

MENA Microbiome

From Biomarkers Discovery
to Microbiota-based Therapeutics

Date: 28-29 September 2024

Venue: [The Plaza Doha](#)



Vertical transmission of Microbiota and Metabolites: Impact of Maternal obesity on Neonate.

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Obesity poses a significant public health challenge in Mexico. Individuals with obesity have different gut microbiota compared to those with normal weight. It has been demonstrated that maternal obesity has an impact on the microbiota of breast milk, leading to an increased susceptibility to obesity and metabolic diseases in newborns. To delve deeper into this phenomenon, a study was conducted involving the collection of samples, including maternal stool and breast milk from individuals across different weight categories, as well as neonatal stool from both obese and normal-weight mothers for DNA extraction. Subsequent analysis involved the utilization of next-generation sequencing and metagenome prediction to examine the V3-16S ribosomal DNA gene libraries and characterize the microbiota. In addition, FT-ICR Mass Spectrometry was employed to analyze the metabolites. The study unveiled that microbiota and metabolites are indeed transmitted through breastfeeding, with *Patiscibacteria* and *Firmicutes* emerging as the dominant bacterial phyla in human milk. Moreover, *Firmicutes* were found to dominate the neonatal stool of mothers with obesity, while the *Lactobacillus* and *Staphylococcus* genera were more prevalent in neonatal stool and human milk from obese mothers. While the alpha diversity index showed no discernible disparities in BMI categories among the samples, a subset of metabolites was identified as being associated with maternal weight and neonatal health. The study underscores the vertical transmission of maternal and neonatal obesity through breastfeeding and provides valuable insights for the development of interventions aimed at mitigating the risk of obesity and metabolic diseases in newborns. Further research in this area is imperative. This work was supported by CONACyT 163235 INFR-2011-01 and CONACyT FORDECYT-PRONACES/6669/2020_Programa Presupuestario F003-Ciencia de frontera 2019.

Keywords: Microbiota, Metabolites, Maternal Obesity, FT-ICR MS, 16s RNA.

CERTIFICATE OF ATTENDANCE

Presented to

Aparna Krishnakumar

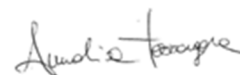
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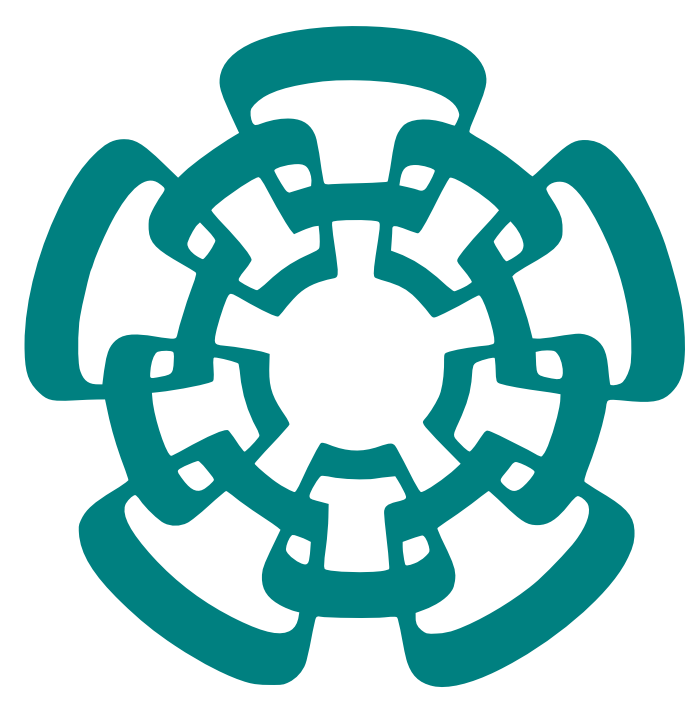
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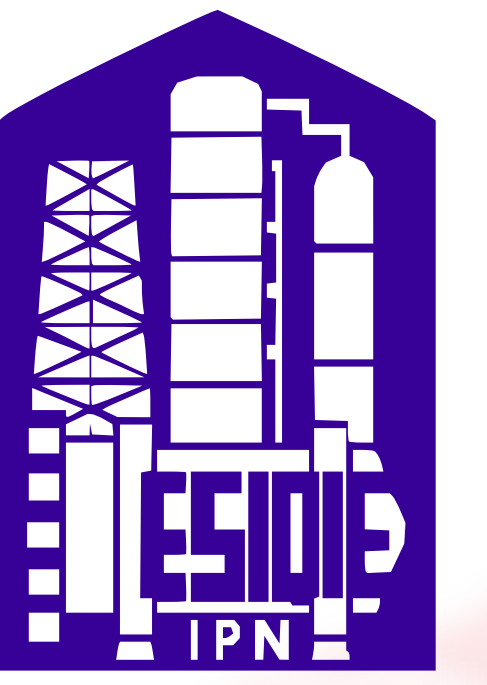
Dr. Souhaila Al Khodor
Event Co -Chair



Dr. Annalisa Terranegra
Event Co -Chair



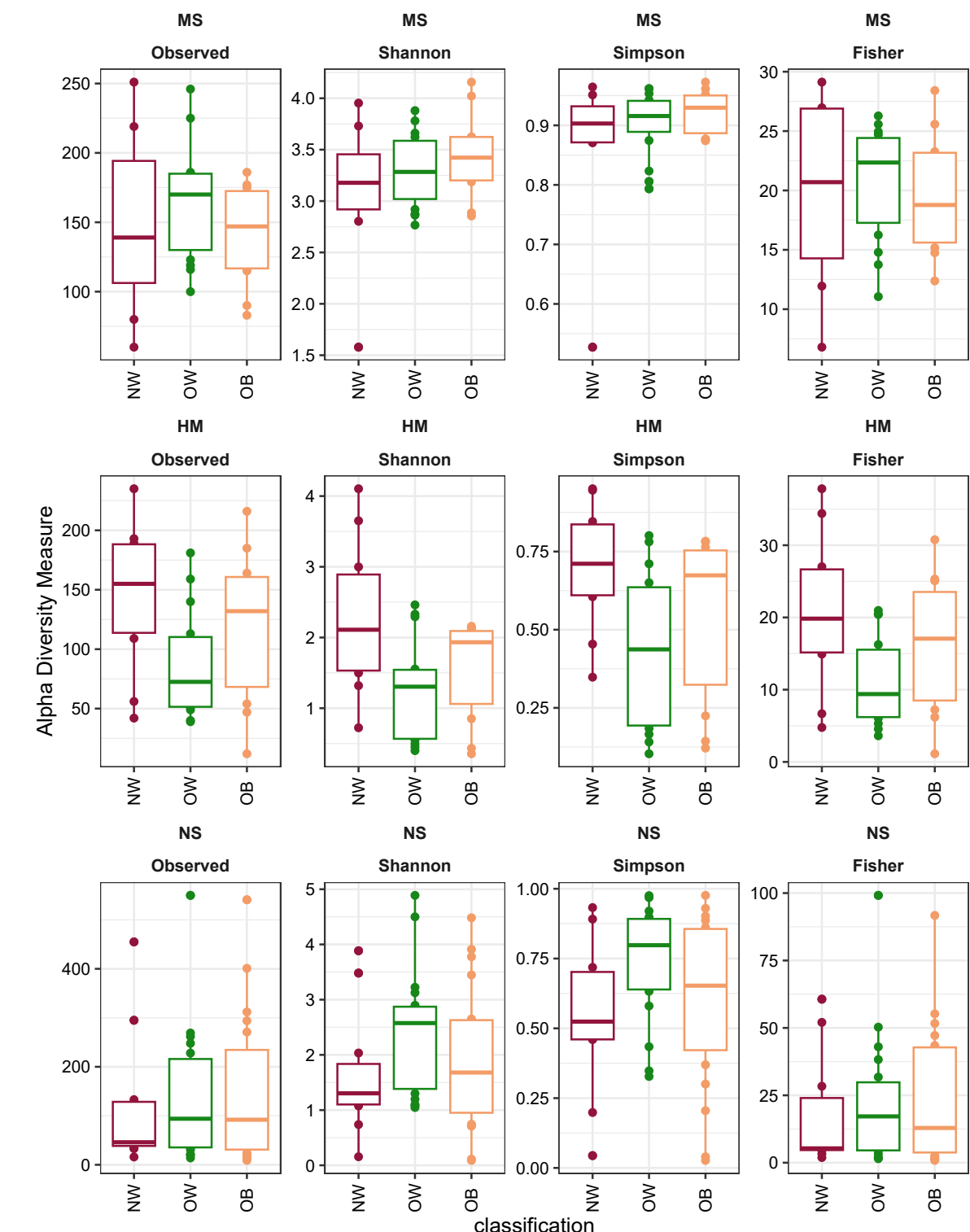
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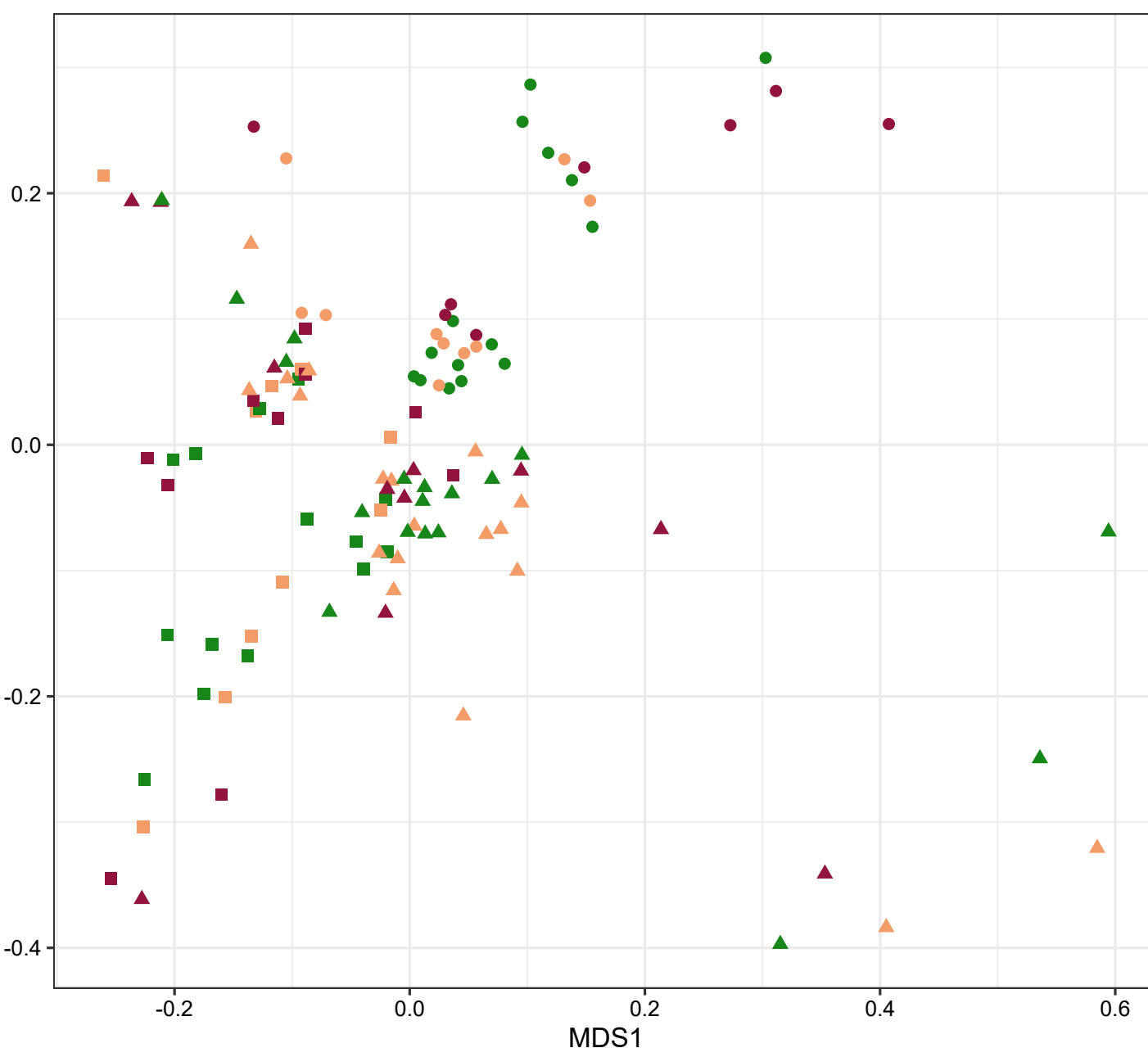
Objective

To characterize microbiota and metabolites in obese women at the time of delivery compared to normal weight women, exploring vertical transmission.

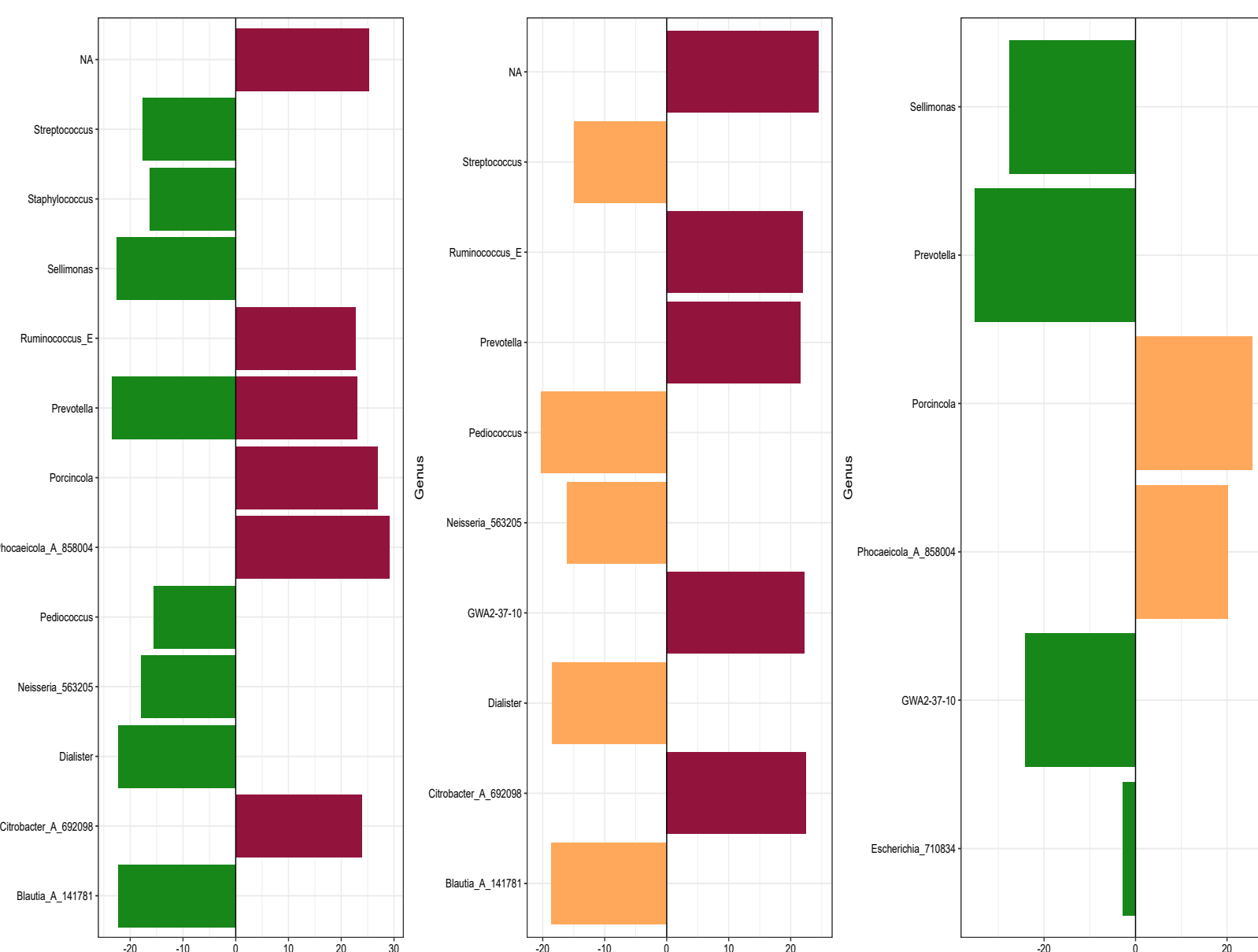
Results



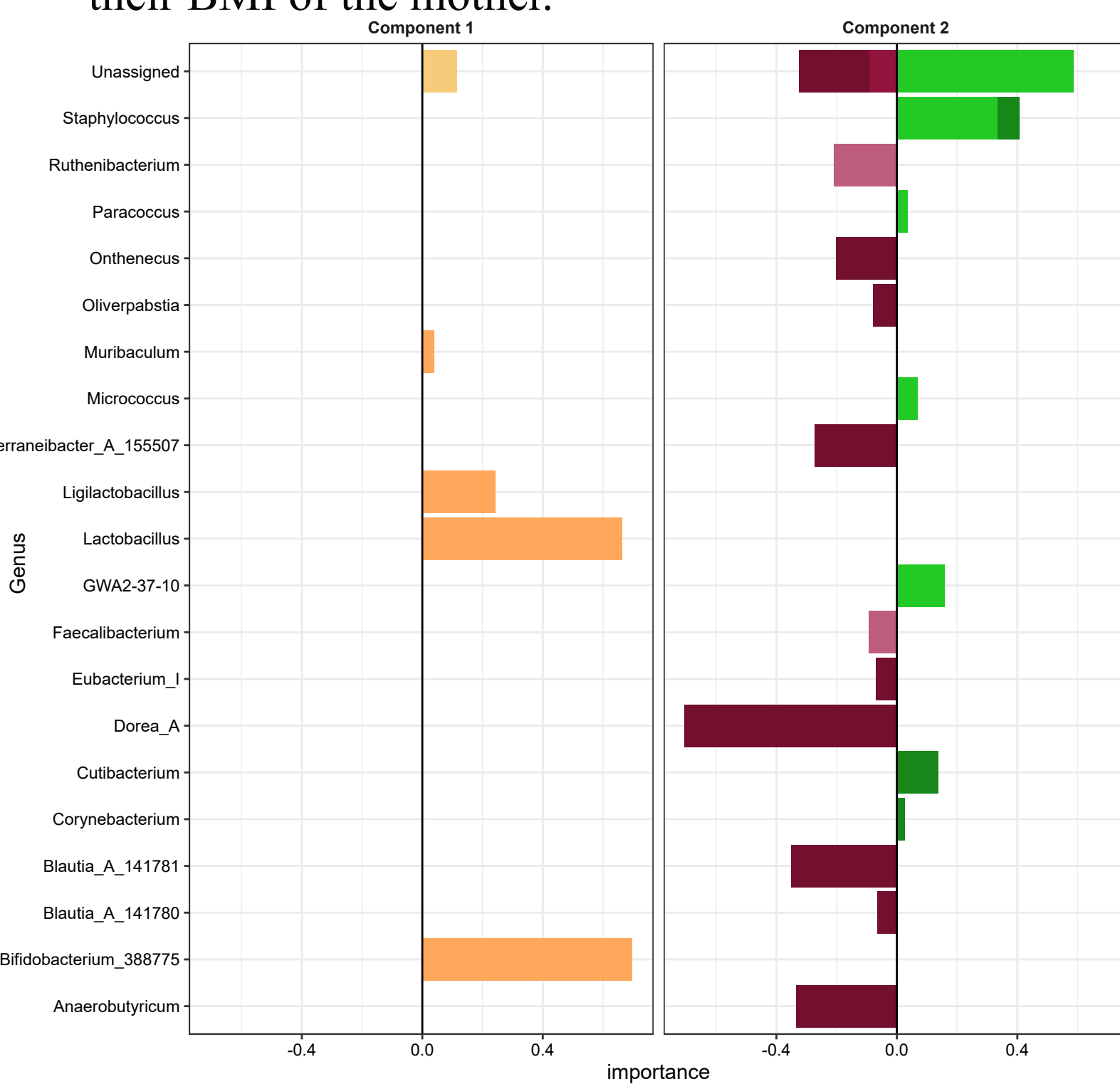
Alpha Diversity index did not show any difference in BMI classification among the samples.



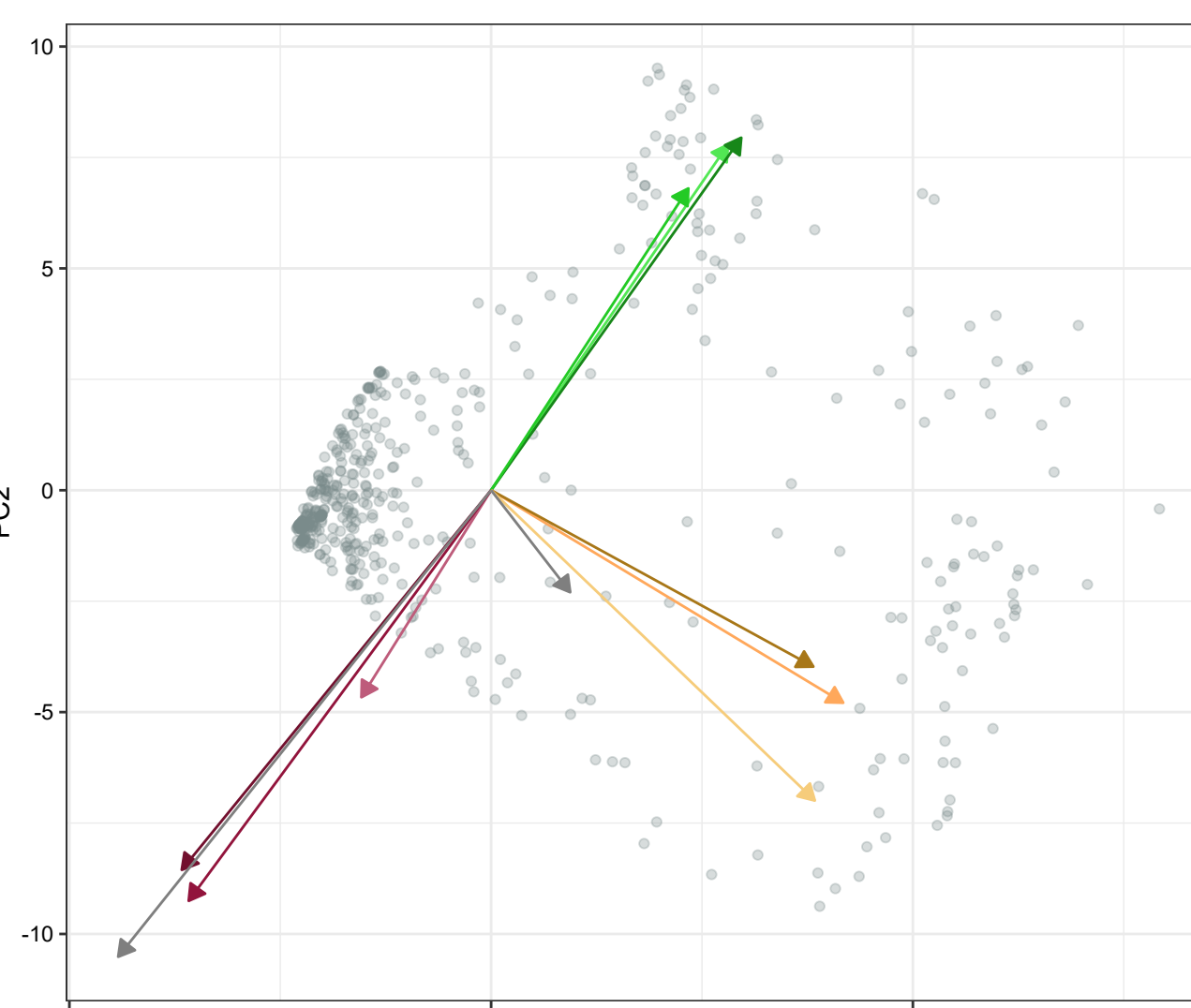
Beta Diversity index-HM and NS share same sample species



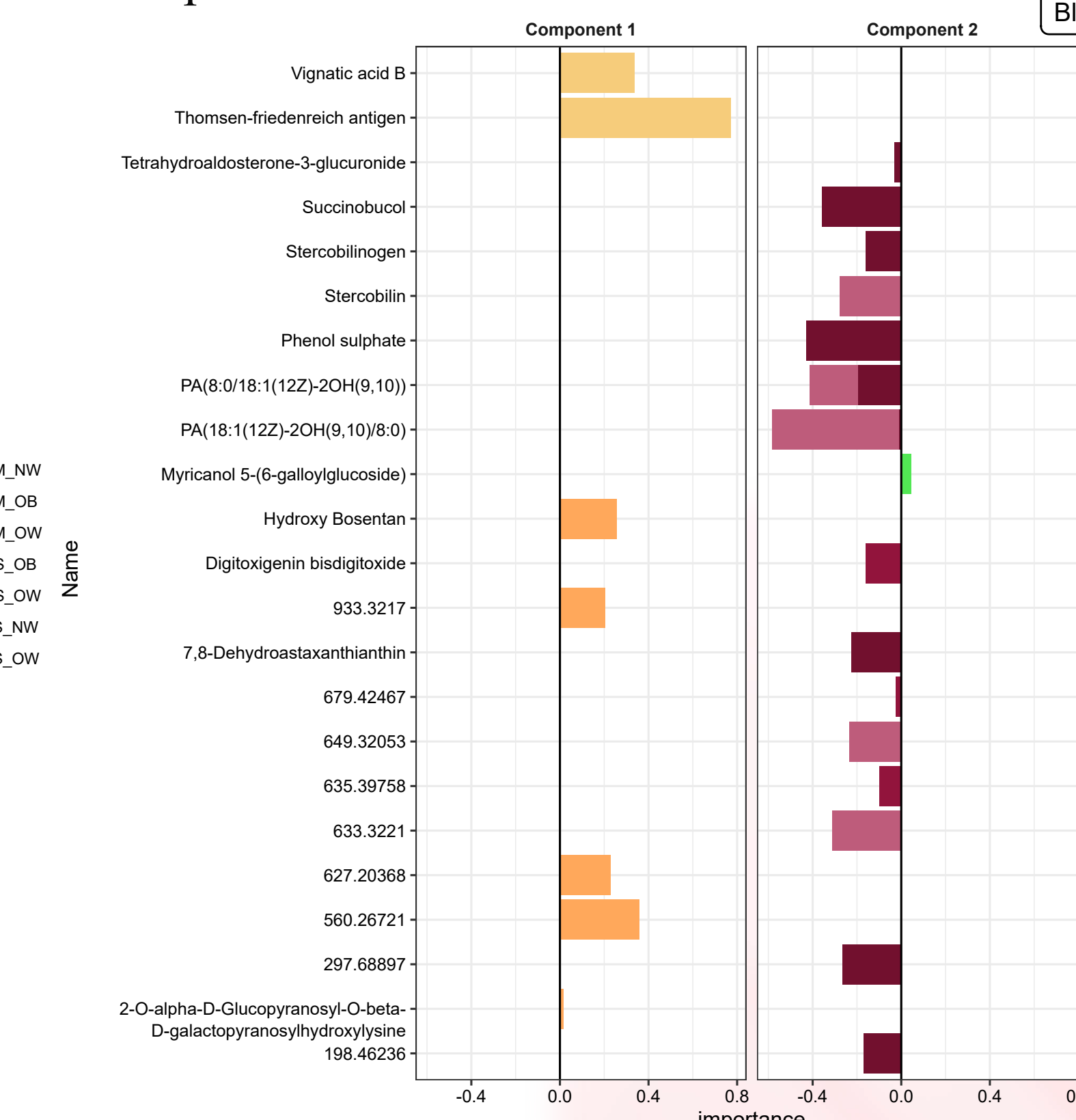
DESeq analysis for samples classified by their BMI of the mother.



Main **bacterial** contributions to the variance of the samples



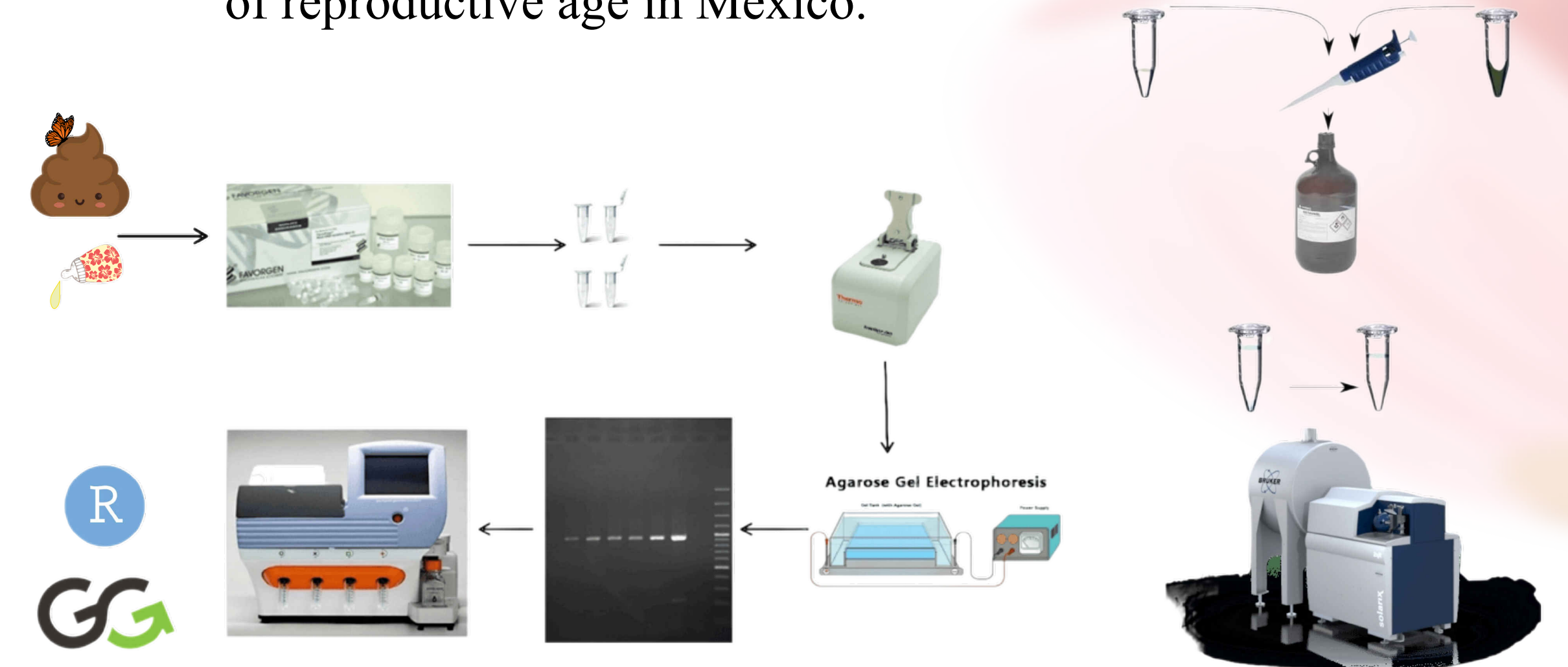
PCA plot- depicts the metabolites in the samples.



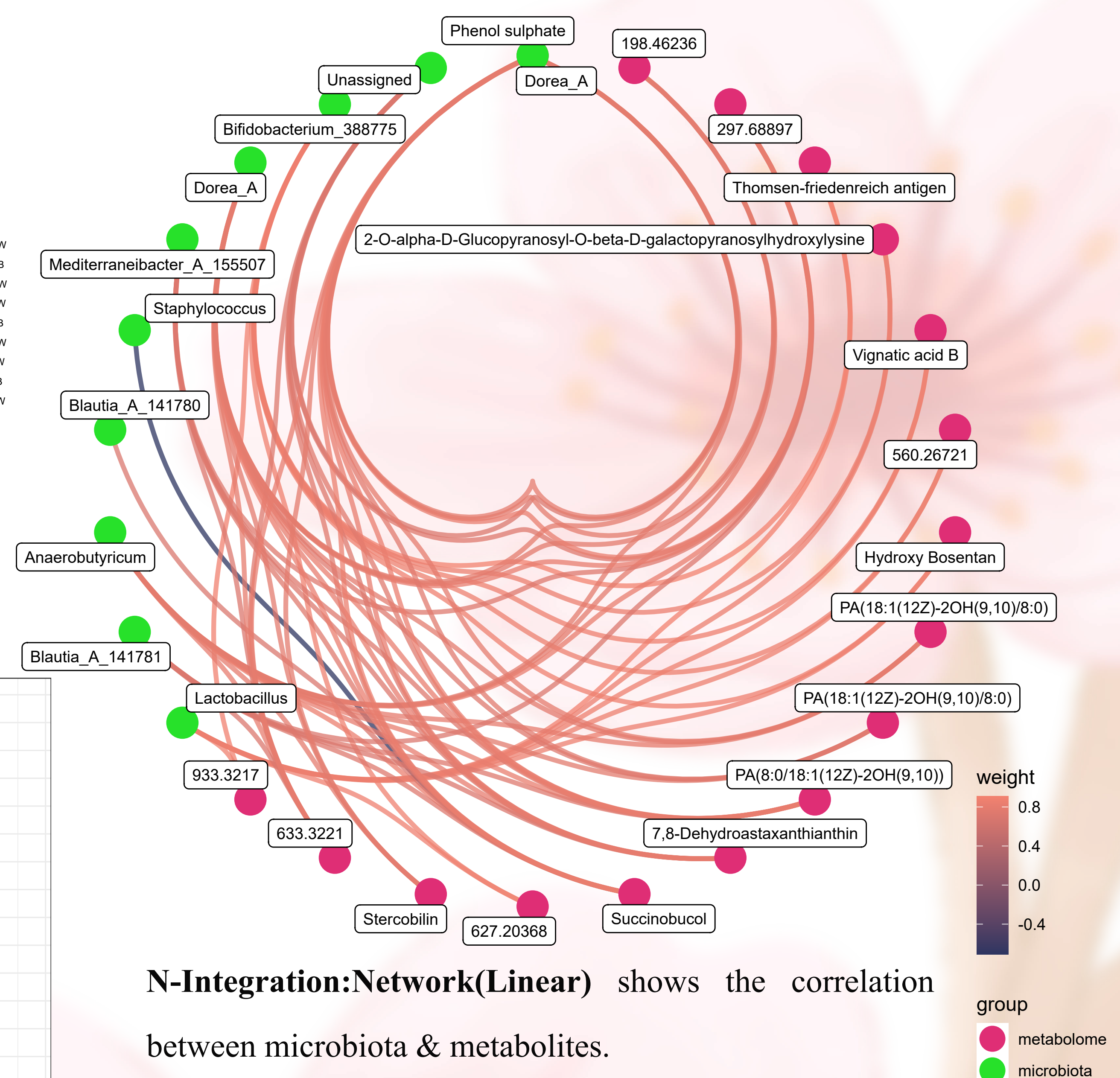
Main **metabolites** contributions to the variance of the samples

Materials and Methods

Obesity affects 41.2% of women and 32% of women of reproductive age in Mexico.



In this study, samples (MS=34, HM=37, NS=55) were collected, with 11 of them being binomials.



N-Integration:Network(Linear) shows the correlation between microbiota & metabolites.

Conclusions

- The study found that breastfeeding plays a crucial role in transferring microbiota and metabolites from the mother to the neonate.
- Human milk and neonatal stool samples share a similar bacterial composition and metabolites.
- A particular group of bacteria and their metabolites are linked to maternal weight and newborn health.
- This research suggests that maternal obesity may be transmitted to offspring through breast milk during breastfeeding.

Acknowledgements

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About Author
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