

Table S1. Enzymes and genes involved in the biosynthesis of pipercolic acid*

Enzyme	Reaction	Organism	Gene
Homocitrate synthase	α -Ketoglutarate + Acetyl-CoA → Homocitrate	Fungi	<i>lys1</i>
Homoaconitase	Homocitrate → Homoisocitrate	Fungi	<i>lys3/lysF</i>
Homoisocitrate Dehydrogenase	Homoisocitrate → α -Ketoadipate	Fungi	<i>lys4</i>
α -Ketoadipate aminotransferase	α -Ketoadipate → α -Amino adipic acid	Fungi	<i>lys6</i>
α -Amino adipate reductase	α -Amino adipic acid → α -Amino adipate semialdehyde	Fungi	<i>lys2</i>
PPTse	α -Amino adipic acid → α -Amino adipate semialdehyde	Fungi	<i>lys5</i>
Pipercolate oxidoreductase	α -Amino adipate semialdehyde → Pipercolic acid	Fungi	---
Saccharopine Dehydrogenase	Saccharopine → Lysine Lysine → Saccharopine	Fungi	<i>lys8</i>
Saccharopine Reductase	Saccharopine → α -Amino adipate semialdehyde α -Amino adipate semialdehyde → Saccharopine	Fungi	<i>lys7</i>
Saccharopine Oxidase	Saccharopine → α -Amino adipate semialdehyde	Fungi	<i>fap2</i>
Lysine w aminotransferase	Lysine → α -Amino adipate semialdehyde	Fungi	<i>w-at</i>
Lysine cyclodeaminase	Lysine → Pipercolic acid	Bacteria	<i>rapL</i> <i>fkbl</i>
Response defense aminotransferase	lysine → 2,3-dehydropipercolic	Plants	<i>ald1</i>
Systemic acquired resistance reductase	2,3-dehydropipercolic → Pipercolic acid	Plants	<i>sard4</i>

- Notice that some enzymes have been studied but the genes have not been cloned.
- The names of the genes corresponds to filamentous fungi and are not the same than in yeasts

Table S2. Enzymes and Genes involved in the biosynthesis of 4-Oxopipercolic acid and 3-Hydroxypipercolinic acid

Enzymes	Reaction	Organisms	Gene
Lysine cyclodeaminase	Lysine → Pipercolic acid	Bacteria	<i>pipA</i>
Pipercolate 4 monooxygenase	Pipercolic → 4-Oxopipercolic	Bacteria	<i>snbF, visD</i>
Lysine-2-aminoatransferase	Lysine → 2-keto, 6 aminocaproic acid (P2C)	Bacteria	<i>hpaA, visA</i>
2 Keto, 6 aminocaproic acid cyclase*	2-keto, 6 aminocaproic acid → 3 Hydroxypipercolinic acid	Bacteria	-----

*The enzyme converting 2-keto, 6 aminocaproic acid → 3 Hydroxypipercolinic acid has not been fully characterized