

IS THE USE OF HORMONES IN THE PIGSTY STILL UP TO DATE?

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For more than 50 years, medium-sized and larger sow herds for piglet production have been successfully managed according to the principle of the periodic group farrowing system (WÄHNER and HÜHN, 2016). Together with artificial insemination, this offers the prerequisite for continuous production over long periods of time while guaranteeing high animal health as a result of the systematic integration of service periods between the production phases in the stalls and a consistent "everything in - everything out" system. This form of management is therefore an essential prerequisite for high profitability.

In order to establish the system of periodic group farrowing, the total number of sows has to be divided into subgroups. The number of sow groups depends on the respective production rhythm in the farm. With a 21-day rhythm there are 7 groups and with a 7-day rhythm there are 21 to 22 groups, depending on the length of suckling. The sow groups see themselves as so-called open groups in which the animals change. Sows leave the group and gilts join for the purpose of herd replacement.

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In the case of the joining gilts, the reproductive cycles must be set to the rhythm prescribed by the parent sows of the respective group, i.e. the reproductive cycles of the gilts are synchronized if necessary. The prerequisite for any influence on the reproductive processes in the sows for the purpose of periodic group farrowing is that the sows are sexually healthy, that they are kept under optimal zootechnical conditions with regard to husbandry and feeding, hygiene and production organization (KÖNIG, 1973). Right from the start, when the periodic group farrowing system was used in the first farms, it was oriented towards zoo technology always being given top priority. This was also the case later, when biotechnical measures to control reproduction in sows were used more frequently (BERGFELD and HÜHN, 1983). The phrase "zootechnology comes before biotechnology" applied and this applies to the same extent today. Any influence on the reproductive processes in the sow never served and never serves to conceal disease and/or a lack of breeding maturity in the animals as well as inadequate herd management. The effect of biotechnical measures is linked to the sow's ovarian cycle. The cycle phase-dependent effect,

as well as the stimulation of follicle growth, which is triggered when it is used on the ovary, is limited in time and is reversible according to the course of the cycle.

In the context of reproductive management in sow herds, cycle control measures have also been or are being used, in which tested and officially approved preparations are used, which are referred to as reproductive biologicals. This article is primarily concerned with this topic of cycle control in sows. The reproductive biologicals are hormonally effective and require a prescription (HELLWIG, 2012). The use of exogenous gonadotropins, the pregnant mare serum gonadotropin (PMSG, today's name equine chorionic gonadotrophins, eCG) and the human chorionic gonadotropin (hCG) is most widespread (WÄHNER and HÜHN, 2012; 2020). In recent years, various alternatives have been developed and are available on the market, such as *Peforelin*[®] as an alternative to eCG with an FSH-releasing effect, the artificially produced GnRH analogue with the brand name *Buserelin*[®] and *Gonadorelin*[®], a synthetic GnRH for the ovulation stimulation. WÄHNER and HÜHN (2020) and the article by IMHÄUSER (2022) go into detail

about the advantages and disadvantages of alternatives compared to the eCG.

It is well known from numerous scientific publications that the eCG, with its active FSH and LH components, is a kind of “gold standard” for oestrus stimulation in sows and other farm animals. Compared to previous decades, the amount used nationwide today is much lower in absolute terms, but the scope of application is nevertheless considerable. IMHÄUSER (2022) refers to information from the Federal Office for Consumer Protection and Food Safety that the sale of eCG-containing veterinary medicinal products increased from around 4.0 to around 6.4 million doses from 2016 to 2019. This underscores the continued importance and need for eCG in piglet production. Therefore, this article will be discussed in more detail.

The eCG is known to be produced by pregnant mares between the 40th and 130th day of pregnancy. Extensive descriptions of the synthesis and the site of secretion, the effect and direction of action as well as the use of such preparations (DÖCKE, 1994; WÄHNER, 2015; WÄHNER and HÜHN, 2012; 2016; 2020) but also the necessity of such measures in piglet production farms (e.g. WÄHNER, 2018) have been published in recent years in the AVA magazine "Nutztierpraxis" and in the AVA specialist book series.

Recently, however, a problem relevant to animal welfare has been focused on, which is seen in the extraction of the eCG from the blood of mares carrying blood and includes its use in sow husbandry (SCHULZ, 2019). The trigger was information in the media about absolutely inappropriate procedures in collecting blood from pregnant mares in other countries. Mare blood sampling practices reported in the media from South American and some Icelandic horse herds are generally unacceptable and should be absolutely condemned. This has nothing to do with the claim to animal welfare and contradicts any responsibility of humans towards the animal.

Basically, an ethically justifiable blood collection is similar to that of humans also possible with mares. In Germany, practices like

those shown in the media are not known and also not imaginable. In the case of pregnant mares, the healthy foal to be born is generally the top priority for all efforts. The collection of blood serum from mares between the 40th and 130th day of pregnancy is absolutely secondary in the farms concerned. It is done with observance of all the conditions necessary for the hygiene and maintenance of the health of the mares, as well as the still unborn foals. All animal welfare requirements are more than met (NN, 2020).

The problem lies in the current view of the relationship between humans and livestock. Man uses the fellow creature animal. He is authorized to "use and consume plant and animal life for his nourishment, his sustenance and for his pleasure" (Declaration of the Christian Churches in the Federal Republic of Germany, 1989). In contrast, the intrinsic value of the fellow creatures of man is emphasized. The intrinsic value of fellow creatures can “serve as a limitation and correction compared to an attitude in which extra-human life is not presented as matter and available assets in the hands of humans” (cited by BREM, 2020). Animals have no knowledge of their origin and future. Nevertheless, human interaction with animals, their use, including killing them is a matter of great responsibility.

Here it is the pregnant mares that are used to produce hormone preparations that are used in another industry. As is well known, the main area of application for hormone preparations is commercial sow husbandry for piglet production for the purpose of stabilizing performance, animal health and optimizing herd management with far-reaching positive effects on profitability. They are only used on the sows for a very short period of time.

Against the background that the extraction of eCG from the pregnant mare, even with guaranteed compliance with all animal welfare requirements, is seen as a problem relevant to animal welfare, but on the other hand the demand for eCG-containing preparations for reproductive control in sows in piglet production is relatively high, the question arises as to how to deal with

this tension. Are hormone-based measures in sow farms still justifiable today, more than 20 years after the beginning of the 21st century, are they up to date? Basically, this applies to the use of hormones in the pigsty in any form, such as the use of eCG-based preparations as well as alternative preparations for cycle stimulation, but also steroid-effective preparations for cycle blockade and prostaglandins for luteolysis (WÄHNER, 2015).

To answer this question, a brief consideration of the developments, i.e. the changes in the reproductive process in the sows and in the management of the same in the herds, in the production process of the piglet farms from the beginnings to the present day should help.

Measures for hormonal reproductive control, i.e. for cycle stimulation in sows, were and are limited to the synchronization of gilts for the purpose of integration into farm group farrowing systems and to possible cycle stimulation in weaned sows for the purpose of time-based insemination of all sows in the group.

Since the time when such measures were first applied more than 50 years ago in the first larger sow farms, various situations and circumstances in reproductive management have changed, in some cases significantly. This applies to the following aspects, among others:

- In the sow herds, a sustained selection has taken place or is taking place for reliable onset of estrus, cycle stability and fertility.
- High performing sows today are in better physical condition than sows of previous generations. - At the time of integration, the replacement animals are in very good breeding condition, which is a prerequisite for high fertility and a long useful life.
- Short lactation times allow better body condition in the weaned sows with a positive effect on rapid and reliable onset of heat after weaning.
- The specialists have extensive knowledge and experience in the application of elements of zootechnical oestrus stimulation in gilt rearing, during the insemination period, after weaning in the sows to be inseminated again.

All of this creates different, new conditions for reproductive management in conventional sow herds, so that today the earlier, standardized procedures in the treatment process are hardly ever used nationwide. In addition, there is a trend in commercial animal husbandry, including sow husbandry, to reduce exogenous measures for manipulating the physiological processes in the animal to a minimum or, if possible, even to exclude them for the purpose of instrumentalization for highly effective production. This aims at the use of hormonal preparations in sow husbandry for piglet production. Because of this, it makes sense for efficient progress in responsible animal husbandry to process the current state of knowledge in order to draw practicable conclusions for piglet production, even in large sow herds, from today's perspective.

It is obvious that as a result of the above-mentioned changes in the sow farms, the scope of application of eCG preparations today is at an absolutely lower level compared to previous years. Extensive use as in previous years is no longer necessary. This should be underlined by detailed information on the special situations in which eCG, but also alternatives, are used, namely during the integration of gilts and at the start of the cycle in weaned sows.

Integration of gilts into herds

Regular herd restocking is necessary on piglet production farms to replace underperforming, sick or old sows that have to leave the herd. The herd renewal covers about a third of the sow herd annually. In recent years, herd sizes have increased on many farms. As a result, an absolutely larger number of gilts has to be reared on the farms or bought and integrated by the farms.

Gilts of any age group generally do not have a synchronous reproductive cycle at the end of their rearing period. In order to be able to integrate the gilts into the herd of older sows, it is usually necessary to synchronize the cycles of the replacement animals. The operational production

rhythm is determined by the old sows of the herd and is important for the procedure. With a 7-day rhythm, biotechnical cycle synchronization with hormonal cycle blockade (Aldrenogest) and subsequent cycle stimulation on an eCG basis or with alternatives is mostly not necessary for the gilts. The number of gilts in heat required for inclusion in the respective weekly parent sow group can be taken from the pool of reared female pigs. The variation in their oestrus and the resulting slightly scattering dates for the tolerance-oriented inseminations between the gilts of the integration group amount to a maximum of 7 days. This is still acceptable in view of the usually somewhat shortened nursing period for the suckling piglets. The lactation period is usually shortened because the majority of the sows in a group are inseminated on Monday and Tuesday, but the gilts that come in, which still spontaneously rustle up to the following weekend and are successfully inseminated in accordance with tolerance, are inevitably pregnant two to three days later, thus also farrow later by this period of time. With the same weaning date for all animals in the farrowing group, the nursing period of the piglets of such first-born sows is thus somewhat reduced. A biotechnical cycle synchronization is therefore hardly necessary in companies with a 7-day cycle. This generally applies to larger stocks.

The situation is different in smaller stocks that are managed with a longer production cycle of 14, 21 or 28 days. The gilts intended for integration, which spontaneously come into heat at different times, must experience cycle synchronization with the help of aldrenogest-based cycle blocking and subsequent hormonal cycle stimulation in order to be easily integrated into the respective old sow group. A temporary application of hormones is therefore required here in order to create the necessary conditions for safe and successful periodic group farrowing of old and young sows.

Start of cycle in weaned sows

It is well known that missing, delayed or unused

heat events of the animals reduce the profitability of piglet production. The number of litters per sow and year is largely determined by the weaning-oestrus interval and the length of time until pregnancy is achieved. Assuming a fixed suckling period and roughly the same farrowing rates, delaying the onset of heat by one week leads to a reduction in the frequency of litters by 0.1 per sow and year. Today, with an average rearing performance of 13 piglets per litter, this corresponds to a loss of 1.3 piglets per sow and year.

In the early years of the development and use of hormone preparations for cycle synchronization in sows, eCG-based oestrus stimulation in weaned sows was a major area of application. This was due to the fact that at that time in the first large farms the nursing period was reduced from 6 or 5 weeks to 4 weeks in order to achieve a higher litter frequency in the sows. At that time, such a shortening of the lactation period by approx. 30 percent meant that the onset of estrus in the sows that were weaned early varied greatly and/or were delayed to varying degrees or even did not occur. In order to nevertheless ensure periodic group farrowing on the farm, the biotechnical process of cycle stimulation in weaned sows was developed. At the beginning of the introduction of this procedure in larger herds of sows for the purpose of increasing and securing performance, the focus was placed on increasing and stabilizing the litter size in addition to the goal of reliable heat in the weaned sows. At that time, significantly higher hormone doses of 1,250 IU for adult sows and 1,000 IU for gilts were prescribed eCG 24 hours after weaning (KÖNIG, 1982).

This goal for the hormonal cycle start no longer exists today. Breeding resulted in an increase in the number of piglets per sow up to more than 16 piglets born in some cases. The breeding goal of most breeding companies and breeding organizations today is that the sow with very well developed teats with mostly 8/8 teats raises her own born piglets with as little human help as possible. A further increase in the size of the litter is therefore not currently being sought. In this respect, very low eCG doses of only 750 to 800 IU are

injected today to stimulate the cycle of weaned sows. It is now in fact only a support of the already starting cycle.

Critical situations justifying the use of hormones in sows

Critical situations for the reproductive process in sow herds have become fewer compared to previous years, but can occur again and again in farms with varying degrees of drama. This includes the following situations:

- A high degree of lactation after the lactation period can result in delayed or even no onset of estrus after weaning in the sows.
- Primiparous sows are still growing, so that a high degree of suckling can have a particularly negative effect on subsequent estrus.
- High ambient temperatures, e.g. during the summer months, can affect heat in the sows. Second litter sows are often more affected than older animals.
- The integration of gilts into the operational production rhythm for the group farrowing system offers the guarantee that the piglets to be born from first litters are guaranteed the same length of suckling time as the piglets from older sows.

These situations, which endanger the production rhythm in the farm and the periodic group farrowing system, as well as trigger veterinary indications, justify the use of hormones in the pigsty, as well as the hormonal oestrus stimulation in sows. In principle, biotechnical control of reproduction in sows must not conceal deficiencies in housing and feeding on the farm. Temporary hormone applications are therefore a tried and tested means of preventing seasonal fluctuations in fertility. This includes temporary use in general, but also specifically in primiparous sows.

Conclusion

In commercial sow husbandry for piglet production, the periodic group farrowing system is predominantly used. It is the prerequisite for

high profitability while ensuring high animal health and working conditions in accordance with today's requirements. This requires measures for stable production in terms of performance and health of the sows, as well as for effective herd management. This also includes the use of hormone preparations to control reproduction in young and old sows. Reproductive control in sows based on exogenous hormone preparations today aims to stabilize performance, regulate the timing of reproductive events in sows and optimize work organization. The principle applies here: "As much as necessary, as little as possible!" Of all the hormone preparations available on the market, the eCG is the most commonly used preparation due to its reliability of action. However, the extraction of eCG from the blood of pregnant mares is generally criticized. Alternative preparations with an eCG-like effect are available. In general, the question today is whether hormone-based methods for reproductive control in sows in commercial herds are up-to-date?

Undoubtedly, temporary use of hormones in sows can be justified with a rationale to control reproduction in sows, just as human medicine does in humans. The reasonable reason is to maintain animal health with the help of a consistent hygiene regime, i.e. veterinary indication to prevent pathological situations to ensure trouble-free production process. Of course, the preparations must meet all the requirements for high "process quality" during their extraction and manufacture. This means the manufacturing process. The top priority is the guaranteed compliance with all aspects of animal welfare. For mares, the healthy foal comes first. The collection of serum is subordinate. The use of hormone preparations in sow herds, which is carried out for a reasonable reason and which absolutely meets these requirements, is therefore absolutely justifiable and necessary.

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