Understanding variability in macromolecular composition of soil microorganisms as a way to determine its growth rate

In soil, total microbial biomass is commonly determined indirectly via proxies. Those are either some macromolecules such as DNA, RNA, ATP, phospholipid fatty acids or fraction of cellular material released to soil solution following chloroform fumigation. It is generally accepted that macromolecular composition of microbial cells is not constant. As documented on single species pure cultures, almost all macromolecules vary widely along the growth rate continuum. If similar relationship holds true also in multispecies consortia such as those found in soil and if the parameters of such relationship are constrained to narrow variability, it is theoretically possible to determine microbial biomass growth rate based on reciprocal amount of any two macromolecules extracted from soil. We test this theoretical assumption on experimental data and data collected from published literature. The results and implications of the analyses are presented and discussed.