A method of applying a coating solution to a surface of a substrate to form a film of desired thickness thereon. The substrate is spun at low speed with a predetermined supplying rotational frequency, and the coating solution is supplied to a region centrally of the substrate. The substrate is decelerated to a predetermined standby rotational frequency lower than the supplying rotational frequency before the coating solution spreads over an entire surface of the substrate. Then, the substrate is accelerated to a target rotational frequency higher than the supplying rotational frequency before the coating solution spreads over the entire surface of the substrate. Subsequently, the substrate is spun at high speed with a predetermined film-forming rotational frequency, thereby coating the surface of the substrate with a film of desired thickness. The supply of the coating solution is continued at least during the deceleration to the standby rotational frequency.