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Feeding pickled wheat to pigs

Department of Agriculture, Western Australia

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INQUIRIES are frequently received from farmers asking whether it is safe to feed pickled wheat to pigs, and if so, the quantities which would be suggested. Until very recently there was no experimental information on the safety or possible dangers of these wheat pickling agents, but feeding trials completed last year at the Animal Health and Nutrition Laboratory, Nedlands, have provided some of the answers to these questions.

The trials were conducted in part by the Senior Veterinary Pathologist (M. R. Gardiner, D.V.M.), and in part by J. Armstrong, B.V.Sc., who is now located at Albany as District Veterinary Officer.

The four pickling agents in common use at the present time are as follows:

- Copper carbonate.
- Ceresan (Organic Mercury Compound).
- Fernesan (Tetramethyl thiuram disulphide —TMTD).
- Hexabunt (Hexachlorobenzene C₁₂Cl₁₂).

Pickling was carried out at the standard rates of 2 oz, to the bushel and four groups of young pigs (slips and light porkers) were fed the following rations, which incidentally provided 18 per cent. protein.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickled wheat</td>
<td>100</td>
</tr>
<tr>
<td>Meatmeal</td>
<td>15</td>
</tr>
<tr>
<td>Limestone</td>
<td>1</td>
</tr>
<tr>
<td>Salt</td>
<td>½</td>
</tr>
<tr>
<td>Vitamin &quot;A&quot; supplement</td>
<td></td>
</tr>
</tbody>
</table>

The animals were kept under close daily observation and the information obtained at the termination of the feeding trials may be summarised thus:

**Copper Carbonate Pickled Wheat.**

Two pigs were fed for 70 days and 120 days respectively on a diet which comprised approximately 87 per cent. pickled wheat, one eating 255 lb. (in 70 days) and
the other 355 lb. (within 120 days). During this period the pigs thrived and showed no visible ill-effects. No abnormalities were detected at post mortem, but analysis of their livers showed dangerously high levels of stored copper, so much so that it was surprising that the pigs did not develop copper poisoning.

**Ceresan Pickled Wheat.**
Two pigs each consumed 255 lb. wheat in 90 days. They thrived well and neither showed any clinical ill-effects; no carcass abnormalities were seen when the animals were slaughtered. However, analysis of their livers and kidneys revealed mercurial levels well above those permitted in food intended for human consumption.

**Fernesan Pickled Wheat.**
Two pigs each ate 269 lb. wheat in 61 days. They grew satisfactorily and in fact had weight gains of 53 lb. and 65 lb. respectively over this period. When the animals were post mortemed, a remarkable bright green discoloration of all the subcutaneous and visceral fat was seen, indicating fat storage of the Fernesan.

**Hexabunt Pickled Wheat.**
Two pigs each consumed 329 lb. wheat in 71 days. The animals thrived and showed weight gains of 50 lb. and 95 lb. respectively over this period. No visible abnormalities or discoloration of the carcasses were seen at post mortem, but analysis of liver, fat and muscle tissues revealed totals of organic chlorine well in excess of that permitted in food intended for human consumption.

**DISCUSSION**
No signs of clinical ill-health, or adverse effects on weight gain, feed consumption or feed conversion were seen in groups of young pigs fed on wheat containing four different pickling agents, at the intake of the pickled wheat attained in each of these trials.

No visible post mortem abnormalities were evident with the exception of the Fernesan group which showed a remarkable green carcass discoloration. Such green carcasses would of course be condemned by meat inspectors as unfit for human consumption.

However, chemical analysis of the animal tissues revealed copper levels as high as 4,400 parts per million, mercury levels as high as 300 p.p.m. and organic chlorine, calculated to B.H.C. levels, as high as 1,000 p.p.m.

New Food and Drug Regulations are about to be gazetted under the provisions of the Health Act. These regulations will be in conformity with those in other States, and will allow copper concentrations up to 30 p.p.m., and mercury concentrations up to 5.5 p.p.m., in meat and other foods. Livers and kidneys, and in all likelihood muscle and fat, from the pigs in question would therefore be unfit for human consumption.

Furthermore, the upper limit of tolerance generally accepted for B.H.C. is 5 p.p.m. and animal tissues with higher B.H.C. levels would also be unfit for human use.

**CONCLUSION**
It is quite clear that the feeding of pickled wheat at the levels described, whilst causing no obvious ill-effects in young pigs, does lead to the accumulation of pickling residues in animal tissues at levels considered a toxic hazard for humans and far in excess of those permitted by the Public Health Regulations. Their indiscriminate use for feeding pigs cannot therefore be recommended.
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