

## Research Article

### Research on Assessment Evaluation in Nutritional Indexes of Sports Drinks

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**Abstract:** This study using social benefits evaluation index, discussed by using attribute recognition method in sports drinks nutrition index system, it can be used in food quality inspection more widely. With the further development of our country public fitness, the continuous improvement of people's living standard, people's demand for sports drinks is more and more high, so in the research and development of sports drink, how to evaluate about the quality of the products effectively, is a comprehensive assessment subject.

**Keywords:** Evaluation index, subject assessment, sports drinks

#### INTRODUCTION

Modern sports drinks should not only meet the needs of professional athletes, but also some general sports population. At the same time, meeting the ordinary consumers needs, sports drinks must be modified according to different factors (age, gender etc). Sports drinks market segmentation needs be further subdivided, Sports drinks now are not only consisted of water, carbohydrate and electrolytes, etc, but the grafting many other concepts, such as tea drink, fruit juice beverage, herbal drink etc. Also different types of sports drinks carbohydrates and is now widespread in the order add analysis of nutrient elements, Hence in the research and development of sports drink, how to comprehensive evaluate the quality of the product effectively, is a subject with economic value and social benefits, this study, analyzes comprehensive evaluation using the method of attribute recognition in sports drinks nutrition index system (Guo, 2006).

Sports drinks nutrition indicators of the national standard is more than a indexes system and the specific standard of soluble solids and nutrients (Gao, 2004). The experimental analysis of the samples have different compound fruit and vegetable juice, sports drinks the measured value of soluble solids and nutrients, the following comprehensive evaluation was made in the premise of all indexes according with national standard for sports drinks, soluble solids and nutrients in the nutritional indexes of measuring value and evaluation results on basis of the research sample selection is foundation as fruit and vegetable juice, sports drinks.

#### MATERIALS AND METHODS

**The index system of coordinated evaluation in sports drink:** The coordinated development of the Sports

Drink performs in the relationship of security evaluation system, food environmental system and economic system (Guo and Cao, 2004). Ecological system, is to achieve maximum overall system efficiency under the premise of making each subsystem achieve high benefit as much as possible, this is actually a multi-objective comprehensive decision problem (Ma and Jiao, 2008).

#### System goal:

$$\max S_{EEE} = \sum_i B_i, i = 1,2,3 \quad (1)$$

Among them:  $B_i = f\{S_i(A, T)\}$

Constraints:  $B_i \geq \min B_i$

Type,  $S_{EEE}$  for security evaluation system development status;  $B_i$  Sports Drink, environment and economic development of each Sports Drink subsystem, respectively;  $S_i$  respectively of the subsystems of the Sports Drink, environment, economy benefit variables;  $A$  for the space variables;  $T$  as the time variables;  $\min B_i$  for Boundary conditions in each subsystem.

Based on the characteristics and the construction principles of evaluation index in the security evaluation systems (scientific, practical, dynamic, systemic), selecting three layers with a total of 16 building power ecological system, we can build comprehensive evaluation index system of coordinate development, as shown in Table 1.

#### RESULTS AND DISCUSSION

**The evaluation results:** For the building index system, we can use AHP and entropy weight to determine the index weight of subjective and objective information, respectively, comprehensive weights are obtained, in

Table 1: Evaluation index system

Target layer	Criterion	Index layer
Development of sports drinks security evaluation compound system (A)	Sports drinks subsystem (B1)	Consumption per unit of GDP (C1)
		The highest load growth (C2)
		Thermal coal consumption of power supply (C3)
		Proportion of thermal power installed (C4)
	Security evaluation subsystem (B2)	Electricity elasticity coefficient (C5)
		Industrial emissions in SO <sub>2</sub> (C6)
		Industrial soot emissions (C7)
		Industrial waste gas emissions (C8)
		Average concentration of SO <sub>2</sub> (C9)
	Economic subsystem (B3)	Average concentration of NO <sub>2</sub> (C10)
		The frequency of acid rain(C11)
		GDP (C12)
		GDP per capita (C13)
		GIOV (C14)
		GIOV per capita (C15)
		The proportion of the tertiary industry (C16)

Table 2: Judgment matrix and index weight of criterion layer

A	B1	B2	B3	$a_j$
B1	1	1	1	0.3333
B2	1	1	1	0.3333
B3	1	1	1	0.3333

Table 3: Judgment matrix and index weight of electricity subsystem

B1	C1	C2	C3	C4	C5	$a_j$
C1	1.0000	7.0000	1.0000	5.0000	5.0000	0.3838
C2	0.1429	1.0000	0.1429	1.0000	0.3333	0.0504
C3	1.0000	7.0000	1.0000	5.0000	7.0000	0.4106
C4	0.2000	1.0000	0.2000	1.0000	2.0000	0.0824
C5	0.2000	3.0000	0.1429	0.5000	1.0000	0.0728

Table 4: Judgment matrix and index weight of environment subsystem

B2	C6	C7	C8	C9	C10	C11	$a_j$
C6	1.0000	5.0000	7.0000	5.0000	3.0000	1.0000	0.3276
C7	0.2000	1.0000	3.0000	0.2000	0.2000	0.2000	0.0474
C8	0.1429	0.3333	1.0000	0.2000	0.2000	0.1111	0.0282
C9	0.2000	5.0000	5.0000	1.0000	3.0000	0.3333	0.1508
C10	0.3333	5.0000	5.0000	0.3333	1.0000	0.2000	0.1046
C11	1.0000	5.0000	9.0000	3.0000	5.0000	1.0000	0.3416

order to improve the accuracy and credibility of evaluation results.

**The determination of index weight method:** When determining our security evaluation system coordinated integrated evaluation system of the index weight  $j$ , we should comprehensively consider the results of subjective and objective weights way, that sports drinks system coordinated weight value  $j$  of comprehensive is concluded.

**Application examples:** Through the yearly information of related data, we select 2000-2011 statistical data in Samples of fruit and vegetable juice sports drink as the original data in the research, weight method. Based on the AHP method.

The judgment matrix and weight of Rule layer are shown in Table 2,  $CA = 0.0000$ , judgment matrix in criterion layer is completely consistent for the consistency check.

Secondly, the layer weights for each indicator are defined. The judgment matrix and the index weight in subsystems of the Table 3 and 4.

**B1:**  $CR = 0.0548$  and  $CR < 0.1$ ; **B2:**  $CR = 0.0944$  and  $CR < 0.1$ ; **B3:**  $CR = 0.0940$  and  $CR < 0.1$ . They are by mean of the consistency check.

According to the weights of the criterion layer and index layer, it conducts the total sort of levels of hierarchy and calculates the comprehensive weights,  $CR = 0.0815$  and  $CR < 0.1$ , via the consistency check. By using AHP method for electric power ecological system to coordinate the weight of comprehensive evaluation index system is as follows:

$$A = \{0.1279, 0.0168, 0.1369, 0.0275, 0.0243, 0.1092, 0.0158, 0.0094, 0.0503, 0.0349, 0.1139, 0.1304, 0.1221, 0.0152, 0.0192, 0.0464\}$$

**Based on entropy weight:** Making use of statistical data in Samples of fruit and vegetable juice sports drink of the standardization, entropy value of each evaluation index is calculated as follows:

$$W = \{0.0460, 0.0709, 0.0286, 0.0373, 0.0643, 0.0391, 0.0362, 0.0283, 0.0252, 0.0449, 0.0312, 0.0447, 0.1348, 0.1684, 0.0932, 0.1069\}$$

## CONCLUSION

Using attribute recognition theoretical model of sports drinks nutrition index has carried on the comprehensive evaluation, for the research and development of fruit and vegetable juice, sports drinks for the quantitative evaluation of a kind of effective method (Cheng, 2007). It is because the rigour of attribute recognition method, simple and practical operation in the process of evaluation to distinguish the degree of good characteristics, make it can get in the field of food quality inspection as well as a wider range of applications.

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