Path analysis of agro-industrial traits in sweet sorghum

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ABSTRACT. Sweet sorghum has considerable potential for ethanol production due to its succulent stalks that contain directly fermentable sugars. Since many traits need to be considered in the selection process to breed superior cultivars for ethanol production, then correlations between the traits might be of use to help the breeder define optimal improvement strategies. The aim of this study was to investigate the association between the principal agro-industrial traits in sweet sorghum, and to evaluate the direct and indirect effects of primary and secondary traits on ethanol production per hectare. In total, 45 sweet sorghum genotypes (lineage/hybrids) were evaluated in an experiment designed in an alpha lattice 5 x 9. The data were analyzed using a mixed model approach. A detailed study of simple correlations was accomplished using path analysis. The experimental precision was high, with an accuracy above 76%. The various genotypes showed genetic variation for all agronomic and industrial traits, except stalk diameter. Some agro-industrial traits showed significant simple
correlations with ethanol production, but according to the path analysis, some of these traits did not show a significant direct or indirect effect on ethanol production. The results highlighted the primary and secondary traits with practical relevance to sweet sorghum breeding, since they showed director indirect effects on ethanol production.

**Key words:** *Sorghum bicolor*; Ethanol production; Correlation; Path analysis