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Comparative analysis of sustainability measurement methods used for the evaluation of processes, products or services

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Sustainability is a well explained and understood paradigm presented by a model consisting of three main pillars of society namely Economic, environmental and social aspects. It could also be said that sustainability is the development of human well-being, acknowledging the fact of one diverse but ultimately finite planet. It is becoming more and more complex as well as challenging for decision makers, how to satisfy human demands without compromising on the natural limits to attain sustainability. The prerequisites include effective management of human demands as well as natural capital, however without crossing its renewability limits. In order to attain this mission, trustworthy measurement tools are required to compare the supply of natural income with the human demand. These measurement tools help decision making bodies to track progress, set goals and devise policies to attain sustainability. Four different sustainability measurement methodologies namely Carbon Footprint, Sustainability Process Index (SPI), Energy Accounting (EA) and Material Input Per service Unit (MIPS) are used to address three different objectives by evaluation of an industrial process. These goals include, authentication of the normative background of these methodologies, finding out main environmental aspects stressed out by the measure and investigation if results obtained by each methodology truly imitate its normative background. The motivation of this study is to figure out similarities and differences among given methodologies and help decision making authorities to choose suitable methodology for specific evaluation process. In this study, sustainable production of a biopolymer polyhydroxyalkanoate (PHA) from slaughtering residue as starting material has been evaluated using given methodologies.

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