

Arginase-less mutants

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Abstract

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Davis, R. H. A note on arginase-less mutants.

At the Asilomar conference, I reported the isolation of arginase-less mutants, representing the ago locus (see Neurospora Newsl. 13, p. 13). Two unexpected characteristics of these mutants were noted. The first was that an ago strain grown on minimal medium had a very low arginine pool. Later work showed that this was the effect of an other-wise undetectable, independent mutation affecting the conversion of citrulline to arginine. Minimal-grown strains carrying aga without this modifier have, in fact, an arginine pool equal to that of wild type. The second characteristic was that arginine inhibits ago mutants. At the time, this was attributed to the "stress" of the enormous internal arginine pool (about 0.3 M) resulting when arginine was added to ago mycelium growing in nitrate minimal medium.

Later work shows that arginine-inhibition results from feedback inhibition of ornithine synthesis, with a consequent starvation for the polyamines derived from ornithine. Wild type does not suffer this deficiency, because the arginase reaction is on an alternate source of ornithine. (In Neurospora, the likely source of polyamines is putrescine, via ornithine decarboxylase.) Therefore, if arginine is used in medium for the growth of strains carrying aga, 0.5 to 1.0 mM putrescine must be added to the medium. The putrescine requirement can be met with similar concentrations of ornithine, and, in some conditions of citrulline. Experiments with multiply mutant strains suggest that the slow growth of aga strains in Vogel's minimal medium supplemented only with arginine reflects slow ornithine formation by reversal of the arginine biosynthetic sequence.

The aga locus lies on linkage group VIR, 3 to 6 units distal to thr-1. Further information from our laboratory on arginase-less mutants will soon be submitted for publication elsewhere. Independent isolation and characterization of ago mutants have been reported by D. H. Morgan (1969 Neurospora Newsl. 14:5). ■ ■ ■ Department of Botany, University of Michigan, Ann Arbor, Michigan 48104.