To evolve a simple oxygen electrode-based method to estimate alternative respiration, one needs to develop a procedure to prevent switch-over of electrons to either pathway upon inhibition by cyanide or salicylhydroxamic acid. It was hypothesized that the inclusion of appropriate electron acceptor, possessing redox potential close to one of the electron transport carriers in between ubiquinone (branch point) and cytochrome a-a3, should be able to stop switch-over of electrons to either pathway by working as an electron sink. To test the hypothesis, 2,6-dichloro-phenol indophenol (DCPIP; redox potential +0.217 V), an artificial electron acceptor having a redox potential quite similar to the site near cytochrome c1 (redox potential +0.22 V) on the cyanide-sensitive pathway, was used with isolated mitochondria and leaf discs in the absence and presence of inhibitors (potassium cyanide, antimycin A, and salicylhydroxamic acid). Polarographic data confirmed electron acceptance by DCPIP only from the inhibited (by cyanide or salicylhydroxamic acid) mitochondrial electron transport chain, hence preventing switch-over of electrons between the cyanide-sensitive and cyanide-insensitive pathway of respiration. Results with antimycin A and reduction status of DCPIP further confirmed electron acceptance by DCPIP from the mitochondrial electron transport chain. Possible implications of the results have been discussed. 