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Nutrient use efficiency in perennial fruit crops: Our preparedness to address production constraints

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Production system of perennial fruit crops is inherently complex to understand due to large variation in nutrient use efficiency (NUE). Current state of diagnosis of nutrient constraints in current season standing crop has minimum efficacy. Therefore, development of production- linked nutrient norms using crop specific index plant parts need a thorough revisit at orchard level using conventional basin irrigation against fertigation. Application of hyper spectral analysis as proximal sensing of nutrient stress has started imparting precision to nutrient constraint diagnosis. On the other hand, the biggest constraint in making soil test ratings more purposeful is the non-redressal of spatial variation in soil fertility in form of soil fertility analogues vis-a-vis fruit crops. Conjoint use of geoinformatics and nutrient experts as decision support tool(s) accommodating site specific nutrient management strategy, newer concept of fertigation as open field hydroponics and variable rate application as possible improvements in NUE, exploiting further the nutrient–hormone and nutrient-microbe (in consortium mode) synergies have yielded definite edge over conventional methods of nutrient management options. Well known microbial including- mycorrhizal dependency of fruit crops still remains an unexploited issue. Such approaches have given birth to a concept like rhizosphere hybridization and nutrient dynamics. The concept of nutriomics highlighting nutritional physiology coupled with functional genomics, as a part of nutriomics will unravel the complexities associated with low NUE in an era of soils sick of multiple nutrient deficiencies. Elevating NUE and consequently, producing nutrient dense fruit crops will, hence, offer complimentary option towards a promising source of nutritional security.

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The influence of seasons and ripening time on yeast communities of a traditional Brazilian cheese

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Traditional Minas cheese is an artisanal cheese manufactured by farmers on a small scale, utilizing raw bovine milk. The occurrence and effects of the dry and rainy seasons on yeast populations in traditional Serro Minas cheese, one of the most popular cheeses produced in Brazil, were studied over the course of 60 days of ripening. A total of 19 yeast species were identified via sequence analysis of the D1/D2 domains of the large subunit of the rRNA gene. Fourteen yeast species were obtained from cheese produced during the dry season, and fifteen species were obtained from cheese produced during the rainy season. High diversity indices for the yeast species were determined for cheese manufactured during both seasons (average H'_D=1.7 and H'_R=1.5, respectively). The predominant species in Serro Minas cheese included *Debaryomyces hansenii, Kodamaea ohmeri* and *Kluyveromyces marxianus. Debaryomyces hansenii* 28.12 showed low lipolytic and high proteolytic activity. *Kluyveromyces marxianus* 83F and 60P demonstrated lipolytic and β-galactosidase activity, respectively. *Kodamaea ohmeri* 88A displayed low lipolytic and β-galactosidase activity. Maximal lipase, β-galactosidase and protease activity was observed at 20°C and pH 6.0, 30°C and pH 7.0 and 50°C and pH 6.0, respectively. Considering that *D. hansenii* 28.12, *K. ohmeri* 88A and *K marxianus* 60P together showed protease, lipase and β-galactosidase activity in this study, further research on the possibility of including these yeasts as part of a starter culture and research on their effects on the sensory properties of Serro Minas cheese merit more study.

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