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CHOKING OF MILKING MACHINE PULSATORS

By G. R. OLNEY, Agricultural Adviser, Bridgetown

THE value of applying the teat cup squeezing action more slowly, by "choking", has been well demonstrated for a number of years. Leslie and Whittlestone (1938) suggested that brutal teat cups and snappy pulsators could be undesirable because of the trauma caused. Choking was recommended by them to overcome this.

As a result of studies of the milking of individual teats, Phillips (1963) has reported that when the squeeze of the pulsation is applied rapidly, milk from the distended teat is ejected violently into the udder. This effect can be accentuated if the top of the teat is constricted by the mouth of the cup, as often happens towards the end of milking. The result is that a high-velocity jet of milk penetrates deeply into a partially empty udder. This can carry mastitis-causing organisms which have entered the teat, to incubation sites high up in the fine duct structures of the udder. It has been shown that the teat orifice remains open for longer periods than the theoretical milking phase. In other words, when a "snappy" squeeze is used, the teat sphincter muscle fails to close as fast as the inflation.

Besides this, motion picture X-rays at the National Institute for Research in Dairying, Shinfield, England, have demonstrated that when the squeeze is applied, the closing of the teat begins at the bottom, and the canal is closed progressively upwards as the squeeze continues. Milk at the bottom of the canal can therefore be forced upward into the teat by a kind of pumping action.

It is not difficult to see how infected milk from one quarter can pass to other quarters of the cow. All four quarters of a cow do not complete milking at the same time. If milk is still being withdrawn rapidly from one quarter, it can cross over the claw and enter the milk tube, then the cup of any quarter that has stopped milking. This appears to be more likely to happen with the conventional H-claw which is fitted to most machines.

Without control measures such as back-flushing, it is obvious that this can also spread infection between cows.

"Choking"

These faults can be largely overcome by applying the squeezing action of the inflation more slowly, although it is not suggested that choking will be a substitute for back-flushing.

At Ruakara (N.Z.) it has been shown that the slow squeeze action does improve the comfort of the cow, and there is evidence that it has materially reduced the incidence of mastitis (Phillips, 1963).

In another study (Whittlestone and Olney, 1962), choking increased milking rate when the pulsator ratio was left constant. On most farms the advantages of this would be negligible, because very few machines have reliable end-of-milking indicators. Over-milking is therefore a universal fault, and any small improvements in milking rate cannot be used to advantage.

It is essential that choking of pulsators be carried out only by persons suitably trained in milking machine testing. Choking will reduce the length of the squeeze phase, and unless care is taken, the resultant full squeeze will be too short. Before choking, a ratio of 30 : 70 was recommended, but with choked pulsators a ratio of between 35 : 65 and 40 : 60 at 5-inch level of vacuum, with at least 20 per cent.
of the pulsation cycle at zero vacuum, is recommended. The hole in commercial choke valves is 7/64 inch, and this should be enlarged as required during fitting and pulsator adjusted to ensure the above characteristics.

**SURVEY OF CHOKING MILKING MACHINES**

Farms where choke valves had been previously fitted during milking machine testing were visited to obtain some assessment of the value of choking. Information was sought regarding changes in milking time, incidence of mastitis, cow comfort, ease of milking and any other factors that could be attributed to choking.

Several McDonald milking machines had been choked by a different method before choke valves were released commercially and these farms were also visited.

For a fair judgment to be made, it was considered that the machines should have operated at a reasonable level of efficiency immediately before choking, and that no other major alterations were carried out at the time of choking the pulsators.

The chokes were all fitted during the normal course of milking machine efficiency-testing and pulsators were adjusted for choking. Many pulsators were operating at incorrect ratios before this, and any resultant improvements could not therefore be attributed to choking alone. In many cases the "reserve air" was grossly inadequate and farmers were advised to make the necessary alterations to improve it. Generally the vacuum pump required either renewing or reconditioning and in most cases this was done.

When a very low reserve persisted it was considered that the farmer could not make a proper assessment of his choked valves.

Machines where the bail pulsators before choking had ratios outside the range of 30:70 to 50:50 were excluded from the survey as it was considered that any improvement in the machine would be mainly due to pulsator adjustment and not choking. Machines with fixed pulsator ratios at about 50:50 were not excluded on this basis, as choking is one of the ways in which such ratios can be improved.

Those machines where the "reserve air" was less than half the recommended standard were also excluded, as the efficiency of these machines was considered too poor to gain any benefits from choking.

Several machines had to be excluded for other reasons. Some farmers had not milked with the particular machine before choking was carried out, and in other cases, the person who carried out the milking immediately before and after choking had left the property and was not available for comment.

Although some 68 machines had been choked in the last four years, 47 had to be excluded from the survey for the above reasons. This left 21 machines on which valid comparisons on the value of choking could have been made by the farmer.

The information available from farmers was not as precise as had been hoped. Figures for milking time were rather vague and farmers did not really know the level of mastitis in their herds as none was using the Rapid Mastitis Test before and after choking. However, some farmers

<table>
<thead>
<tr>
<th>Method of Choking</th>
<th>No. of Machines Choked</th>
<th>Machines Not Suitable for Comparison*</th>
<th>Machines Suitable for Comparison</th>
<th>Improvement Noted</th>
<th>Possible Improvement, But Not Definite</th>
<th>No Noticeable Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choke Valves</td>
<td>46</td>
<td>30</td>
<td>16</td>
<td>8</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>McDonalds Choked Previously</td>
<td>22</td>
<td>17</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>68</td>
<td>47</td>
<td>21</td>
<td>11</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

*Machines where the pulsator ratio before choking was outside the range of 30:70 to 50:50, where the "reserve air" was less than half the recommended standard, or where for other reasons a fair comparison of the operation of the milking machine for the period immediately before and immediately after choking was not possible.
did comment that they considered mastitis had been reduced.

The main assessment possible from farmers was therefore their opinions of the value of choking. Of the 21 farms, about half considered that choking had made a definite improvement. Some of the others considered that there could have been some improvement, although they had not detected a marked difference.

The details of the number of machines on which an assessment of the value of choking was possible, and the number on which an improvement in the operation of the milking machine had been detected, are shown in the table opposite.

Results

Of the 11 farmers who had noticed an improvement due to choking, nine claimed that the cows were milked out better. One of the farmers who had previously hand-stripped some of his cows, found that after choking this was no longer necessary.

Six farmers claimed that the choking appeared to make the milking machine more comfortable for the cows. Most of the farmers said that cows which were slightly restless before the machines were choked were no longer restless after choking. The three farmers who considered that there may have been an improvement but could detect no marked difference, considered that any possible difference was due to improved cow comfort.

Two farmers considered that milking was quicker, and one said that the slow cows milked out quicker. However, it is doubtful whether the farmers could have detected changes in milking rate. None of the milking machines on which choking was assessed had reliable end-of-milking indicators and very few farmers would have been able to take advantage of minor changes in milking rate.

It is very disturbing to note that even on new milking machines, reliable end-of-milking indicators are rarely fitted as standard equipment.

Two farmers claimed that the incidence of mastitis had fallen following choking. Even though it is known that choking reduces irritation to the cow and should help reduce the incidence of mastitis, this is very hard to substantiate in commercial herds unless some test such as the Rapid Mastitis Test is used regularly before and after choking. However, in the two herds in which improvement was claimed, the incidence of clinical mastitis apparently did decline over this period.

Conclusions

The fact that over half of these farmers had noticed an improvement due to choking does seem to substantiate the findings of research work from which the recommendations regarding choking have evolved.

However, as with any other improvement in the operation of milking machines, if any benefit is to be derived from choking, a good milking routine is essential. Much of the work on improving milking machine efficiency has been of only limited benefit to the farmer because of failure to adopt a good milking routine.

The need for adequate stimulation in udder washing, the placing of the cups on the cow before the effect of stimulation declines, and the removal of the cups as soon as milking has been completed, have often been emphasised, but are still common faults in the milking routine.

Recent work on the control of mastitis has shown that washing with running water instead of an udder cloth and water

Choking should be done by an expert with the proper equipment
from a bucket, and back-flushing the teat cups between cows are worthwhile measures to include in the milking routine.

Choking of milking machine pulsators must be done properly and a vacuum recorder must be used to ascertain whether an adequate, full squeeze is being obtained. Pulsators that have been correctly adjusted before choking will need further adjustment when choking is carried out, as choking alone will shorten the squeeze phase of the pulsation cycle and lead to dangerous consequences if done indiscriminately.

Provided the milking routine and overall milking machine efficiency is satisfactory, applying the squeeze phase of the pulsation cycle slowly, by choking, will improve the performance of the milking machines.

**References**


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<tr>
<th></th>
<th>Dose</th>
<th>1/2 gall. pack</th>
<th>2 gall. pack</th>
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<tr>
<td>Young lambs</td>
<td>2.5 cc</td>
<td>908  1.9 cents per dose</td>
<td>3,632  1.8 cents per dose</td>
</tr>
<tr>
<td>Lambs</td>
<td>5 cc</td>
<td>454  3.8 cents per dose</td>
<td>1,816  3.7 cents per dose</td>
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<tr>
<td>Weaners or Hoggets</td>
<td>7.5 cc</td>
<td>302  5.8 cents per dose</td>
<td>1,208  5.6 cents per dose</td>
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<tr>
<td>Adult sheep</td>
<td>10 cc</td>
<td>227  7.7 cents per dose</td>
<td>908    7.5 cents per dose</td>
</tr>
</tbody>
</table>

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