DYNAMIC RESPONSE OF *SACCHAROMYCES CEREVISIAE* TO TRANSIENT PERTURBATIONS IN AMMONIA CONCENTRATION AND INTEGRATION OF METABOLOME AND TRANSCRIPTOME DATA

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Saccharomyces cerevisiae, as all organisms, adapts to sudden changes in environmental conditions in the most efficient way, to be able to survive. For this reason, it has evolved several strategies incorporated into sudden and slower responses. Assimilation and utilization of the nitrogen source in organisms is of essential importance for survival, maintenance and reproduction. Variations in the amount of ammonia, generally accepted as the preferred nitrogen source, present in the cultivation medium affects the intracellular dynamics of the yeast cells considerably. The yeast metabolism undergoes major transformations as a response to the amount and type of available nitrogen source in the extracellular environment. A sudden shift from ammonia starvation where the maintenance of the cell population in terms of nitrogen source mainly depends on the amino acids which are provided to compensate for the cell auxotrophy to an abundance in the amount of ammonia present in the cell culture creates notable changes in both transcriptional levels of many genes and as well as in intracellular and extracellular metabolite levels. The dynamic response of the yeast cells in chemostat cultures fall either into short time series responses, measured in terms of seconds, or they could be observed as a longer time series response, measured in minutes, or for some transcripts and metabolites, hours. With the integration of the dynamic transcriptome and metabolome data, we aim to achieve a more thorough understanding of nitrogen regulation (nitrogen catabolite repression) by using a systems biology approach.