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Genetics of seed phenolic content and antioxidant activity in diallel crosses of sesame, *Sesamum indicum* L.

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Proper understanding of genetic mechanisms involving in the expression of total phenolic content and antioxidant activity would help in planning effective breeding programs in sesame. The objective of this study was to evaluate genetic variability for total phenolic content and antioxidant capacity in twelve sesame lines and investigate gene action in 6x6 diallel analysis. The field experiment was conducted at Mora during cropping season from 2011 to 2013 in randomized complete block design (RCBD) with three replicates. Data analysis showed significant ($p < 0.05$) variability in the sesame cultivars for these traits. Broad sense heritability was high for total phenolic content ($h^2 = 0.96$) and for antioxidant activity ($h^2 = 0.99$), indicating preponderance of genetic factors controlling these traits. The value of $2GCA/2SCA$ ratio was less than one for total phenolic content (0.38), suggesting the prevalence of non-additive gene effects in the genetic control for this trait, while for antioxidant activity, its value was greater than one (3.73) showing the preponderance of additive genes effects. The parents differed for their general combining ability (GCA) and the crosses showed specific combining ability (SCA). Dominant genes have positive effects for these traits. Genotype variation for phenolic content and antioxidant activity indicates that, it would be possible to select for these quantitative traits in a breeding program.

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