Dextrose improves birth weight uniformity

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Over the past year, a number of pig breeders have started to add dextrose or sugar to the sow feed in the period between weaning and mating. Various compound feed suppliers extended their product range with a 'flush-feed' containing extra sugar or dextrose. However, so far there is hardly any evidence available that extra sugar/dextrose has a positive influence on the sow's fertility, the number of liveborn piglets or the birth weight of piglets in the subsequent litter.

Dextrose is another name for grape sugar or glucose. Also called sucrose or saccharose, sugar is a compound of glucose and fructose. Sugar must first be broken down into glucose and fructose (by the enzyme sucrase) before it can be absorbed in the blood. Dextrose enters the bloodstream more rapidly. Glucose in the blood stimulates insulin production, which in turn fuels the release of the LH and FSH sex hormones.

These hormones activate follicle growth, resulting in ovulation five to eight days after weaning. It has been demonstrated in first and second litter sows that increasing the feed supply (flushing) during the weaning-oestrus interval (WOI) influences the ovulation rate and, possibly, the duration of the WOI.

Little is known about the impact of the feed composition on this interval. Van den Brand et al. demonstrated on an experimental scale that a high starch diet during the WOI resulted in a higher percentage of sows in heat within nine days after weaning and a shorter WOI than a high fat diet.

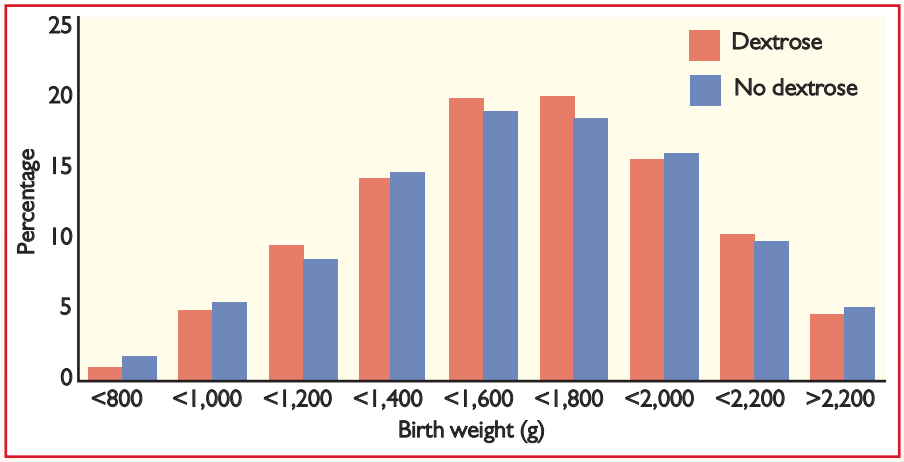

Fig. 1. Effect of dextrose on birth weight.

Field tests showed that the addition of 150g of sugar (75g twice daily as top dressing) during the WOI did not influence the reproduction results. In recent field studies in Germany, sows were given 200g of dextrose every day in the period between weaning and mating. The dextrose was not found to have any effect on the pregnancy rate and the number of liveborn pigs in the subsequent litter.

One of the questions that remains however, is to what extent the addition of sugar or dextrose during the WOI could have on pigs born in the subsequent litter. Around the time of ovulation it could have an effect on the quality of the egg cells and therefore, of the embryos. This may have consequences for the uniformity of the piglets at the time of birth and, possibly, at weaning.

Together with Denkavit, the specialist in young animal feed, Animal Science Group (ASG) Wageningen carried out a test at Denkavit research farm 'De Grutto' in Voorthuizen to find an answer.

Material and methods

A total of 223 sows were used in this test. Every week, upon arrival in the farrowing pen, some 10-12 sows were divided into a

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Table 1. Effect of addition of dextrose during the weaning oestrus interval on the technical results of all sows.

Dextrose	Yes	No	P value
Number of sows	110	111	-
Parity	1.95	2.02	0.61
Weaning-oestrus interval (hour)	106	105	0.56
Oestrus duration (hour)	47	49	0.47
Not pregnant or returned to service (%)	11.8	11.7	0.98
Litter following administration of dextrose			
Number of litters	93	93	
Liveborn piglets	12.87	13.19	0.33
Stillborn piglets	0.57	0.76	0.20
Mummies (number)	0.13	0.09	0.50
Mortality (number)	1.45	1.74	0.23
Weaned	11.24	10.95	0.26

Table 2. Effect of dextrose during the WOI on birth and weaning parameters of the piglets in the subsequent litter.

Dextrose	Yes	No	P value
Number of litters	91	85	
Litter size	12.91	12.71	0.83
Birth weight (g)	1608	1591	0.81
Birth weight CV (%)*	17.5	21.2	0.03
Litters with piglets <1,000g (%)	40.7	45.9	0.49
Piglets <1,000g (%)	5.1	8.1	0.17
Mortality rate (%)	6.9	7.4	0.68
Number of piglets weaned	11.84	11.62	0.80
Weaning weight (kg)	7.9	7.9	0.86
Weaning CV (%)*	17.3	17.4	0.95

* CV = Coefficient of Variation = STD/mean * 100%.

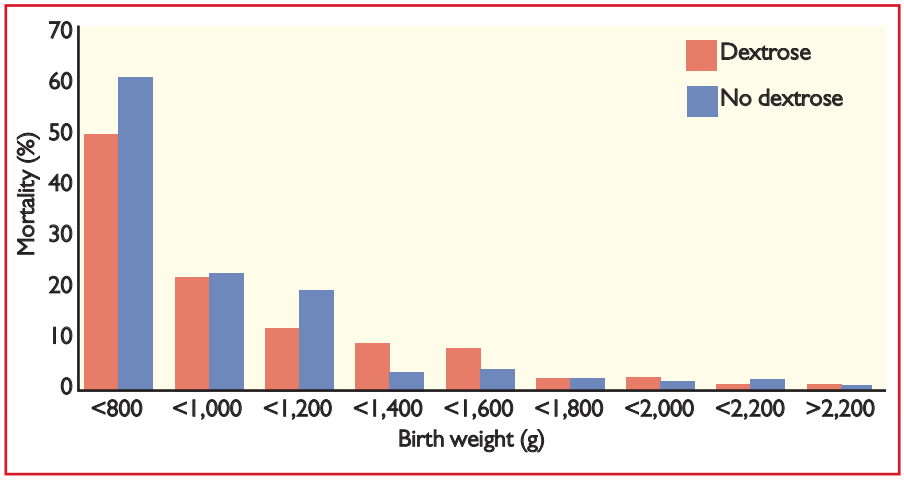

Fig. 2. Effect of dextrose and birth weight on mortality before weaning.

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group that was to receive dextrose after weaning and a group that would not be given dextrose. This was based on parity. During the lactation period, the normal activities took place and fostering was applied as far as necessary.

The sows were not fed in the morning of the day of weaning. Next, the sows were given ad lib amounts of a high grade starter feed for sows (41.9% starch and sugars, 10% dNSP, 6.6% crude fibre, 15.8% protein, NE 9.4 MJ). From day one after weaning, the pre-selected sows were given 150g of dextrose a day (75g twice daily) as a top dressing on their feed.

The dextrose was given until the end of oestrus. The piglets from 176 litters were individually weighed directly after birth and at weaning.

Piglets that had been moved to another sow were not included in the within-litter variation calculation upon weaning.

Results and discussion

Table 1 presents the results for the sows that were given dextrose during the WOI and for the control group, which was not given dextrose. There were no significant differences between the two groups. That applies to both the number of liveborn pigs, the number of still births and the mortality rate. These results prompt the conclusion that the addition of dextrose during the WOI has no effect on the technical results.

Table 2 shows the effects of dextrose administration on parameters at birth and weaning of piglets of the subsequent litter. No interactions between parity and dextrose were found for the piglet parameters, so data are not split for parity.

Table 2 shows that the coefficient of variation (CV) in birth weight based on individually weighed piglets is lower in sows that are given dextrose during the WOI than in sows that were not given dextrose, although birth weights themselves did not differ much between the two groups.

This was mainly caused by the smaller number of piglets with a birth weight <1,000g but there were also less piglets >2,200g. At weaning the coefficient of variation in weight was identical again. This may be caused by fostering of the light piglets.

Although not significant, the percentage of individual piglets with a birth weight lower than 1,000g was lower in the dextrose group. It should be noted that the birth weight of the piglets on the research farm is (usually) very high, despite the high number of liveborn pigs.

At a birth weight that would, on average, be lower (approximately 1,400g) there will probably be more piglets that weigh less than 1,000g and, accordingly, have a higher chance of developing problems.

The effects of dextrose addition on the uniformity of birth weight may, in that case, be greater.

From Fig. 2 it can be deducted that the mortality of piglets with a low birth weight is considerably higher than of those with a higher birth weight.

The same figure shows that the addition of dextrose during the WOI results in a lower mortality amongst piglets with a birth weight <1200g.

It is difficult to explain the more uniform litters at birth of sows given dextrose before (during the WOI).

If there is a relationship between dextrose in the feed and egg cell maturation and follicle quality it is not clear. Extra dextrose results in higher insulin levels in the sows' blood that improves follicle development.

The administration of exogenous insulin improved follicle development, possibly as a result of an increased release of LH.

Conclusion

The conclusion that can be drawn from the results of this experiment is that the addition of dextrose to the feed of sows during the WOI has no effect on the technical results.

The addition of dextrose during the WOI does appear to improve the uniformity of birth weight, primarily by reducing the number of piglets with a too low birth weight. ■