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Classification of the Piedmont "prairie" community complex

The concept of the Piedmont "prairie" encompasses a complex of heterogeneous communities generally characterized by a semi-open canopy with a prairie-affinity forb and graminoid understory. Many rare species of state and federal concern are associated with Piedmont prairies, such as Echinacea laevigata, Helianthus schweinitzii, and Symphyotrichum georgianum. Piedmont prairies require periodic disturbance and quickly degrade when historical disturbance patterns are disrupted, as under fire suppression. The classification of these communities is challenging because few high-quality examples remain and many sites have degraded beyond recognition, resulting in a loss of the diverse herbaceous understory following the development of a closed canopy. Using a dataset of over 2000 Piedmont plot records extracted from the Carolina Vegetation Survey database, we seek to explore the Piedmont prairie concept in the context of the current landscape and to circumscribe these communities to better fit within the US National Vegetation Classification (USNVC) framework. We used hierarchical cluster analysis and fuzzy clustering to quantitatively identify subsets of these plots that best fit within the USNVC hierarchy. Non metric multidimensional scaling was used to ordinate the plots and explore compositional trends across the Piedmont landscape. Ongoing analyses include determination of diagnostic species and exploration of environmental factors influencing the occurrence and persistence of Piedmont prairie communities. We are also interested in identifying signals for distinguishing potentially degraded Piedmont prairie communities from other Piedmont forest communities.

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Processing Human Milk to Increase Nutrient Density for Preterm Infants

Preterm birth can cause problems with initiation of lactation. In this situation direct intragastric feeding can use donor breast milk from a milk bank, infant formula, or a combination. Concerns regarding the choice of feed are catchup growth and health effects. Formula might cause NEC and negative long term health effects but has faster catchup growth. Preterm infants have better tolerance for human milk, but lower caloric density of term mothers' milk or donor milk might not meet preterm infant's increased growth needs.

Aims of this study were to concentrate donor breast milk to have a higher caloric density and protein, but at the same time avoiding side effects of higher lactose concentration and hyperosmolarity by precipitating lactose at low temperature.

Donor breast milk was obtained from WakeMed Mothers' Milk Bank. For preliminary results 10 human milk samples of 50 mL were concentrated by evaporation to different concentration levels at 35oC, followed by refrigerated centrifugation for lactose removal. Measurement of lactose was performed with enzymatic analysis on supernate vs control.

Preliminary data found that low temperature removal of lactose from unprocessed human milk was minimal. Therefore milk was concentrated to varying volume reductions. Macronutrients were concentrated in the milks during the evaporation procedure in proportion to the amount of water removed, so caloric density was higher. Volume reduction (%) vs. Lactose concentration (g/L) yielded a linear relationship. Lactose was not consistently precipitated at the lower levels of volume reduction. Regression analysis found that every percent of concentration increased 1.2 g/L of lactose in milk, but the effectiveness of low temperature lactose precipitation was not statistically significant. Similar concentration should be true for protein and other bioactive factors.