

30th

RAU

Annual Users Meeting

LNLS | CNPEM

ABSTRACT
BOOK

SURVIVAL OF BAKER'S YEASTS UNDER IONIZING RADIATION

Ana Carolina S. R. de Carvalho^{*1}, Monica B. Mathor², Isabela C. de Moraes³,
Fabio Rodrigues⁴, Murilo de Carvalho⁵, Douglas Galante³

¹Interunidades em Biotecnologia USP, Brazil

²Instituto de Pesquisas Energéticas e Nucleares (IPEN-CNEN/SP), Brazil

³Brazilian Synchrotron Light Laboratory (LNLS), Brazilian Center for Research in Energy and
Materials (CNPEM), Brazil

⁴Instituto de Química USP, Brazil

⁵Brazilian Biosciences National Laboratory (LNBio), Brazilian Center for Research in Energy
and Materials (CNPEM), Brazil

*anacsrc@usp.br

The aim of this study is to comprehend the effects of ionizing radiation on the resistance mechanisms of microorganisms that survive and even thrive in extreme environments on Earth and space, subjected to above-the-background radiation levels. Some examples are disaster nuclear plants, radioactive waste and even the International Space Station. Radiation exposure affects cellular components including nucleic acids, proteins and lipids. Understanding the molecular processes of these interactions could lead to a better understanding of the adaptive evolution and response of eukaryotes under ionizing radiation. In addition, these studies are necessary to delineate the optimal experimental conditions for *in vivo* studies at the beamlines of Sirius. *Saccharomyces cerevisiae* is a well-know model organism to study radiobiology and it was exposed to gamma radiation on Gammacell irradiator at IPEN-CNEN/SP and X-ray radiation at the Mogno beamline of Sirius - CNPEM. The radiotolerant bacterium *Deinococcus radiodurans* was also tested, as a benchmark. Additionally, one indigenous yeast isolated from *Salicornia ambigua* plant and two different strains of the common baker's yeast *Saccharomyces cerevisiae* were also tested due to the abundance of molecular data on this molecular biology model organism, its biotechnological potential, and also because of promising preliminary results that we already obtained. Our results showed that most yeasts' strains have survived under ionizing radiation up to 5 kGy, not far from the model organism *Deinococcus radiodurans* has survived for more than 10 kGy as expected. This reinforces the importance of yeasts as model organisms for studies of extreme environments, including for space colonization and particle accelerator applications, such as in synchrotron science.