The global coffee market is prosperous and can grow further with the availability of low-caffeine coffees from genetic improvement. However, the multiplication of these plants by seed germination is avoided due to genetic segregation, and indirect or direct somatic embryogenesis is recommended. In the direct route, *Coffea arabica* forms few somatic embryos. The osmotic concentration of the culture medium can affect the somatic embryogenesis of different species. This study aimed to evaluate the effect of sucrose and gelling agent on direct somatic embryogenesis of low-caffeine genotypes. Leaves collected from thirteen genotypes of *C. arabica* plants in the F3 generation and from the Obatã and Catuaí Vermelho cultivars belonging to the low-caffeine breeding program of the Instituto Agronômico de Campinas, SP, were used. Explants obtained from these leaves were subjected to direct via. For this purpose, culture medium with ½ the concentration of MS salts with 10 µM of 2-Isopentenyladenine, the addition of 20 or 30 g/L of sucrose and gelled with 5 g/L of agar or 2 g/L of Phytagel were used. Each treatment consisted of ten replications. Explants of all genotypes formed somatic embryos, but 2, 7 and 14 had lower responses. Explants of the thirteen genotypes in the presence of 20 g/L of sucrose with agar or Phytagel formed a total of 1,821 and 2,645 somatic embryos, respectively. But, those treated with 30 g/L sucrose and Phytagel had 3775 embryos. The combination of 20 g/L of sucrose and agar is standard for direct pathway induction in *C. arabica*. However, Phytagel combined or not with 30 g/L of sucrose caused a change in the osmotic concentration of the culture medium, which promoted the direct genotype pathway. These results indicate that the osmotic concentration may participate directly or indirectly in the control of the direct somatic embryogenesis of *C. arabica*.

Keywords: Coffea, osmotic concentration, somatic embryo