

## **A Detailed Catalogue of Astrobiologically Interesting Stars within 20 parsecs of the Sun**

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Life based on carbon chemistry, water oceans and planetary surfaces relies upon stellar properties, such as mass, age and metallicity, which can be well constrained with present knowledge. Here we extend the study of Porto de Mello et al. (*Astrobiology*, **6**, 308, 2006) presenting a thorough compilation of the atmospheric parameters, chemical composition, multiplicity and degree of chromospheric activity for all solar-type stars within 20 parsecs of the Sun. Their states of evolution, masses, ages and galactic orbits were determined, and an optimized list produced of astrobiologically interesting candidates. These merit consideration by the space-based interferometric probes aimed at detecting Earth-sized extrasolar planets and seeking spectroscopic infrared biomarkers as evidence of photosynthetic life. We assessed the past history of spiral arm crossing of all stars, trying to characterize if constant crossings might represent a danger to planetary biospheres. Out of 499 stars within 15 parsecs of the Sun, with complete data, we present 33 objects as the nearest “biostars”, after eliminating multiple stars (discussed in a complementary work), young, hard X-ray emitting stars, stars with short-period giant planetary companions, potentially disruptive to orbital stability inside the CHZ, and low metallicity objects. Among these, Zeta Tucanae, Nu Phoenicis, Alpha Mensae, 47 Ursae Majoris, Beta Canum Venaticorum, 61 Virginis, 18 Scorpii (a solar twin), HD69830 and HD104304 reproduce well most of the solar properties and are considered premier targets. Among the nearby stars, ~7% are optimally interesting targets for astrobiology, and only ~2% have properties truly close to those of the Sun.