ABSTRACT

Using onion epidermis layer a very accurate method for measuring the permeability of epidermis cells to water was standardized. In this method a 1.4 cm diameter epidermis disc was soaked in tritiated water (500 μcurie/ml) for about 1 hour. Next the disc was mounted in a specially designed elution chamber where it was held flat and washed on the non-cuticular side with ordinary water. A constant flow rate, high enough to minimize unstirred layer effect, was used. Permeability was calculated in the usual way after separating different exponentials from the efflux curve of tritiated water. Turgor pressure of the cell was regulated by soaking the disc in mannitol solutions containing tritiated water and washing it in the chamber with same concentration mannitol solution containing no radioactivity. Water permeability values were found to decrease less than 8% when the turgor pressure was decreased from 8 atmospheres (full turgor) to zero. Turgor pressure had no significant effect on the water permeability of onion epidermal cells. Our results are contradictory to the findings of Zimmerman and Steudle

(1974, J. Memb. Biol. 16:331-352) but are similar to the findings of Tazawa and Kamiya (1966, Aust. J. Biol. Sci. 19:399-419).