

n a similar way to carbon, the nitrogen source is understood to regulate secondary metabolism. Actinomycete isopenicillin synthase was found to be sensitive to ammonium levels (Demain, 1986). However, Zhang et al. (1996) found ammonium to stimulate an antibiotic produced by *Streptomyces griseofuocus*. Control of ammonia concentration during the mid-cycle was found to be important in the optimization of idiophase secondary metabolite production (Junker et al., 1998), though this may reflect the role of nitrogen in growth promotion. The use of unsuitable amino acids as a nitrogen source can inhibit good synthesis of secondary metabolites (Ahronowitz, 1980; Martain and Demain, 1980). Multi-input feed strategies may be of use in process intensification, after optimization of the nitrogen type and concentration at different fermentation stages