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Neuroprotective properties of African Indigenous Vegetables (AIVs) extracts in yeast models of synucleinopathies

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Nutraceutical compounds can be defined as foods or parts of foods that provide health benefits, including the prevention of diseases. Legumes contains several nutrients and proteins that bring, in accordance with many literature reports, a promotion of biological activity and disease protection in human cells. In collaboration with the group of Prof. M. Labra, we evaluated the health-benefits and neuroprotective features of legumes classified as "AIVs" (African Indigenous Vegetables), which play a significant role in the diet of Afrikaans people especially from the Arusha area in Tanzania.

We used standardized extracts from *Vigna unguiculata* and *Cajanus cajan*, in comparison with the most universal-common reference species, *Phaseolus vulgaris*, to investigate their health-beneficial and neuroprotective proprieties using as a model the budding yeast *Saccharomyces cerevisiae*. It is well known that *S. cerevisiae* is one of the most popular eukaryotic model organisms, sharing a high degree of conservation with human cells. We evaluated the yeast longevity parameter of chronological lifespan (CLS), that represents the time in which a population of non-dividing cells remains viable in nutrient depletion. CLS experiments were performed to evaluate the effects of AIVs extracts on wild type yeast cells and on cells expressing heterologous human α -Synuclein, implicated in a large number of agerelated diseases called "synucleinopathies" including Parkinson's disease. Although all extracts significantly increased longevity of yeast cells, the highest effect was noticeable with *Vigna unguiculata* extracts, which increased both mean and maximal lifespan of yeast cells. To observe maximal anti-aging effects, the Ras pathway, the Snf1/AMPK pathway and the autophagy pathway are required. Remarkably, treatment with the *Vigna unguiculata* extract strongly extended lifespan in the α -Synuclein expressing strain too.

Given these positive effects on longevity of both wild type and α -Synuclein expressing cells, *Vigna unguiculata* consume should be encouraged, both in the tropical and subtropical zones of the world - where it is primarily cultivated and used- and in the rest of the world.

