基于DNA编码的人工免疫模型在土壤质量评价中的应用

Artificial immune model based on DNA-encoding and its application in evaluating the soil quality

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中文摘要：

针对目前土壤质量评价方法中存在的不足之处，该文通过分析人工免疫模型中二进制编码所存在的问题，提出采用DNA编码对其进行改进，构造一种基于DNA编码的人工免疫模型进行土壤质量评价。利用该模型对东莞赤红壤现代农业试验区进行土壤质量评价，将试验区土壤质量分为4等，根据实地抽样对照评价的结果，结果表明采用基于DNA编码的人工免疫模型进行土壤质量评价时与实际相符，并具有稳定、结果可靠等特点，能较好地解决在进行土壤质量评价时，对于具有空间特性、模糊性、不确定性以及多指标的对象难以评价等问题。

英文摘要：

Based on the shortage of the evaluation methods for soil quality, the artificial immune model was applied to evaluate soil quality. After analyzing the shortage of binary-encoding in the artificial immune model, the authors proposed to integrate DNA with immune algorithm and to construct an artificial immune model based on DNA-encoding. Then the new evaluation method was used to evaluate the soil quality in Dongguan Agricultural Modernization Experimental Field in Guangdong Province. The results showed the new evaluation method was stable and reliable. The artificial immune model based on DNA-encoding was able to solve the soil quality evaluation problems which were uncertain, fuzzy, and had a spatial characteristic. It was also able to solve the problem of multiple objects under multi-index condition for soil quality evaluation.

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