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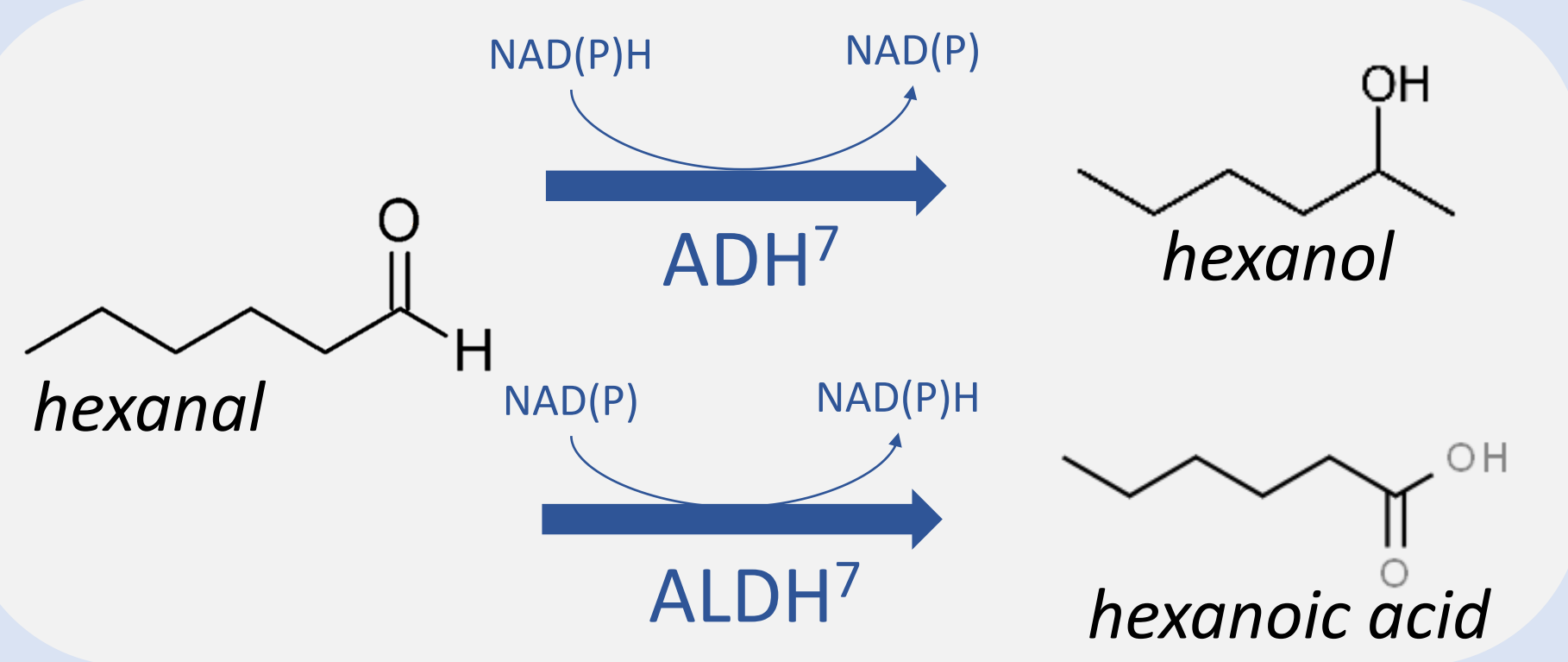
# POTENTIAL OF MICROORGANISMS TO DECREASE THE « BEANY » OFF-FLAVOR

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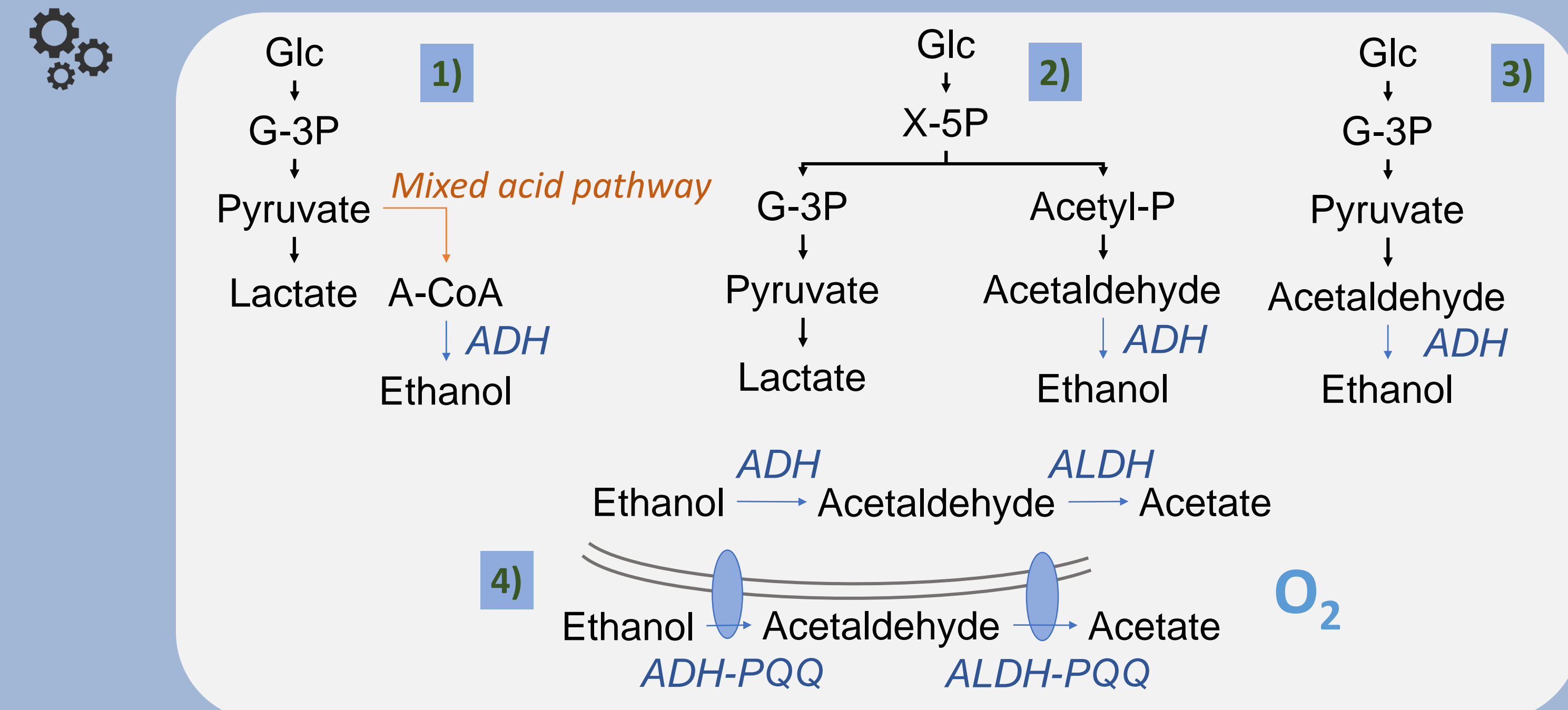
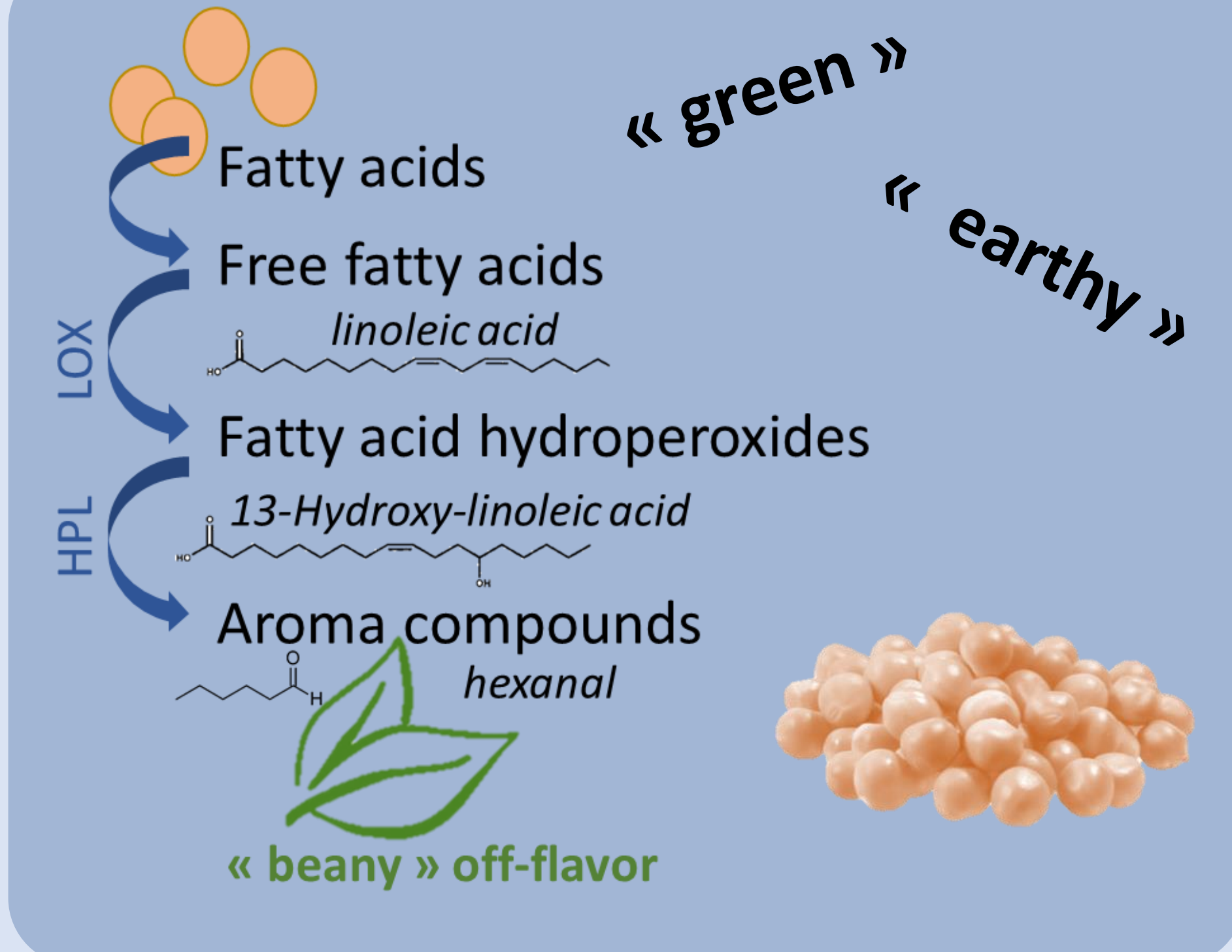
Plant-based protein consumption<sup>1</sup> → disadvantages : “beany” off-flavors<sup>2</sup>.  
Decrease the off-flavor ? Breeding, harvesting and storage, chemical and physical treatments.

**Fermentation - Investigate the potential of mo to decrease the “beany”**<sup>3-6</sup>



*Lactobacillus acidophilus*  
*Limosilactobacillus fermentum*  
*Lactiplantibacillus plantarum*  
*Streptococcus thermophilus*  
*Saccharomyces cerevisiae*  
*Gluconobacter suboxydans*

« BEANY » OFF-FLAVOR



**Figure 1:** ADH and ALDH in the primary metabolism of 1) homofermentative LAB<sup>8-10</sup>, 2) heterofermentative LAB<sup>8,10,11</sup>, 3) yeast alcoholic fermentation<sup>12,13</sup>, 4) acetic acid bacteria<sup>14-16</sup>. Carbon dioxide is not represented in metabolic pathways 2) and 3).

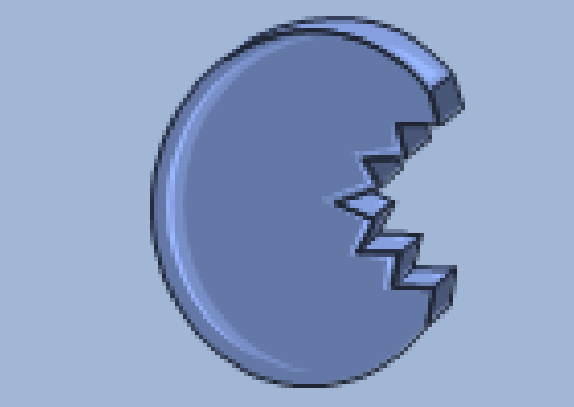
Involved ADH and ALDH in the strains catabolism (Fig. 1.)

Inducible or constitutive enzymes

Homo and HeteF inducible enzymes  
HeteO, Y and AAB constitutive enzymes



CATABOLISM STUDY



BIO-INFORMATICS

LINKED WITH

VS Litterature

REDUCED « BEANY » OFF-FLAVOR



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ADH and ALDH diversity, presence in the genome (Fig. 2.) KEGG<sup>17</sup>



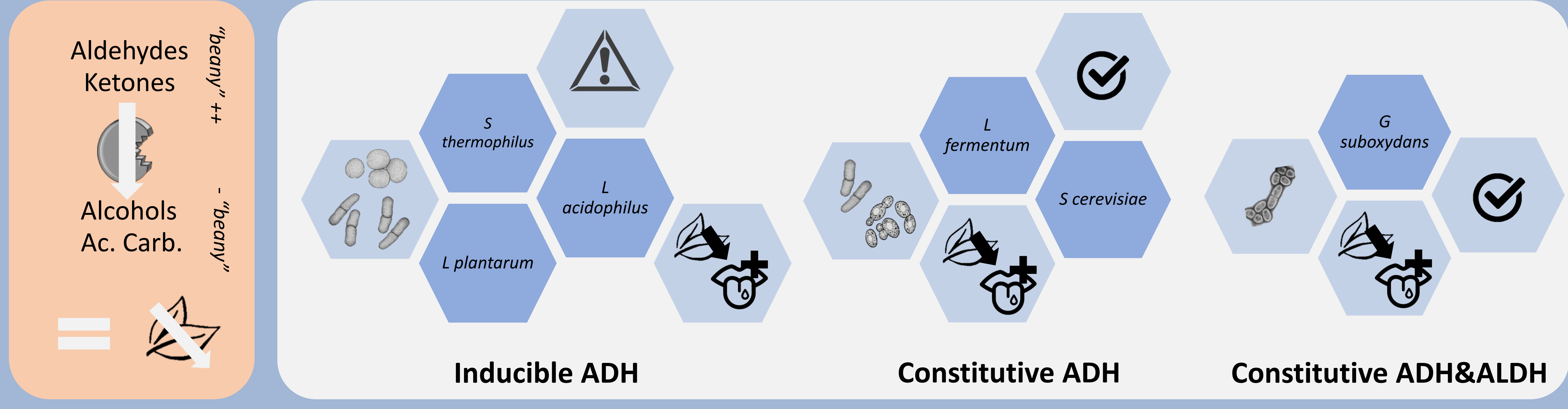
**Table 2:** Bioinformatics data on ADH and ALDH

Species	ADH	ALDH
<i>L acidophilus</i>	3	6
<i>L fermentum</i>	4	8
<i>L plantarum</i>	4	11
<i>S thermophilus</i>	2	6
<i>S cerevisiae</i>	5	10
<i>G suboxydans</i>	4	13

Differences in enzyme diversity

≥ 4 ADH in He, Y and AAB  
≥ 8 ALDH in He, Y and AAB

Fermentative type, presence of enzyme and diversity leads to ≠ efficiencies (Fig. 2.)<sup>7,18,19</sup>  
+ Correlation between constitutive enzyme, diversity AND efficacy to ↓ “beany”



**Figure 3:** Correlation between ADH and ALDH presence and organoleptical improvement reported in the litterature

Constitutive enzyme = higher efficacy  
LAB: ADH predominant, HeteO ++  
Y: ADH++ ; AAB: ADH&ALDH++ polyvalent  
**ADH&ALDH activities correlated with sensory improvement**

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