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The treatment of urban sewage sludge is of vital importance for mitigating the risks of environmental contaminations, and the negative effects on human health. However, there are usually various different technologies for the treatment of urban sewage sludge; thus, it is difficult for decision-makers/stakeholders to select the most sustainable technology among multiple alternatives. This study aims at developing a generic multi-criteria decision support framework for sustainability assessment of the technologies for the treatment of urban sewage sludge. A generic criteria system including both hard and soft criteria in economic, environmental, social and technological aspects was developed for sustainability assessment. The improved analytic hierarchy process method, namely Best-Worst method, was employed to determine the weights of the criteria and the relative priorities of the technologies with respect to the soft criteria. Three MCDM methods including the sum weighted method, digraph model, and TOPSIS were used to determine sustainability sequence of the alternative technologies for the treatment of urban sewage sludge. Three technologies including landfilling, composting, and drying incineration have been studied using the proposed framework. The sustainability sequence of these three technologies determined by these three methods was obtained, and finally the priority sequence was determined as landing filling, drying incineration and composting in the descending order.

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