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# Danish experiences after stopping the use of antibiotic growth promoters

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## Introduction

The use of antibiotic growth promoters (AGPs) was definitively stopped in Danish food animal production on 1 January 2000. This ended a period of intensive focus and increasing discussion on the use of AGPs with respect to food safety. This discussion intensified when the AGP Avoparcin was banned in Denmark in 1995. Bacterial resistance in *Enterococcus faecium* induced by Avoparcin caused cross-resistance to Vancomycin, which is used for treatment of *E. faecium* infections in humans. It was considered likely that Vancomycin-resistant *E. faecium* from food animals could enter the food chain and establish in humans and thereby potentially cause human infections that would not respond to treatment. The actual risk of resistant *E. faecium* from animal reservoirs for human morbidity, however, has not been established. The Danish ban was followed by an EU suspension of Avoparcin in 1997. In 1998 the AGP Virginiamycin was banned in Denmark and, in 1999, in all EU member states along with the AGPs Spiramycin, Tylosin and Bacitracin.

The Danish food animal industries responded to this development by voluntarily stopping the use of AGP in cattle, poultry, and finisher pigs in 1998. During 1999 AGP was voluntarily stopped in the remaining pig production segments. An EU order to stop the use of remain-

ing antibiotic growth promoter in all member states is expected during autumn of 2002.

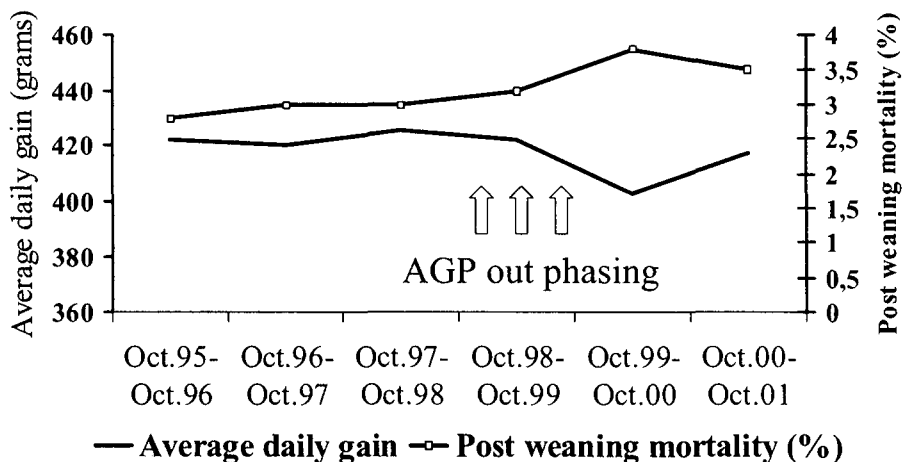
The Danish experience in the pig production sectors has shown the benefits as well as the drawbacks of discontinuing the use of AGPs.

## Production and health

### Weaner pigs

Production results from a representative sample of Danish record-keeping herds with weaner and grower pigs (7-30 kg) appears in **Figure 1**. The sample size varied from 956 to 1816 herds per year. Following the voluntary out-phasing of AGP during 1999, a temporary reduction in growth-rate and an increase in mortality was observed. Increased prevalence of post-weaning diarrhea (*E. coli*) was observed in several herds, but was generally well controlled by management changes. Proliferative enteritis (*L. intracellularis*) also increased in many herds and is still a major clinical and sub-clinical problem. Oral medication against enteritis in weaners and growers constitutes 80% of the consumption of therapeutic antibiotics for pigs, according to VETSTAT figures.

Figure 1: Daily weight gain and mortality in weaned pigs (7-30 kg), 1995-2001.



Data: National Committee for Pigs

**Finishers**

Production results from a representative sample of Danish record-keeping herds with finisher pigs appears in **Figure 2**. The sample size varied from 956 to 1816 herds per year. Following the voluntary stop of AGP use in early 1998, a slight and transient reduction in average daily growth-rate was observed. No apparent effect was observed in average feed conversion ratio. Some herds experienced increased prevalence of enteritis, but generally the effects in finishers was considered insignificant.

**Consumption of antibiotics**

Following the AGP stop, an increased consumption of therapeutic antibiotics was observed. All therapeutic antibiotics for swine herds are prescribed by vets and bought from pharmacies. The increase was mainly due to increased use of oral medication for treatment of enteritis with tetracyclines and macrolides and is not explained by

increasing national pig production. However, the total antibiotic consumption (therapeutic + AGP) is considerably lower than before the AGP stop.

**Resistance to antibiotic growth promoters**

A decrease in resistance to the most commonly used AGPs was observed in bacterial isolates from animals and, to a lesser extent, in isolates from meat products after the AGP stop. Figures from the Danish surveillance of resistance development in animals and humans (DANMAP) are shown in **Figure 5**. At present no studies showing direct health-related effects in the human population due to the AGP stop have been performed.

**Effect on *Salmonella* in pig herds**

The prevalence of *Salmonella*-infected pig herds has decreased further after the AGP stop. **Figure 6** shows the

Figure 2: Daily weight gain and feed conversion ratio in finishing pigs (30-100 kg), 1994-2001.

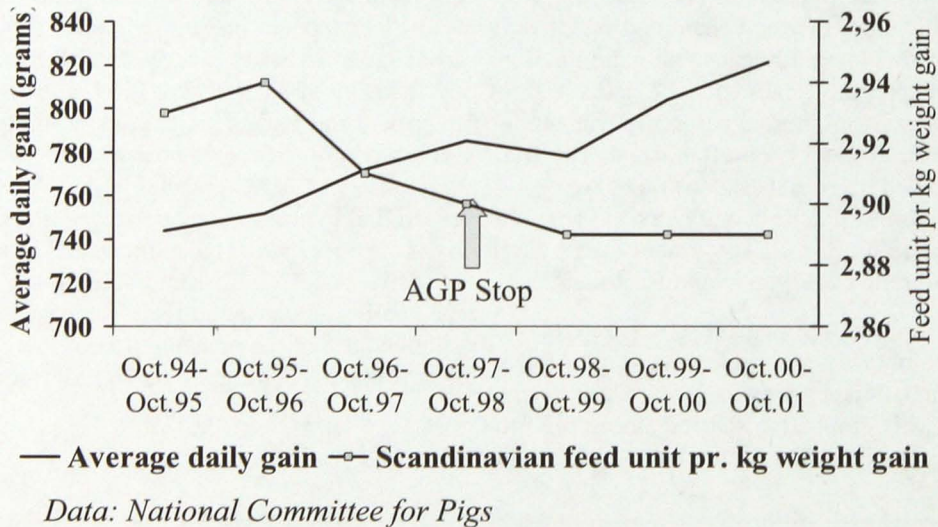


Figure 3: Consumption of antimicrobial growth promoters and veterinary therapeutic antimicrobials in Denmark, 1990-2001.

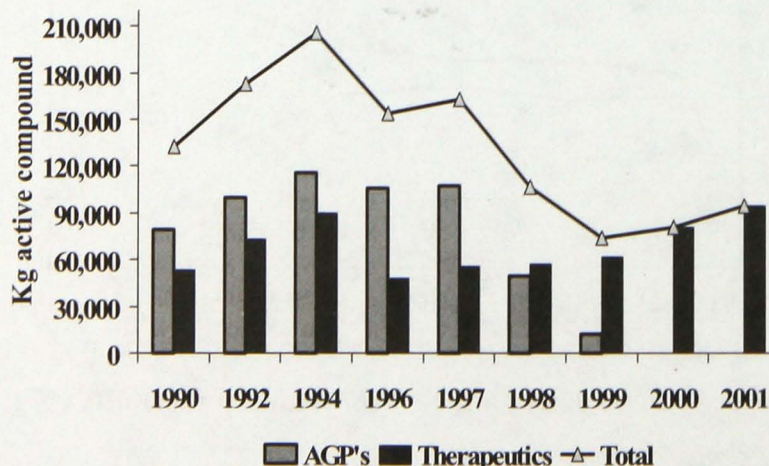
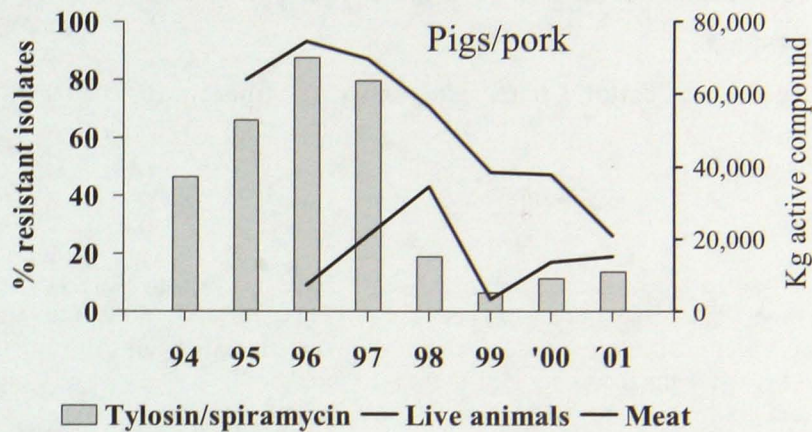
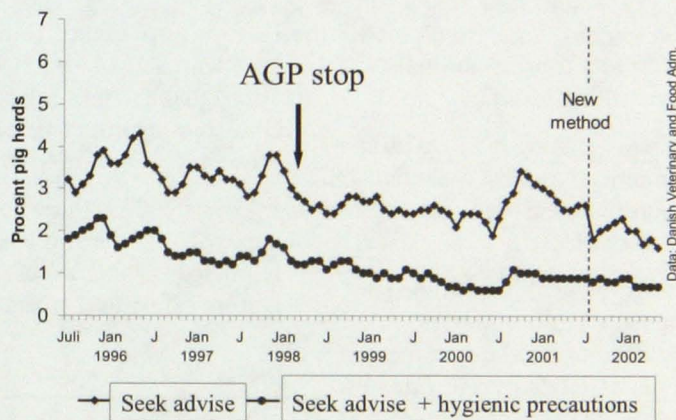


Figure 4: Tylosin/Spiramycin consumption and resistance to Erythromycin among *E. faecium*.



Data: DANMAP

Figure 5: *Salmonella* surveillance in Danish finisher herds, 1996 – 2001.



data from the nationwide *Salmonella* surveillance program based on meat-juice testing for *Salmonella* antibodies from slaughtered pigs. Level 1 herds have no or very low levels of sero-positive animals. Level 2 herds have higher levels and should seek advice. Level 3 herds have high levels and should seek advice and see that special precautions are carried out at the slaughter plant. Deductions in payment for slaughter plants are made for pigs delivered from Levels 2 and 3. The cause of the sudden increase in mid-2000 is unknown.

## Conclusions

Experiences during the last two years have shown that profitable, intensive pig production was possible without using AGPs. However, significant effects on health and productivity in weaner pigs has been observed. An increased consumption of therapeutic antibiotics has been observed, and the major challenge for the next years will be a further focus on disease-control by prophylactic measures and risk-factor-reduction, as opposed to disease-

control by medication. When medication is necessary, it should be targeted to diseased animals only, e.g., animals transferred to isolated hospital pens.

As expected antibiotic resistance in bacteria of animal origin was reduced in parallel with reduced use of antibiotics. The implication of this reduction for human health warrants further study.

## Acknowledgements

DVM Hanne Dorthe Emborg and professor Henrik C. Wegener from the Danish Zoonosis Centre are sincerely thanked for preparing several of the figures.

Data and information has been obtained from:

- Danish Veterinary Laboratory
- Danish Bacon and Meat Council
- Danish Zoonosis Centre

