

## PENGEMBANGAN METODE TRANSFORMASI GENETIK SECARA *IN PLANTA* PADA TANAMAN KOSMOS (*Cosmos sulphureus* Cav.)

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### INTISARI

Tanaman kosmos (*Cosmos sulphureus* Cav.) umumnya dimanfaatkan secara komersial sebagai tanaman hias. Namun, variasi warna yang ada saat ini sangat terbatas. Sementara itu, belum ada laporan mengenai pengembangan teknik rekayasa genetik pada tanaman kosmos melalui transformasi genetik. Adanya kandungan senyawa fenolik yang tinggi pada tanaman kosmos menyebabkan transformasi genetik secara *in vitro* dapat terkendala. Oleh karena itu, pada studi ini dilakukan uji coba transformasi genetik secara *in planta* dengan harapan dapat mempercepat transformasi genetik pada tanaman kosmos. Penelitian ini bertujuan untuk optimasi metode transformasi genetik *in planta* pada tanaman kosmos dengan metode perendaman biji (*seed transformation*) dan metode *floral dip*. Metode biji dilakukan dengan perendaman 200 biji kosmos dalam suspensi *Agrobacterium* dengan perlakuan waktu infeksi selama 3, 6, dan 9 jam. Sementara itu, pada metode transformasi *floral dip*, transformasi dilakukan dengan pencelupan 5 hingga 10 kuncup bunga dalam dua suspensi yang berbeda, yaitu suspensi *A. tumefaciens* OD<sub>600</sub> = 1,5 tanpa penambahan Silwet L-77 dan sukrosa dengan perlakuan lama pencelupan kuncup 30, 60, dan 90 detik, sementara suspensi kedua yaitu suspensi *A. tumefaciens* dengan penambahan 0,05% Silwet L-77 dan 5% sukrosa dilakukan dengan perlakuan lama pencelupan 30, 60, 90, dan 120 detik. Konfirmasi tanaman putatif transforman dilakukan dengan analisis PCR. Hasil analisis menunjukkan bahwa transformasi genetik dengan metode perendaman biji belum mampu menghasilkan tanaman positif transforman. Metode transformasi *floral dip* dengan penambahan 0,05% Silwet L-77 dan 5% sukrosa penting menghasilkan tanaman positif transforman. Efisiensi transformasi tertinggi (55,56%) diperoleh melalui perlakuan pencelupan selama 30 detik. Sementara secara keseluruhan, efisiensi transformasi yang diperoleh sebesar 23,72%.

Kata kunci: kosmos, transformasi genetik, *in planta*, transformasi biji, *floral dip*

**DEVELOPMENT OF IN PLANTA GENETIC TRANSFORMATION METHOD  
FOR COSMOS (*Cosmos sulphureus* Cav.)**

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**ABSTRACT**

*Cosmos (Cosmos sulphureus Cav.) is commonly grown as an ornamental plant. However, color variations of cosmos flowers that exist today are very limited. Moreover, the development of genetic engineering techniques of cosmos through genetic transformation has not reported yet. Genetic transformation by in vitro culture remains challenging since the cosmos plants contain a high phenolic compounds. Therefore, this study was conducted through in planta genetic transformation trials to accelerate the genetic transformation method in cosmos plant. The aim of this research is to determine the best method for in planta genetic transformation method in cosmos by seed transformation and floral dip method. The seed transformation method was performed by soaking 200 seeds of cosmos with suspension of Agrobacterium  $OD_{600} = 0,8$  for 3, 6, and 9 hours of infection time treatments. The floral dip method was performed by dipping 5 to 10 flower buds of cosmos into two different conditions of Agrobacterium suspension. The first suspension was using *A. tumefaciens* culture with  $OD_{600} = 1,5$  without addition of Silwet L-77 and sucrose for 30, 60, and 90 seconds of flower bud dipping duration treatments. The second suspension was *A. tumefaciens* culture with  $OD_{600} = 0,8$  with addition of 0,05% Silwet L-77 and 5% of sucrose for 30, 60, 90 and 120 seconds of flower bud dipping duration treatments. The putative transformant plants was further confirmed by PCR analysis. The results showed that the seed transformation method has not be able to produce any transgenic cosmos plants. The successful transformation method was shown in the floral dip method with addition of 0,05% Silwet L-77 and 5% of sucrose. It revealed that 0,05% Silwet L-77 and 5% of sucrose are an important agents for in planta genetic transformation method in cosmos plants. The highest transformation efficiency (55,56%) was obtained during 30 seconds of flower bud dipping duration, while overall the transformation efficiency was achieved at 23,72%.*

*Key words: cosmos, genetic transformation, seed transformation, in planta, floral dip*