect to biomasses have been observed. Application of FGD gypsum showed an acceptance with the produced biomass with both poplar clones (Weser 6 and Hybrid 275). Acceptance of FGD gypsum is higher with poplar clone Hybrid 275 (till 4 times gypsum amelioration) compared to poplar clone Weser 6 (1 time gypsum amelioration). Development of structure has been evaluated using parameters shear stress and penetration resistance. Objective of this work is to investigate FGD gypsum on structure development of clay and is compared with lime. Sand-clay mixtures (65 % sand – 35 % clay) are subjected to undergo 1, 5, 10 and 20 drainage cycles (swelling and shrinking processes). Shear lines are established based on 12 load stages using box shear machine. Penetration resistance has been accomplished using modified penetrometer. Shear lines distinguished a new structure development with good crystal growth after 10 drainage cycles with FGD gypsum, where as with lime it was rather lubricative. Penetration resistance decreased from 30 MPa to 5 MPa with FGD gypsum amendment where as with lime amendment it reduced to 10 MPa only. From

water retention characteristics it could be observed that samples are well drained indicating reduction in water holding capacity of clay due to amelioration achieved by FGD gypsum. Observations showed that FGD gypsum is more effective in amelioration compared to lime.