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THE RADIO-ASSAY OF SOME OPIUM ALKALOIDS IN PAPAVER SOMNIFERUM L. CAPSULE LATEX

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ABSTRACT

This work consists of the assays of morphine and its N-oxides, codeine and thebaine in the latex collected from the capsules of Papaver somniferum L. of two different years. The results show that the factors which effect the increase and decrease of the contents of these substances are irrigation, rain fall during naturation and the kind of fertilizers used, mainly, rather than humidity, temperature and the effect of the sun.

ÖZET

Bu çalışmada Papaver somniferum L. bitkisinin iki yıla ait kapsüllerinden toplanan latekslerindeki morfin ve N-oksitleri ile kodein ve tebain gibi alkaloidlerin yüzde verimleri tayin edilmeye çalışılmıştır. Çalışma N-metil - ^{14}C morfin HCl kullanılarak yürütülmüştür. Sonuç olarak üzerinde çalışılan maddelerin birbirleriyle uyumlu şekilde artıp eksildiği ve artış eksilişlerin ise, nem, güneş ışınlarının şiddetinden çok, kullanılan gübre çeşidi, düzenli sulama ve bitkinin olgunlaşması esnasında yağan yağmurlara bağımlı olduğu açıklandı.

INTRODUCTION

Papaver somniferum L. is one of the medicinal plants which is economically important for Turkey. Opium alkaloids, which are being used in therapy, were being previously maintained from the latex of the plant, in our country. The growing of the plant was restricted for some years and later the permission was given, provided that opium was to be maintained from dried capsules, thus lancing of the capsules in order to maintain the latex was restricted. This is why we wanted to make the radio-assays of some of the opium alkaloids (morphine, codeine, thebaine) and morphine

N-oxides which are proved to be natural products /1/, in the dried and wet capsules and latex of the plant.

This work, covers up only the radio-assays of the above mentioned alkaloids in the latex, concerning two years, 1979 and 1980. The radio-assays of the alkaloids in the dried and wet capsules will be subject to further work. Thus a comparison of the radio-assays of the above mentioned alkaloids will be made in the latex and dried and wet capsules. By this way, we hope to be helpful to the country in finding out the factors which cause the decrease and increase of the contents of these alkaloids.

EXPERIMENTAL

The plant used in this work is P. somniferum L. ssp. anatolicum and N-methyl ^{14}C-morphine HCl (57 mCi/m mol., 2,1 GBq/m mol) is used as a tracer.

TABLE-1. The Place and Dates of Collection

Species	Place	Dates
P.somniferum L. ssp.anatolicum	Isparta, Eğridir Göndürlü Village	June 19th-June 30th 1979 June 23rd-July 3rd 1980

Eleven samples are collected for each year, the sixth (WO + 12), being the lancing day, which is accepted to be the day of opium collection by the farmers.

WO : Day on which petals are fully opened.

WO + 7 : Days on which first sample is collected.

WO + 12 : Lancing day.

The lancing of the capsules is done in the morning and approximately 1 gr. latex is collected from each capsule early the next morning.

Each latex sample is fed with 1 ml. prepared /2/ N-methyl- ^{14}C-morphine HCl solution and this mixture is extracted as indicated in previous works /1-3/.

The alkaloids are collected in the organic layer. From each organic layer 1 ml. is taken and this is applied to thin layer chromatography. The plates are prepared with Silica gel GF_{254} and are developed in a solution prepared with:

Carbon tetrachloride : n-butanol : methanol : conc. NH_4OH

(40 : 30 : 30 : 3) /3/.

The alkaloid bands are scraped from these developed plates and are separately eluted with methanol and are made up to known volume and counts are taken. The calculations are made according to the radioisotope dilution technique /4/. The Liquid Scintillation Counter is used for the counts throughout the work.

Fig. 1 and 2 show the results of the two years conerning the percentages of the alkaloid contents.

RESULTS AND DISCUSSION

If the results of the two years, 1979 and 1980, are compared, it is easy to come to the conclusion that the amounts of alkaloids maintained in 1979 are more than the amounts obtained in 1980. According to the previous investigations /5/ rain-fall before the plant growth is one of the factors which effect the amounts of alkaloids. More than this, humidity, temperature, direct effect of the sun, the kinds of fertilizers used and irrigation are factors which cause increases and decreases in the amounts of alkaloids /5-10/. Meterological findings show that, there is no significant difference between humidity, temperature, sun-shine, concerning these two years. The high percentages in the alkaloid contents maintained from the latex samples of 1979 then depend on N-fertilizers used around Isparta and irrigation, which is applied to the crop grown in this year. The low contents obtained in 1980, however, must bu due to the rain-fall seen this year, during maturation.

In conclusion, if fertilizers which contain N are to be used and irrigation is emphasized, then we think plant will be more helpful to the country, economically.

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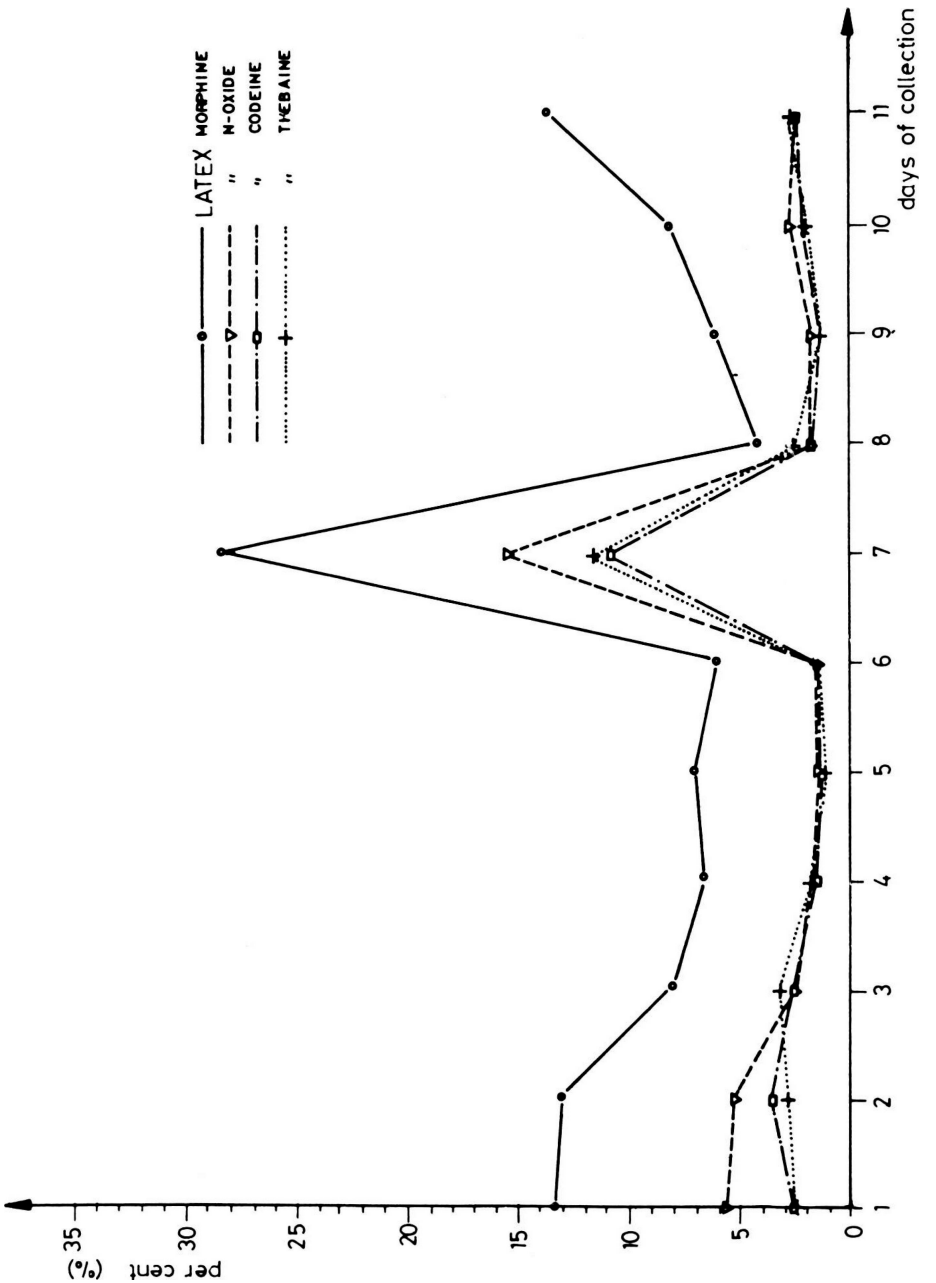


Fig. 1. The contents of morphine, morphine N-oxides, codeine and thebaine in capsule latex collected in 1979.

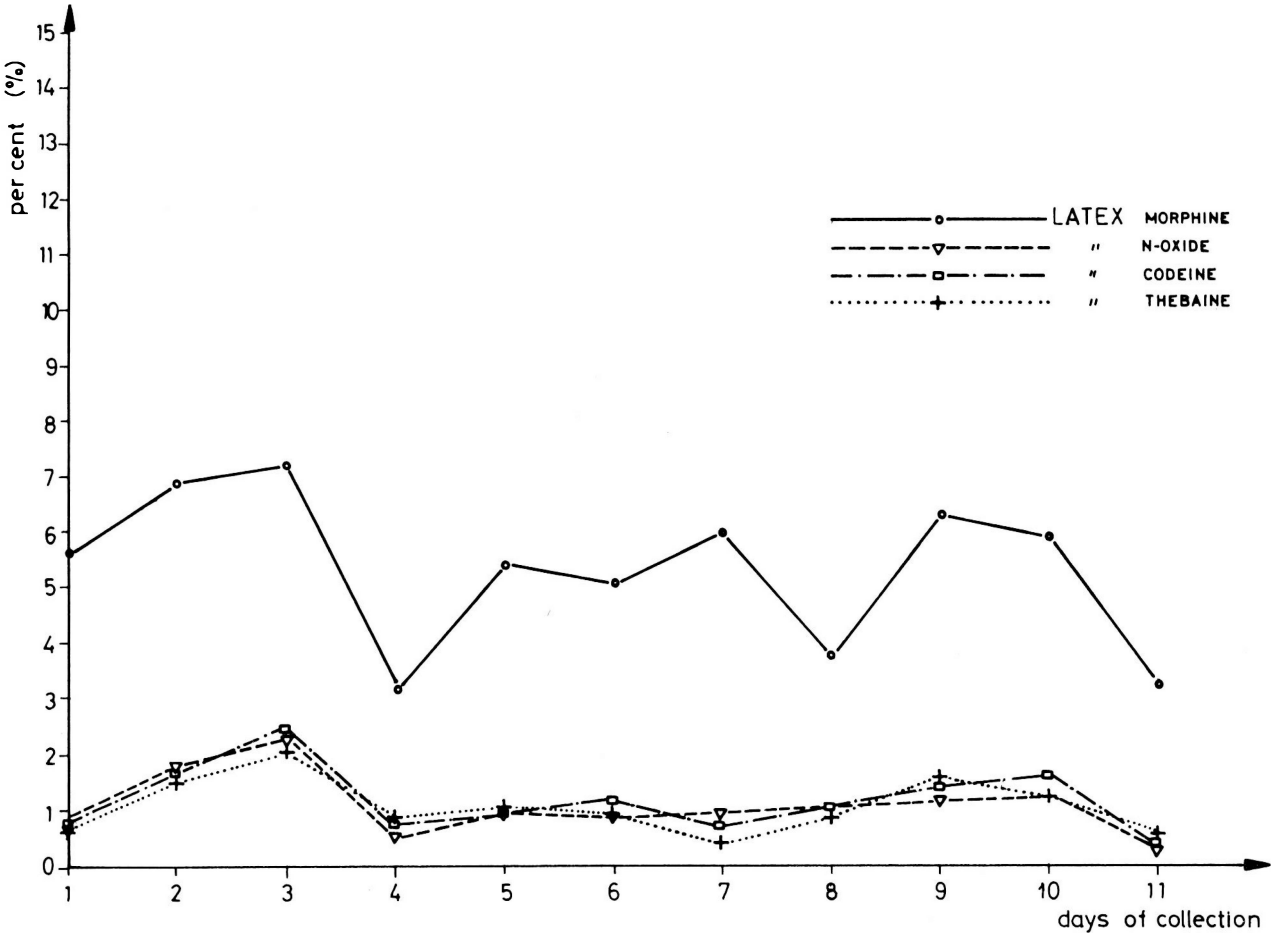


Fig. 2. The contents of morphine, morphine N-oxides, codeine and thebaine in capsule latex collected in 1980.

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