

EFFECT OF pH ON TEMPERATURE DEPENDENT MORPHINE UPTAKE BY
PAPAVER SOMNIFERUM AND PAPAVER BRACTEATUM LATEX ORGANELLES

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The 1000xg organelles separated from the latex of Papaver somniferum have been reported to accumulate morphinan alkaloids (Fairbairn and Steele, 1981, Roberts et al, 1983). P. bracteatum latex organelles have also been reported to accumulate morphinan alkaloids (Kutchen et al, 1985). In a previous paper on the mechanism of alkaloid uptake and sequestration by the latex 1000xg organelles (Homeyer and Roberts, 1984) we reported that maximal morphine uptake by P. somniferum latex organelles occurred at pH 7.5 and that uptake was essentially temperature independent.

Investigations with latex 1000xg organelles from both P. bracteatum and P. somniferum showed that they took up codeine, papaverine and morphine as well as thebaine, and that in experiments where both thebaine and morphine were fed, changes in the relative concentration of thebaine had essentially no effect on the rate of morphine uptake. The morphine uptake by P. bracteatum latex organelles is noteworthy since the plant does not normally produce morphine. Further investigation has shown that the native pH of P. somniferum latex is about 6.2, that of P. bracteatum about 6.0. The rate of alkaloid uptake at the native pH is less than that at pH 7, but the sensitivity to temperature is considerably greater as demonstrated by the uptake of ¹⁴CH₃ labelled morphine by pairs of samples maintained at temperatures 20° C apart (i.e. 10° and 30°, 0° and 20°). The average ratio of high to low temperature sample uptake (Q₂₀) is shown in Table 1.

Table 1. Q₂₀ of labelled morphine uptake by latex organelles

	pH 6.2	pH 7.0
<u>P. somniferum</u>	3.95	1.54
<u>P. bracteatum</u>	4.12	3.18

The investigation also revealed that P. bracteatum latex organelles are more temperature sensitive than P. somniferum latex organelles at the pH tested.

- Fairbairn, J.W. and Steele, M.J. (1981) *Phytochemistry* 20: 1031-1036
 Roberts, M.F. et al (1983) *Arch. Biochem. Biophys.* 222: 599-609
 Kutchen, T.M. et al (1985) in: *The Chemistry and Biology of Isoquinoline Alkaloids*, Phillipson, J.D. et al, eds., Springer-Verlag, Heidelberg, p.281-294
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