

Study on Suitability Evaluation of Native Products

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Abstract: As a characteristic agricultural product relying on natural resources and ecological environment in a specific region, local products are favored by the market because of their unique quality and cultural connotation. However, the current development of local specialty products industry is facing many challenges, such as uneven product quality, lagging brand construction, lack of market competitiveness and so on. By systematically analyzing the environmental factors affecting the characteristics of local products, including climate, soil, terrain and hydrological conditions, this paper constructs a scientific and reasonable evaluation index system, and compares a variety of evaluation methods to select the optimal evaluation method. The results show that scientific suitability evaluation can effectively improve the quality and market competitiveness of local products, and help rural revitalization and industrial optimization. Future research should further combine big data and artificial intelligence technology, improve the quality formation mechanism of local products, and develop more efficient and accurate evaluation models.

Keywords: Native products; Suitability evaluation; Environmental factors; Evaluation index; Evaluation method.

1. Introduction

Local specialty products refer to products produced in a specific region, relying on the unique natural resources and ecological environment of the area, using traditional crafts or special technologies, with distinct regional characteristics and excellent quality. These products not only carry local cultural characteristics and historical memories, but also become an important force in promoting rural economic development. With the improvement of people's living standards and the change of consumption concepts, local specialty products are increasingly favored by consumers. However, due to the lack of a scientific evaluation system, the development of the local specialty product industry faces problems such as uneven product quality, lagging brand building, and insufficient market competitiveness. Therefore, conducting research on the suitability evaluation of local specialty products is of great significance for guiding the healthy development of the local specialty product industry.

2. Environmental Factors Affecting the Characteristics of Local Specialty Products

2.1. Climate factors

Climate conditions are one of the key factors affecting the quality of local specialty products. Mainly including temperature, precipitation, light, humidity, etc., these climatic conditions directly affect the growth, development, and quality formation of local specialty products[1]. Appropriate temperature and precipitation can promote crop growth, and sufficient light can aid photosynthesis, thereby improving product quality. Different local specialty products have different requirements for climate conditions, so when conducting suitability evaluations, it is necessary to analyze

in detail the impact of these climate factors on the products.

2.2. Soil factors

The texture, fertility, acidity, and alkalinity of soil have a significant impact on the growth and quality of local specialty products. The soil texture determines the aeration and water retention of the soil, while fertility directly affects crop growth and yield, and pH affects the availability of nutrients in the soil[2]. These soil factors not only affect the nutritional composition of local specialty products, but also affect the accumulation of their flavor compounds. Therefore, when conducting suitability evaluation, it is necessary to conduct detailed analysis and assessment of the soil.

2.3. Terrain factors

The terrain and landforms affect the distribution of light, temperature, and moisture, while factors such as altitude and slope direction affect local climate and soil conditions, which in turn affect the quality of soil products[3]. The sunny slope usually receives more sunlight and higher temperatures than the shady slope, which may be more favorable for the growth of certain light loving crops. However, excessive slope may lead to soil erosion and affect soil fertility. Therefore, when conducting suitability evaluation, it is necessary to comprehensively consider the impact of terrain factors on the growth of local specialty products.

2.4. Hydrological factors

The adequacy and quality of water sources also have a significant impact on the growth and quality of local specialty products. Adequate water sources can ensure that crops are not threatened by drought during their growth process, while good water quality can prevent soil and crop pollution. Therefore, when conducting suitability evaluations, it is necessary to assess the availability and water quality of the water source to ensure that the growth environment of local

specialty products meets the requirements.

3. Construction of Suitability Evaluation Index System for Local Specialty Products

3.1. Construction Principles

3.1.1. Principle of Scientificity

The evaluation indicators should objectively reflect the relationship between the quality of local specialty products and environmental factors. The selection of evaluation indicators should be based on scientific theories and methods to ensure the scientificity and reliability of the evaluation results. The selected indicators should be able to directly or indirectly reflect the growth conditions and quality characteristics of local specialty products.

3.1.2. Systematic principles

The evaluation index system should cover the main environmental factors that affect the quality of local specialty products. The evaluation index system should comprehensively consider various factors such as climate, soil, terrain, and hydrology to ensure the comprehensiveness and systematicity of the evaluation results. Not only should climate conditions be considered, but also factors such as soil fertility and topography should be taken into account.

3.1.3. Principle of operability

Evaluation indicators should be easy to obtain and quantify, and convenient for practical operation. The selected evaluation indicators should have clear definitions and operable acquisition methods to ensure the feasibility and practicality of the evaluation process. The selected indicators should be able to be measured and evaluated through existing technologies and methods.

3.2. Indicator System

The suitability evaluation index system for local specialty products should include three levels: target layer, criterion layer, and indicator layer.

3.2.1. Target Layer

The target layer is the suitability of local specialty products, that is, the ultimate goal of evaluation is to determine whether a certain area is suitable for planting or producing a certain local specialty product.

3.2.2. Criteria layer

The criteria layer includes climate factors, soil factors, terrain factors, and hydrological factors. These factors are the main environmental factors that affect the suitability of local specialty products and require detailed analysis and evaluation.

3.2.3. Indicator Layer

The indicator layer selects corresponding evaluation indicators based on specific types of local specialty products. For some light loving crops, light intensity and sunshine hours may be important evaluation indicators; For certain crops that require high soil fertility, soil organic matter content and nitrogen, phosphorus, and potassium content may be important evaluation indicators.

4. Choose the Optimal Evaluation Method

4.1. Analyze data types and characteristics

Clearly define the types of data that can be obtained, including natural factor data such as climate, soil, and terrain, as well as human factor data such as socio-economic and cultural customs. Evaluate the accuracy, completeness, and timeliness of data, and select evaluation methods that are suitable for the characteristics of the data. For example, if the data is relatively complete and has high accuracy, more complex evaluation methods can be chosen; If the data is limited, a simpler evaluation method can be chosen.

4.2. Consider the characteristics of the research area

The natural and cultural environments in different regions vary greatly, so it is important to choose evaluation methods that reflect the characteristics of each region. For mountainous areas, terrain factors may be more important; For plain areas, soil factors may be more important. The availability of data varies in different regions, so choose an evaluation method with moderate data requirements [4]. Some regions may lack detailed soil data, but have relatively complete climate data. In this case, evaluation methods mainly based on climate data can be chosen.

4.3. Compare the advantages and disadvantages of different evaluation methods and choose the most suitable evaluation method

Analytic Hierarchy Process (AHP): Suitable for handling qualitative indicators, but highly subjective and requires expert scoring. AHP can effectively handle multi factor comprehensive evaluation problems by constructing a judgment matrix and calculating the weights of each factor [5]. However, AHP has strong subjectivity and requires experts to score, which may affect the objectivity of the evaluation results.

Fuzzy comprehensive evaluation method: It can handle fuzzy information, but the calculation process is relatively complex. The fuzzy comprehensive evaluation method can effectively handle the fuzziness of evaluation criteria and the uncertainty of data by establishing a fuzzy evaluation matrix and calculating the membership degree of each factor [6]. However, the calculation process of the fuzzy comprehensive evaluation method is relatively complex and requires a high level of mathematical foundation and computational ability.

Geographic Information System (GIS): capable of spatial analysis and visualization, but requires professional software and technical support. GIS technology can process various geographic spatial data, generate intuitive distribution maps [7], and provide visual support for decision-making. However, GIS technology requires professional software and technical support, and has high requirements for operators.

Machine learning methods: capable of processing massive amounts of data, but require a large amount of training data and computing resources. Machine learning methods can effectively handle complex data relationships and improve prediction accuracy by automatically learning patterns in the data. However, machine learning methods require a large amount of training data and computing resources, with high demands on data volume and computing power.

If the evaluation purpose is to delineate suitable planting areas and has relatively complete spatial data, a combination of GIS and AHP methods can be chosen. GIS technology can process spatial data and generate intuitive distribution maps, while AHP can determine the weights of various factors. The combination of the two can effectively handle multi factor comprehensive evaluation problems. If the evaluation purpose is to assess the potential of product quality and there is a large amount of historical data, machine learning methods can be chosen. Machine learning methods can predict the quality potential of products and improve the accuracy and reliability of evaluations by learning patterns from historical data.

5. Conclusion

The suitability evaluation of local specialty products is of great significance for promoting rural revitalization, improving product quality, and optimizing industrial layout. This article systematically analyzes the environmental factors that affect the characteristics of local specialty products, proposes a scientifically reasonable evaluation index system, and compares multiple evaluation methods to select the optimal evaluation method. Future research should strengthen the following aspects:

1. Strengthen basic theoretical research: Improve the mechanism of quality formation of local specialty products, conduct in-depth research on the impact of different environmental factors on the quality of local specialty products, and provide theoretical support for the construction of evaluation index system.

2. Build a scientifically reasonable evaluation index system: improve the accuracy and reliability of evaluation results, ensure that evaluation indicators can comprehensively and objectively reflect the suitability of local specialty products.

3. Combining big data and artificial intelligence technology: Developing more efficient and accurate evaluation models, utilizing big data and artificial intelligence technology to process massive amounts of data, and improving evaluation

efficiency and accuracy.

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