

# NUTRACEUTICAL MICO-MAMA 2.0 MUSHROOM EXTRACT SHOWS PREBIOTIC ACTIVITY IN AN *IN VITRO* MODEL USING MICROBIOTA FROM BREAST CANCER PATIENTS

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## Objective

Breast cancer (BC) is the second leading cause of death in women and accounts for 11% of cancers detected in Spain. Gut microbiota is an emerging field of research, that has been associated with cancer, through direct or indirect interference in diverse biological processes and may have an influence as a potential key player in the treatment of BC.

The **main objective** of this study was to determine if Mico-Mama 2.0, based on a combination of I Ganozumib® and Herizumib® mushroom extracts, has a potential prebiotic activity and it is able to modulate BC microbiota differentially from a control group.

## Methods

5 recently diagnosed breast cancer patients and 5 control patients were enrolled in this study. Each patient provided a faecal sample which was preserved in 20% Glycerol/PBS and frozen at -80°C until use. A pool of each group mixing equal proportions of the individual samples was incubated for 20 hours with the extract at two concentrations, 1 mg/ml and 10 mg/ml according to the protocol described by (Pérez-Burillo *et al.*, 2021). Inulin at the same concentrations was included as a positive control and each incubation was performed in triplicate. After 20 hours, total bacterial DNA was extracted using the ZymoBIOMICS DNA Miniprep Kit (Zymo Research) according to the manufacturer's instructions. The characterization of the microbial communities was performed using 16S rRNA amplicon sequencing for the V3-V4 region with an Illumina Miseq 2x300 pair-end sequencer. The results obtained were analysed in QIIME2 in combination with R and the analysis packages phyloseq and microeco.

## Results

Microbiota composition of breast cancer patients was significantly different compared to the control group (Bray Curtis and Unweighted Unifrac: Adonis2 p-value < 0,001\*\*\*). The *in vitro* studies revealed that the nutraceutical Mico-Mama 2.0 **has the potential to modulate the microbiota** differentially, based on whether it has been applied to the breast cancer or control group. At 10 mg/ml dose, the extract increased the total relative abundance of *Bifidobacterium* genera in the same way as inulin for both, BC and control microbiota. The abundance of the pro-inflammatory genera *Escherichia/Shigella* was decreased only in the BC group but not in the control group.

## Conclusion

Based on the *in vitro* results obtained, Mico-Mama 2.0 could be a good candidate for use in intervention studies that aim to modulate the intestinal microbiota of breast cancer patients.

Pérez-Burillo, S. *et al.* (2021) 'An *in vitro* batch fermentation protocol for studying the contribution of food to gut microbiota composition and functionality', *Nature Protocols*, 16(7), pp. 3186–3209. doi: 10.1038/s41596-021-00537-x.