SOME NEW MARKET DISEASES OF VEGETABLES

DURING recent years much attention has been paid to the post-harvest diseases of vegetables. They not only inflict enormous losses to plant products during marketing and storage but also serve as sources of infection through seeds and other plant products. In the present paper, some of the new and interesting diseases of vegetables collected during a survey of the local vegetable markets are described. Symptoms of various diseases were recorded and the colours are recorded as per Ridgway's color chart. The pathogen associated with the disease was isolated on Asthana and Hawker's medium 'A' and was identified. Pathogenicity of the organism was confirmed by inoculating the pathogens on healthy vegetables employing Granger and Horne's method and the diseases have been described hostwise.

Lactuca bulbosa (Dutch) Rusby. (Bottle gourd)

The infection started mostly from the blossom end of the fruit in the form of white patches which later on changed their colour to tawny olive. Some of the patches coalesced and the region beneath became soft. The deeper tissues of the fruit also showed the presence of the fungus. Later on, the entire fruit was affected and as a result, the inner portion of the fruit was completely destroyed. The fungus responsible for the disease was found to be an isolate of Aspergillus niger Van Tiegh.

Luffa cylindrica Roem. (Sponge gourd)

A severe rot of this fruit was observed during the months of August and September 1973. The infection started either from the apical or basal end of the fruit as olive brown coloured necrotic areas. Some of the necrotic lesions coalesced and infected portion became pulpy. An isolate of Aspergillus niger Van Tiegh. was found associated with the diseased fruits.

Solanum melongena L. (Brinjal)

The disease appeared in the form of verona brown coloured necrotic areas. These areas enlarged gradually and ultimately occupied major portion of the fruit. The rotted tissue produced a juice emitting foul odour. The disease was more common on deep purple variety than on green variety. Isolations from the diseased portion yielded an isolate of Aspergillus niger Van Tiegh.

Trichosanthes dioica Roxb. (Parval)

The disease could start at any place on the fruit as ochraceous buff colour spots. The spots enlarged and their colour changed to tawny olive. Sometimes 2 or 3 spots coalesced and formed a bigger spot. On some of the older spots, black fruiting bodies were visible. Isolations from the diseased portion yielded an isolate of Phoma pomorum Thum.

Zingiber officinale (Ginger)

The disease started as ochraceous buff to tawny olive coloured irregular depressed areas on the surface of rhizome. These areas, later on, increased in size and occupied major portion of the rhizome. The internal tissue of the rhizome developed a dry rot. In the case of severe infection, the rhizome became smaller in size and lighter in weight. An isolate of Rhizopus oryzae Went. and Prinsen was found responsible for the disease. The morphological characters of the isolate were similar to those described by Yamamoto.

Authors are grateful to Prof. D. D. Pant for providing laboratory facilities and to Dr. A. Johnston, Director, C.M.I., Kew, for his help in confirming the identity of pathogens.

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Allahabad, November 11, 1974.


A RAPID METHOD FOR DETERMINATION OF OSMOTIC POTENTIAL OF PLANT CELL-SAP

In the study of plant-water relationships assessment of water potential and osmotic potential are important, particularly in plants grown under saline stress, where osmotic potential determines the plant growth. There are two major methods to determine osmotic potential (osmotic pressure, \( \pi \)) of plant cell-sap: (a) freezing point depression and vapour pressure method and (b) plasmolysis. Both these methods are accurate but rather difficult and time-consuming.

The United States Salinity Laboratory observed that the OP (atm) of the soil solution is approximately equal to 36% of the electrical conductivity measured in millimhos/cm. Furthermore, the conductivity of soil or plant extract gives a measure of the quantity of salt present. As such it is apparent that moisture content of plant tissue should also be considered. At a given temperature, the OP of a dilute solution is directly proportional to its solute concentration. The OP of non-electro-
lytes is normally very much lower than that of electrolytes. Hence, in the present investigations the use of conductance measurements for the determination of OP has been extended to plant samples. The relation \( \text{OP} = 0.36 \times EC \times 10^3 \times \text{dilution factor} \) is used in the case of \( \text{Rhoeo discolor} \) leaves, and compared with the standard plasmolytic method. The details are as follows:

One g of fresh leaves of \( \text{Rhoeo disicolor} \), Hance, was ground to a paste in a porcelain mortar, strained through a muslin cloth and made up to 25 ml with distilled water. The electrical conductance of the expressed cell-sap was measured in a 'Elico' conductivity bridge. Moisture content of \( \text{Rhoeo} \) leaves was measured following standard methods of plant analysis. The OP in bars of \( \text{Rhoeo} \) cell-sap was then calculated as: 

\[
\text{OP} = \frac{(EC \times 0.36 \times \text{d.f.})}{0.987},
\]

where, \( EC \) = electrical conductance in millimhos/cm at 25°C of plant extract; \( \text{d.f.} \) = dilution factor depending upon the moisture content of the tissue and extract volume: 0.987 = factor for converting atmospheric pressure to bars.

For comparative purposes, OP of \( \text{Rhoeo} \) cell-sap was also determined by standard plasmolytic method, using sucrose as a plasmolytic agent\(^1\). Ten samples were analysed by each method. The results are presented in Table I.

### Table I

<table>
<thead>
<tr>
<th>New method</th>
<th>Plasmolytic method</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>r</td>
</tr>
</tbody>
</table>

**After accounting for moisture in tissue**

<table>
<thead>
<tr>
<th></th>
<th>New method</th>
<th>Plasmolytic method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.05</td>
<td>7.32</td>
</tr>
</tbody>
</table>

* Mean of ten samples.

** r = Correlation coefficient.

** Significant at 0.01%.

### Table II

<table>
<thead>
<tr>
<th>Salinity gm salt/kg of soil (NaCl + CaCl(_2 ))</th>
<th>OP in bars</th>
<th>% decrease over control</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>6.13</td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>6.44</td>
<td>5.2</td>
</tr>
<tr>
<td>3.0</td>
<td>8.74</td>
<td>42.6</td>
</tr>
<tr>
<td>4.5</td>
<td>10.61</td>
<td>73.1</td>
</tr>
</tbody>
</table>

† Average of duplicate samples.

The OP, obtained after accounting for moisture (94.3%) in the tissue by the new method, was slightly lower than that obtained by plasmolytic method (Table I). However, there was a highly significant correlation between the two methods.

Applying the new method, the OP was determined using the leaves of a twenty day old sunflower seedlings (\( \text{Helianthus annuus} \) L. var. Sunrise) grown under three salinity levels. The data in Table II indicate decreased OP of plant cell-sap with increase in salinity level. These findings are in conformity with the views expressed by Kramer\(^4\) and Slater\(^7\).

The proposed new method will be of immense use when large samples are to be investigated for the OP of the plant cell-sap.

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**IN VIVO PRODUCTION OF TRANSELIMINASE BY HELMINTHOSPORIUM APATTARNAE**

(DESII. & DESII.)

Since Albersheim *et al.*\(^1\) and Nagel and Vaughn\(^4\) reported the non-hydrolytic split of 1,4-glucosidic bonds in pectic substances, many workers tried to explain the role of transelliminative enzymes in the disease development by demonstrating their *in vitro* production by various plant pathogens. But little is known about *in vivo* production of these enzymes. Therefore, an attempt has been made to detect the transelliminase (TF) in the totted potato tuber caused by *H. apattarneae.*