What is Kefir?

Kefir is a type of fermented milk that is cultured with Kefir grains. Kefir grains make up the probiotic culture used to produce Kefir. These cauliflower-like grains contain mostly lactobacilli bacteria and yeasts held together by Kefir granules, an exopolysaccharide structure (Korsak et al. 2014). Kefir grains are Mesophilic. Mesophilic starters are cultured at room temperature, which allows the probiotics to remain active when consumed. Properties of mesophilic starters also give Kefir the liquid consistency it is known for. (Sarah, 2016). Kefir originated in the Caucasus Mountains thousands of years ago. The name coming from the Turkish work Kefiy meaning “good feeling”. Kefir is well known for its health benefits, which can be attributed to its probiotics. Probiotics are foods that contain beneficial bacteria and yeasts for the human body (Otles & Cagindi, 2003).

Kefir as a product

Rising awareness in American culture for maintaining good health is now driving up the demand for the Probiotic Food and Beverage Market. (“Probiotics Market Analysis”, 2015). In a highly competitive consumer Probiotic Food and Beverages Market, producers are constantly challenged to keep the quality of their product high while maintaining an affordable price for their product. In the United States Kefir is marketed as a yogurt-like probiotic beverage. Therefore, the quality of Kefir can be determined by the viability of its probiotics and how effective they are at delivering health benefits to the human body. (Kaufman, 2015). This study aims to discover if Kefir products, bought at a supermarket, can produce enough viable probiotics to be extracted and cultured. If successful, can a dominant lactobacilli species be determined for each Kefir product tested, using standard barcoding methods.

HYPOTHESIS

Hypotheses # 1

If seven selected Kefir products are advertised to contain health beneficial probiotics, then these probiotics can be extracted from the Kefir products and cultured onto agar plates containing an MRS medium.

Hypotheses # 2

If probiotics from seven selected Kefir brands are successfully cultured onto the agar medium using an MRS medium, then the dominant lactobacilli species of each brand of Kefir can be determined using standard barcoding methods.

METHODS

Experimental Design

The following brands of Kefir were chosen: Dahlicious Lassi, Green Valley Organics, Helios Greek, Lifeway, Redwood Hill Farm, and Wallaby. These Kefir products were chosen based on the availability of Kefir brands at local supermarkets.

Protocols

Samples were obtained from all seven brands of Kefir. Samples were cultured with an MRS medium, which favors the growth of lactobacilli bacteria. A 1/10 dilution “MRS Medium” and 1/100 dilution “MRS Dilute Medium” were prepared for each of the seven Kefir samples, a total of fourteen plates. Samples were incubated at 30°C for 24 hours. Colonies were extracted from each plate by scraping a t-cross shape on the agar plate with a heat wire loop. The MRS medium sample was combined with the “MRS medium dilute” sample to create one sample for each kefir brand, a total of seven samples. These were then used for DNA extraction. DNA extraction of the samples was done using SurePrep Soil DNA Isolation Kit. A Quant-it kit was used to quantify the DNA and check the DNA extraction worked. The primers used for PCR amplification were EUB 338, the forward primer, and EUB 518, the reverse primer, these bacterial primers amplify the 16S rRNA gene. To purify the DNA, an ExoSap Treatment was used to remove primers and unincorporated nucleotides. These were sent for DNA sequencing. The sequencing results were sent to the Utah DNA sequencing Laboratory. If successful, the sequences were then compared with an existing database. The sequences were then use to identify and sequence the dominant probiotics present in Kefir. If probiotics from seven selected Kefir brands are successfully cultured onto the agar medium using an MRS medium, then the dominant lactobacilli species of each brand of Kefir can be determined using standard barcoding methods.

FUTURE STUDIES

Psychobiotics studies the ability of probiotics to produce and deliver neuroactive substances, such as GABA, to the human body (Dinan et al., 2019). GABA is an important inhibitory neurotransmitter in the mammalian central nervous system. The metabolic process of GABA produces energy for the brain. GABA also controls, “the regulation of sleep-awake cycle, motor activity, vascular tone, as well as in maintaining a high seizure threshold, memory formation and cognition.” (Yunes et al., 2016). Lactobacilli and Bifidobacterium are both studied for their efficiency at producing GABA. (Yunes et al., 2016). Both probiotics can be found in Kefir. If seven selected Lactobacilli and Bifidobacterium strains are found to produce GABA, then Kefir producers can improve the quality of their Kefir by adding these strains of probiotics to their products.

REFERENCES

Dinan, T. G. et al. (2016). Lactobacillus casei subsp. casei ATCC 334 and lactobacillus rhamnosus ATCC 53103 exert opposite effects on the enteric function and gene expression in the mouse colon. Microbiome, 4:60. Print.


