



# Effects of *p*-chlorophenoxyisobutyric acid, arabinogalactan, and activated charcoal on microspore embryogenesis in kale

R.Q. Niu, Y. Zhang, Y. Tong, Z.Y. Liu, Y.H. Wang and H. Feng

College of Horticulture, Shenyang Agricultural University, Shenyang, China

Corresponding author: H. Feng

E-mail: fenghuiaaa@263.net

Genet. Mol. Res. 14 (2): 3897-3909 (2015)

Received March 25, 2014

Accepted February 27, 2015

Published April 27, 2015

DOI <http://dx.doi.org/10.4238/2015.April.27.4>

**ABSTRACT.** To improve embryogenesis in microspore cultures of kale (*Brassica oleracea* L. var. *acephala* DC.), 6-benzylaminopurine (6-BA), naphthaleneacetic acid (NAA), arabinogalactan (AG), *p*-chlorophenoxyisobutyric acid (PCIB), and activated charcoal (AC) were added to the medium using four varieties of kale. The results showed that the addition of AG (0.1-0.2 g/L), AC (0.1-0.2 g/L) or a combination of 6-BA (0.1-0.2 mg/L) and NAA (0.1-0.2 mg/L) promoted embryogenesis. Adding 40  $\mu$ M PCIB or a combination of 40  $\mu$ M PCIB and 0.2 g/LAC to NLN-13 medium at pH 5.8 effectively enhanced embryogenesis. Treatment with a combination of 40  $\mu$ M PCIB and 10 mg/L AG gave the highest rate of embryonic induction, especially in genotype “Y007,” which showed a twelve-fold increase in yield.

**Key words:** Kale; Embryogenesis; *p*-Chlorophenoxyisobutyric acid; Arabinogalactan; Activated charcoal