

Space Studies of the Earth-Moon System, Planets, and Small Bodies of the Solar System (B)
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KOMBUCHA MIGHT BE PROMISING PROBIOTICS FOR CONSUMPTION ON THE MOON

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The sanitization at permanently manned lunar bases and consuming germ-free food in a concert with effect of lunar stressors may result in crews disorders, including inflammatory and atopic states and decrease of resistance to indigenous pathogens which present in human organism in suppressed state. The administration of live microbial supplements with presumptive health benefits on human physiology might be reasonable solution to prevent disbacteriosis. Many of microbial species are associated with the fermentation of dairy products, however, they have a short self-life and so far unpractical to be used at lunar habitation. The popular "Tea mushroom" or "Kombucha Tea" is a probiotics proven by FDA that many people are now taking in health promoting diets to detoxify and revitalize the organism (Danielian, 1993; Sreeramulu et al., 2001). Kombucha is composed by symbiotic bacteria and yeasts, surrounded by a permeable membrane. The Kombucha culture is a tiny biochemical factory, producing organic acids, amino acids, enzymes, polyphenols, antibiotic substances, vitamins, enzymes as well as some other products beneficial for human health. Within the ages the Kombucha Tea has been consumed by practically all nations in Far East and now in Eastern Europe and America due to probiotic properties, and within this period the Kombucha microbial ecosystem has been selected to be remarkably adaptive to culturing conditions and resistant to adverse factors. Metagenomic approaches in a study of microbial ecosystems will allow to reconstruct the Kombucha microbiome and to elucidate unknown species and genes on the base of bioinformatics programs. Compared with Kombucha wild type, metabolically engineered strains, expected to exhibit broader substrate specificity, utilizing sugars from waste material which will be used for Kombucha fermentation.

References

1. Danielian L.T. (1993) Tea fungus. Publ. House "Armenia", 112 pp.
2. Palmer C., Bik E.M., DiGiulio D.B., Relman D.A., Brown P.O. (2007) Development of the Human Infant Intestinal Microbiota. PLoS Biol 5(7): e177.

3. Sreeramulu G., Zhu Y., Knol W. (2001) Characterization of antimicrobial activity in Kombucha fermentation. *Acta Biotechnol.* 21:49-56.
4. Versalovic J., Relman R. (2006) How bacterial communities expand functional repertoires. *PLoS Biol* 4(12): e430.