FUMONISIN CONTENT OF AUSTRALIAN MAIZE

W.L. BRYDEN, G. RAVINDRAN, H. SALAHIFAR*, R.J. GILL and L.W. BURGESS*

The fungal species *Fusarium moniliforme* and *F. proliferatum* occur worldwide on a variety of plant hosts and are invariably associated with maize. Contamination of maize with these fungi has been associated with leukoencephalomalacia (ELEM) in horses and pulmonary oedema in pigs. The causative agent in both diseases is the fumonisins. This carcinogenic group of mycotoxins has also been linked with human oesophageal cancer (Nelson et al. 1993; Riley et al. 1993). We have demonstrated that Australian isolates of the four closely related species *F. moniliforme, F. napiforme, F. nygami* and *F. proliferatum* produce significant quantities of fumonisins when cultured under laboratory conditions (Bryden et al. 1994). The natural occurrence of these toxins in Australian feedstuffs is suggested by the diagnosis of ELEM in this country (Christley et al. 1993). These observations and the worldwide concern over the occurrence of fumonisins in maize and maize products and possible consequences for human and animal health prompted the current study of screening local maize for fumonisins.

Samples of maize were obtained from human and animal food manufacturers and grain merchants. The maize was ground, extracted with methanol/water and the fumonisin B_1 content determined by ELISA (Veratox®; Neogen) with a sensitivity of 200µg/kg. Of the 53 samples tested only six did not contain the toxin and in contaminated samples the concentration range was 1.0 - 40 mg/kg with a mean of 10 mg/kg. Although containing the toxin, most contaminated kernels appeared normal and unmoulded. Two samples of corn gluten meal were also analysed and shown to contain 23 and 30 mg fumonisin B_1/kg. In addition, samples of corn associated with three cases of ELEM that recently occurred in New South Wales (Shanks et al. 1995) were analysed and had a mean fumonisin B_1 content of 164 mg/kg.

On the basis of the present investigation and our previous results of the high toxigenicity of Australian isolates of *F. moniliforme*, it seems that kernel infection with fumonisin-producing Fusarium species and subsequent natural occurrence of fumonisins is likely to be widespread in Australian maize. However, the impact of maize genotype, agronomic practices and environmental conditions on fumonisin contamination requires further study.

BRYDEN, W.L., VAN WEL, P.W., SALAHIFAR, H. and BURGESS, L.W. (1994). Proc. Nutr. Soc. Aust. 18: 67.

CHRISTLEY, R.M., BEGG, A.P., HUTCHINS, D.R., HODGSON, D.R. and BRYDEN, W.L. (1993). Aust. Vet. J. 70: 225.

NELSON, P.E., DESJARDINS, A.E. and PLATTNER, R.D. (1993). Ann. Rev. Phytopathol. 31: 233.

RILEY, R.T., NORRED, W.P. and BACON, C.W. (1993). Ann. Rev. Nutr. 13: 167.

SHANKS, G., TABAK, P., BEGG, A.P. and BRYDEN, W.L. (1995). Aust. Equine Vet. 13: 17.

Department of Animal Science, University of Sydney, Camden, New South Wales 2570
* Department of Crop Sciences, University of Sydney, New South Wales 2006