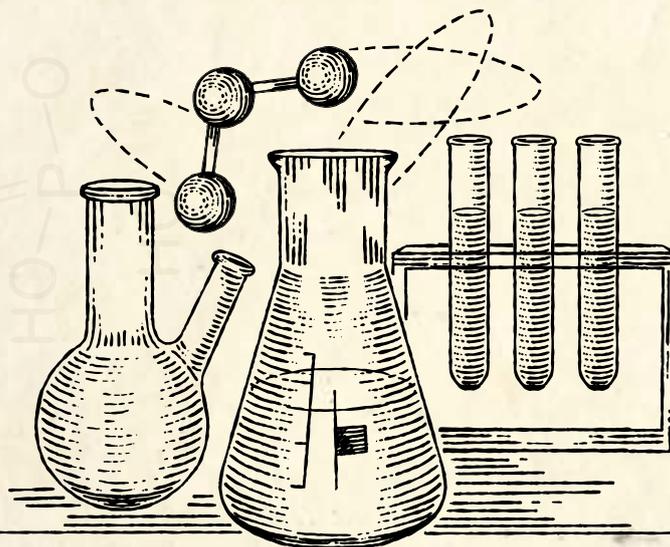


YEASTSPLORATION

ON THE HUNT FOR THE ULTIMATE SOUTH AFRICAN BEER



We have South African malt, hops and of course, water, but there has always been one ingredient stopping local brewers from producing a truly South African beer. **Christopher Rothmann and Dr. Errol Cason** are on a mission to create a range of local yeast strains.

One of the defining characteristics of humankind has been a person's ability to bend the forces of nature to his or her will. Nowhere has this been more prominent than in the domestication and guided evolution of agricultural and industrial organisms. Whether it is the development of wheat and cattle for better production or genetically engineering salmon to grow quicker, man has been on an ongoing quest for perfection. Of course, the brewing industry is no exception, with evidence of yeast domestication as early as the

1500s. Quite the feat since we were not even aware of microbes until the middle of the 17th century.

Fermentation used to be rather a wild affair since the lack of microbial knowledge basically left it in the hands of the gods. However, the 16th century saw the move from homebrewing to pub brewing and these early commercial brewers started employing continuous "backslopping", where part of an old batch of beer would be used as an inoculum for a new batch. This action inadvertently kick-started the domestication of yeast since brewers were now consciously, albeit unknowingly, selecting the best yeast for the product they wanted to produce.

CONSISTENCY VS DIVERSITY

Today brewing is a much different ball game. Gone are the days of "backslopping" and selection in breweries. If a brewer wants a specific yeast profile in his beer, it's as easy as hopping online and ordering it. Yeast will also only be used for a couple of generations before being discarded and the brewer returning to a frozen stock or ordering again.

This, of course, is fantastic for consistency in the final product but one can also argue that this consistency comes at the price of diversity. It was exactly these inconsistencies and mutations that we now so actively avoid which produced the current iterations of brewers' yeast we have



Bioreactor propagation



Microscopy



Tint test batches



Test batches



Happy yeast cell

come to appreciate and love. California ale yeast and Weihenstephan Weizen also started life as wild yeasts. However, they have been domesticated and commercialised and now, worldwide, people are brewing with the same yeasts producing very similar beers at a yeast profile level.

This has also led to certain strains of yeast being representative of different locations across the world, giving each location its own yeast flavour profile. Think about the American ale strains with their clean profiles and Jack-of-all-trades repertoire or the Belgian arsenal bringing the highest quality funk. But what about Southern Africa, where there was none of this selection for all those centuries?

This will allow brewers to keep brewing their favourite styles but now the beers will be 100% South African

A YEAST FOR AFRICA

Over the last year, LiquidCulture has been exploring the yeast-scape, searching for and collecting native Southern African yeast strains, and in collaboration with the University of the Free State has been allowed to take a peek into their prized culture collection which is over 50 years old and houses thousands of cultures. The range of places the yeasts were isolated from includes spontaneous fermentations, leaves, hops, trees, flowers, a wide range of fruits, vegetables, malts and air samples. Isolates were also selected from studies currently on the way by the UFS, focusing on the unique microbial diversity involved in the proudly southern African beverage, Sesotho – the traditional, sorghum-based beer of Lesotho.

A whole book could be written about the intricacies and fluctuations of the microbial populations involved with this spontaneous fermentation. The first basic principal for selecting the right strains was to look at the DNA, then after sequencing to species level we could cut our group of candidates

by more than half. Isolates which had been implicated in certain diseases or which might produce harmful products in humans, animals or plants, were disregarded and isolates with some brewing heritage (like the *Saccharomyces* species) were the first picks.

Next we moved on to hundreds of very basic fermentation trials using 200ml batches of low IBU SMASH (single malt and single hop) wort. This allowed us to get a whiff of the aroma and a small taste to determine if the isolate's profile was at all palatable. After the larger experimental fermentations and some serious culling, we were left with three strains of yeast that we are excited to release during our first launch a little later this year. For the first round of releases we decided to go with strains that will deliver clean profiles. There will be some interesting esters but generally the beers will be clean and well attenuated. This will allow brewers to keep brewing their favourite styles but now the beers will be 100% South African.

The first truly South African yeast strains will be a duo of ale strains similar to the American/English yeasts and one bottom fermenter similar to a Mexican lager strain but with the ability to accentuate malt character. We are also working on a secret strain that might be the next great Weiss yeast from a completely different genera. There are still tons of variables to be explored and we haven't even begun to scratch the surface of what these new strains of brewing yeast can do. And who knows what else is still out there in SA? All we know is that it's going to be a lot of fun finding them. ☺

BREEDING NEW YEASTS

The yeast industry has two avenues to explore when it comes to discovering new yeasts: isolation or breeding. As the name implies, yeast breeding, much like animal breeding, involves taking yeasts with desired traits and breeding them to get new strains with the desired traits from the parents. This is not science fiction, and is a field being actively explored by industry. In truth, genetic evidence basically shows us that our favourite lager yeast, *Saccharomyces pastorianus*, is a cross between *Saccharomyces cerevisiae* and *Saccharomyces eubyanus*.