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Zearalenone

Zearalenone, or F-2 toxin, as it is often called, is produced by the mould Fusarium graminearum. Zearalenone is an oestrogenic mycotoxin and its production is favoured by poorly dried corn and alternating high and low ambient temperatures. Zearalenone is a substituted resorcyclic acid lactone similar in chemical structure to the anabolic agent zearanol which is used in cattle.

Action

Zearalenone competitively binds to oestrogen receptors in the uterus, mammary glands, liver and hypothalamus and causes uterine hypertrophy and the cornification of vaginal epithelium. Zearalenone is rapidly absorbed from the pig's intestine and is metabolised to α- and β-zearalenol, which are then conjugated with glucuronic acid for excretion via the bile or urine.

Clinical signs of toxicity

The clinical signs vary with the dosage of the mycotoxin and the age of the sow. In gilts before puberty 1-5ppm in the feed can cause vulvovaginitis, which is typically manifested as swelling (tumescence) and oedema of the vulva and vagina and precocious development of the udder. Tenesmus is common and occasionally results in rectal prolapses.

At the clinical dose level in sexually immature gilts zearalenone causes ovarian follicular atresia and intensive cellular proliferation in the uterus and oviduct.

Prepubertal gilts fed 2ppm for up to 90 days attained normal sexual maturity with no adverse effects on subsequent reproductive performance. When a diet containing a maximum of 4.3ppm deoxynivalenol and 0.6ppm zearalenone was fed to piglets their body weight gain was significantly reduced and uterus weight compared to bodyweight was increased by almost 100%.

The reproductive effects of zearalenone on mature cycling sows where zearalenone is luteotrophic include induction of anoestrus when fed to sows mid cycle at dietary concentrations of 3-10ppm. If it is fed to sows on days 7-10 post mating at 30ppm it can cause mild blastocyst degeneration by day 11 and advanced degeneration by day 11. Some 22ppm of zearalenone in the ration of breeding gilts causes a decrease in the number of corpora lutea, ovarian weight and number of live embryos and an increase in the number of piglets born dead and abortions.

Zearalenone and its α- and β-metabolites are in the milk of exposed sows and can cause oestrogenic effects in the piglets including enlarged external genitalia and uteri. Enlargement of the prepuce can occur in boars exposed to zearalenone and young boars can have reduced libido and smaller testicles.

Diagnosis

Zearalenone toxicosis needs to be differentiated from toxicities caused by oestrogenic feed additives and natural oestrogens such as coumestrol in mature alfalfa.

Treatment

Treatement is by removal of feed. In the case of pre-pubertal gilts regression of clinical signs should start within a week of the feed withdrawal.

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