

# Life without Oxygen

## CHEM-643 Intermediary Metabolism Case Study Problem No. 2 - Written by Harold B. White

### Case Study 2 Comments

The catabolism of sugars figures prominently as the primary source of energy in many organisms. For example, in many fermentations, more than 95% of the carbon in sugars end up in products and less than 5% in cellular components. In glycolysing yeast (and muscle for that matter), glycolytic enzymes comprise a substantial proportion of the soluble protein. These high flux pathways come in many varieties, a few of which were showcased in Case Study 2 - *Life Without Oxygen*. Among the objectives of this case study were to:

- Illustrate the ways biochemists think about fermentations in terms of ATP yield, redox balance, and mass balance.
- Compare several fermentation pathways to illustrate that they are often built from modular units containing familiar sequences connected by one or two distinctive enzymes such as KDPG aldolase or phosphoketolase.
- To analyse phase plane plots for metabolites to determine the sites of metabolic regulation.
- Appreciate how a knowledge of intermediary metabolism is essential for genetic engineering of organism for industrial and nutritional uses.
- Apply principles to new situations.