absorption spectrum on the protein before a method for its estimation is chosen, and an absorption curve in the visible region on the anthrone colour, so that if necessary a correction can be made for tryptophan interference.

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Influence of Excreted Substance from Leaves on Decomposition of Zineb, a Dithiocarbamate Fungicide

A variety of substances are excreted by leaves[1], and have a direct influence on the germination of fungus spores[2] and on the activity of copper fungicides[3]. Since the fungicidal activity of the dithiocarbamate fungicides depends largely on their mode of decomposition and this in turn depends on environmental conditions[4], we examined the influence of the foliar excreta.

Leaves of grape (var. 'Trebbiamo'), potato (var. 'Majestic'), sugar beet (var. 'Maribo P.'), and apple (var. 'Golden Delicious') were collected. Four samples, each of 100 cm² surface, of each species were prepared by cleaning with a dry cotton plug and immersing for 3 h in 100 ml. of distilled water. Care was taken to exclude petioles. After 3 h one part of each liquid sample was mixed with a previously prepared 4 per cent suspension of zineb (zinc ethylene-*bis*-dithiocarbamate), in a ratio of one part of zineb to nine parts of wash-water, yielding 0·4 per cent zineb suspension. These operations were repeated on three consecutive days with the only difference that samples of the first day were chromatographed immediately after mixing wash-water and zineb; samples of the second day were mixed with zineb and maintained for 3 h at 26° C and those of the third day were mixed and maintained for 5 h before being chromatographed. As a control zineb suspension was mixed in every case with distilled water (one part of 4 per cent zineb with nine parts of distilled water).

Descending chromatograms were prepared on Whatman No. 1 paper with a mixture of distilled water, ethanol and butanol (1 : 1 : 1 mixture for 24 h at laboratory temperature). After drying, the chromatograms were developed with a spore suspension of *Aspergillus niger* in diluted peach juice ($7{\cdot}5 \times 10^5$ spores/ml.). 1·34 ml. of this suspension was distributed on 100 cm² paper. After 72 h incubation at 27° C the zones of inhibition were evident on the paper as white spots.

Neither of the wash-waters without zineb gave inhibition spots, whereas all those suspensions with zineb did so at $R_F = 0$, that is, at the start, corresponding to zinc-ethylene-*bis*-dithiocarbamate.

A second inhibition spot with $R_F = 0{\cdot}86 - 0{\cdot}89$ was evident with the following suspensions: (*a*) Chromatograms prepared immediately after mixing zineb and wash-water: zineb in distilled water, light spots in all four replications; in grape wash-water, light spots in two replications; in potato, in sugar beet, and in apple wash-water, no spots. (*b*) Chromatograms prepared 3 h after mixing zineb and wash-water: distinct spots with distilled water and with all wash-waters in the four replications. (*c*) Chromatograms prepared 5 h after mixing zineb and wash-water: only zineb in potato wash-water gave inhibition spots in all four replications. There were two distinct spots at $R_F = 0{\cdot}86 - 0{\cdot}88$ and at $R_F = 0{\cdot}70 - 0{\cdot}72$.

Table 1. *p*H Values of the Wash-waters obtained using Different Kinds of Leaves, with and without Zineb

	Mean	*S.E.*
Sugar beet wash-water	6·79	0·07
Sugar beet wash-water + zineb	7·11	0·24
Potato wash-water	6·94	0·05
Potato wash-water + zineb	7·76	0·03
Grape wash-water	7·27	0·09
Grape wash-water + zineb	7·51	0·04
Apple wash-water	7·38	0·02
Apple wash-water + zineb	7·56	0·01
Zineb alone	7·26	0·01
Distilled water	6·10	0·72

It is evident that the substances excreted from the leaves affect the decomposition and activity of the zineb sprayed on the leaf-surface; as a rule, the activity is enhanced. The small differences in the R_F-values suggest that the decomposition products are similar, with the exception of the product of the potato wash-water.

Comparison of the chromatographic results with the *p*H values (Table 1) suggests that the more distinct inhibition spots of the potato wash-water are due to its higher *p*H value, and this agrees with Thorn's suggestion[4] that decomposition of zineb is enhanced by an alkaline environment, where it produces ethylenethiurame-monosulphide. In fact, in other trials carried out by us (unpublished) the R_F values of the ethylenethiurame-monosulphide were 0·84–0·88.

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Chloroplast Ribosomes

Previously[1] we have found ribosomes in chloroplasts of *Chenopodium album* and *Clivia miniata*. As shown by electron microscopy and biochemical methods, ribosomes located in the matrix of chloroplasts are 180–200 Å in diameter and possess a sedimentation coefficient of about 70 *S* in the presence of 10^{-2} M Mg^{2+}. The work described here is concerned with the isolation of chloroplast ribosomes from a number of higher plants and investigation of some of their chemical and physico-chemical properties.

Chloroplasts were isolated from leaves of eight species of higher plants (before flowering) belonging to six families: *Clivia miniata* (Amaryllidaceae), *Beta vulgaris* and *Chenopodium album* (Chenopodiaceae), *Galinsoga parviflora* (Compositae), *Triticum vulgare* (Gramineae), *Lamium album* (Labiateae), *Phaseolus vulgaris* and *Pisum sativum* (Leguminosae). Wheat and pea seedlings, 7–10 days old, were also used.

The isolation of chloroplasts was carried out by differential centrifugation, the rate of precipitation of nuclear and chloroplast fractions being particular for each plant. The details of the procedure were described previously[1].

Chloroplast and cytoplasmic ribosomes were isolated as described previously[1] with the only modification that the former were purified not only by reprecipitation but