

Development of Knowledge Test Regarding Method of Preparation of Traditional Dairy Products

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ABSTRACT

The preparation of the milk products appeals more to the changing demands of the consumers. So, it may be argued that the manufacturing of traditional dairy products could fetch additional income to farmers besides providing considerable employment opportunities; but even then only limited amount of milk is value added at the household level, in the villages due to the low level of awareness about value-addition in milk, at the village level. In this context, a knowledge test was required to be developed in order to assess the knowledge level of the respondents. A sample of 60 respondents was selected involved in the preparation of two dairy products. Data were collected through personal interview method. So, in order to assess the knowledge level of the people a knowledge test was developed by collecting items and analyzing them using discrimination index and difficulty index. So, finally 11 statements were selected for the final evaluation of the respondents.

Keywords: Knowledge test; Traditional dairy products (TDP);

Knowledge is considered as the body of facts which an individual accumulates throughout his/her lifetime. Bloom *et al.* (1956) defined knowledge as those behavior and test situation, which emphasized the remembering, by either recognition or recall, of ideas, materials and phenomenon. English and English (1961) defined knowledge as "The body of understood information possessed by an individual or by a culture". Knowledge is one of the important components of behavior and as such plays an important role in the covert and overt behavior of an individual. An appropriate knowledge test helps us how to know the level of relevant knowledge of the participants from time to time. Knowledge test score is also used as a variable to test its relationship with other variables.

The term 'Traditional Dairy Products' (TDP) refer to those milk products which originated from undivided India. The importance of these milk products has been recognized since the Vedic times. The variety of ways the traditional milk products are prepared is more or less an art (De, 2008). Traditional Indian dairy products or Indian traditional milk products comprise of as all milk products, which are native of India and which were

evolved over ages, utilizing locally available fuels and cooking wares.

It can be said that, in the coming years, farmers generate more income from dairying than from the crop farming alone as the consumption pattern is changing in India. As the preparation of the milk products appeals more with the changing demands of the consumer group. In this context it may be argued that since manufacturing of traditional dairy products could fetch additional income to farmers besides providing considerable employment opportunities; but even then only limited amount of milk is value added at the household level, in the villages. Low level of knowledge and awareness about value-addition in milk/ dairy products, at the village level, is the main cause of this scenario.

Accordingly, a knowledge test was developed to assess dairy farmer's knowledge regarding the method of preparation of Traditional Dairy Products.

METHODOLOGY

In order to develop the knowledge test 60 respondents were purposively selected from the village of Taprana and Pritampura Colony, Karnal District.

Purposive selection of the respondents was done, while selecting those who were involved in the preparation of at least two of the traditional dairy products like *Ghee*, *Dahi*, *Lassi*, *Paneer*, *Gulab Jamun* and *Khoa*. Also, they should not have undergone any training programme related to the preparation of dairy products previously.

Collection of items: The content of knowledge test is composed of questions called items. A list of 37 items was prepared by consulting different sources such as literatures from *Murtaza et.al. (2017)*, *Rai et al. (2017)*, *Pandya et al. (2008)*, *Dastur (1956)*, *Patil (2002)* and *De (2008)* as well as from the specialists/experts of National Dairy Research Institute (NDRI), Karnal along with researcher's own experience. The items were collected in relation to the method of preparation of traditional dairy products like *Ghee*, *Dahi*, *Lassi*, *Paneer*, *Gulab Jamun* and *Khoa*. The questions were of single word answer type. Correct replies of the items were ascertained in consultation with the specialists and experts. The responses of the respondents were compared against these correct replies.

Data collection: A structured interview-schedule was developed in order to carry out the data collection. Data were collected through personal interview techniques, by visiting them at the respective houses of the respondents.

Their responses were collected and quantified by assigning a score of 1 to correct answer and 0 to incorrect answer. After calculating the scores obtained by 60 respondents, the scores were arranged from the highest to the lowest according to magnitude. A respondent's total score was attained by summation of the score for all questions. These responses were then further subjected to item analysis i.e. difficulty index & discrimination index.

Item analysis: Item analysis was done on two types of indices i.e. item difficulty and item discrimination (*Yadav, 2009*). The index of item difficulty indicates how much difficult an item is for a respondent, and the item discrimination index indicates the extent to which the well-informed respondents were being differentiated from the poorly informed ones.

Difficulty index: The difficulty of an item is subjective in nature and varies from person to person. When a respondent answers them correctly, it was assumed that the item was relatively easier than his ability to cope

with the difficulties. The assumption in this item statistic of difficulty was that the difficulty was linearly related to the level of respondent's knowledge about the method of preparation of 'Traditional Dairy Products'. The difficulty index of an item is defined as the proportion of respondents giving correct answer to the item. It is calculated by the following formula:

$$P_i = \frac{n_i}{N_i} \times 100$$

Where,

P_i = difficulty index in percentage of the i^{th} item

n_i = number of respondents giving correct answer to i^{th} item

N_i = Total number of respondents to whom the items were administered i.e. 60

Discrimination index: If the item is answered by only a limited number of respondents and not by others, such items has the power to differentiate the more knowledgeable persons from the less knowledgeable ones than another item, which is either answered correctly by everyone or not a single person in the sample. If an item is so simple, that it is correctly answerable by everyone or is too difficult to be correctly answerable by everyone, it does not have the power to discriminate the respondents with variation in knowledge levels. So, the items which carry the higher discrimination power implicitly indicate that such items are moderately difficult. They are the only ones as only they could discriminate the ones who could answer them correctly from those who are unable to answer them. The discrimination power of all the thirty-seven raw items were worked out using $E_{1/3}$ method to find out the item discrimination, as given below. In this method, those 60 respondents were divided into six equal groups, each having ten respondents and they were arranged in descending order of their magnitude of their knowledge scores as obtained from them. The middle two groups were eliminated. Only four extremes groups i.e. the groups with highest and lowest scores were considered in order to calculate the 'Discrimination Index'. It is calculated by the following formula:

$$E_{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}$$

Where,

N = Total number of respondents to whom the items were administered.

S_1 and S_2 were the frequencies of correct answers of

highest and higher scores, respectively; whereas, S5 and S6 are the frequencies of correct answers of lower and lowest scores, respectively.

Selection of items for final knowledge test: Two criteria were considered i.e. item difficulty index and item discrimination index, for selection of items for the final knowledge test. The assumption underlying was that the difficulty was linearly related to the level of an individual's knowledge about the topic. When a respondent gives a

correct answer to an item, then it was assumed, as *Coombs (1950)* described, that the item was less difficult than the individual's ability to cope with it. The items with difficulty index ranging from 30 to 80 (*Mitra et al., 2009*) and discrimination index ranging from 0.25 to 0.8 were used to select the final items (*Hingorjo et al., 2012*). That is, the items, which were neither too difficult nor too easy to reply and could discriminate the well-informed individuals from the less-informed ones.

Table 1. Frequency of correct responses against items of the knowledge test regarding method of preparation of traditional dairy products

Items of the knowledge test	Correct	%	Incorrect	%
Ghee is prepared from _____	57	95.00	3	5.00
What is done to prevent scorching in the process of conversion of butter into ghee?	46	76.67	14	23.33
What is the endpoint that indicates the completion of ghee making Process?	57	95.00	3	5.00
1 st step of ghee making process from butter.	57	95.00	3	5.00
The layers after sedimentation of the butter at high temperature	47	78.33	13	21.67
How ghee is obtained from butter after cooling & sedimentation?	57	95.00	3	5.00
The colour of ghee prepared from Cow/ Buffalo milk	50	83.33	10	16.67
Lassi is a by-product obtained by _____	57	95.00	3	5.00
Ingredients used to enhance the taste of lassi are :	33	55.00	27	45.00
What are the uses of lassi ?	57	95.00	3	5.00
Coagulation of milk forms _____	41	68.33	19	31.67
The milk prepared for the preparation of <i>paneer</i> is _____	39	65.00	21	35.00
The milk is cooled to the temperature of _____ after heating	36	60.00	24	40.00
Material used as coagulant. _____	40	66.67	20	33.33
Indication to stop addition of coagulant _____	42	70.00	18	30.00
Temperature at which coagulation is done. _____	28	46.67	32	53.33
Weight applied on the top of <i>paneer</i> block. _____	30	50.00	30	50.00
The time period for which weight is applied on the <i>paneer</i> block _____	18	30.00	42	70.00
The amount of coagulant used in coagulation of 1litre milk. _____	31	51.67	29	48.33
The amount of starter culture used for inoculation. _____	42	70.00	18	30.00
The starter culture used for inoculation are. _____	59	98.33	1	1.67
Time required for inoculation. _____	51	85.00	9	15.00
The temperature required for inoculation	52	86.67	8	13.33
<i>Dahi</i> is stored in temperature of _____	24	40.00	36	60.00
What should be done to avoid scorching of milk?	50	83.33	10	16.67
What milk is preferred for <i>khoa</i> preparation?	27	45.00	33	55.00
Thermal evaporation of milk produces _____	49	81.67	11	18.33
What is the texture & colour of <i>khoa</i> ?	33	55.00	27	45.00
How much <i>khoa</i> is produced from milk?	32	53.33	28	46.67
<i>Gulab Jamun</i> is prepared from _____	15	25.00	45	75.00
<i>Gulab Jamun</i> is prepared from _____ <i>khoa</i> variety.	2	3.33	58	96.67
<i>Gulab Jamun</i> is flavoured with _____ water.	0	0.00	60	100.00
In <i>Gulab Jamun</i> preparation amount of maida used _____	8	13.33	52	86.67
Baking Powder is used _____% of total mixture for the preparation of <i>Gulab Jamun</i> .	10	16.67	50	83.33
_____ amount of milk is added in making of <i>Gulab Jamun</i> per 100g mixture	4	6.67	56	93.33
<i>Gulab Jamun</i> balls are cooked for time period of ____ min at a temperature of ____ æ% C.	12	20.00	48	80.00
The <i>Gulab Jamun</i> Balls are soaked in sugar syrup for a time period of _____	14	23.33	46	76.67

RESULTS AND DISCUSSION

The items were collected from different sources and were administered to 60 respondents. Scores were given as 1 against a correct response and 0 for an incorrect one. The item wise correct and incorrect responses are presented in Table 1. After getting response of all the 37 items, the difficulty index and discrimination index was calculated using the formula discussed in the methodology

section (Table 2). The items, having difficulty index value within 30 to 80 and discrimination index value within 0.25 to 0.80 were selected as final items of the knowledge test. Thus, the following 11 items were selected for the knowledge test which were considered as neither too difficult nor too easy to reply and could discriminate the well-informed individuals from the less-informed ones which are presented in Table 3.

Table 2. Item difficulty and discrimination indices values of the items of the knowledge test regarding method of preparation of traditional dairy products

Items of the knowledge test	Difficulty Index	Discrimination Index
Ghee is prepared from _____	95	0.15
What is done to prevent scorching in the process of conversion of butter into ghee?	76.67	0.55
What is the endpoint that indicates the completion of ghee making Process?	95	0.15
1 st step of ghee making process from butter.	95	0.15
The layers after sedimentation of the butter at high temperature	78.33	0.35
How ghee is obtained from butter after cooling & sedimentation?	95	0.15
The colour of ghee prepared from Cow/Buffalo milk	83.33	0.3
Lassi is a by-product obtained by _____	95	0.1
Ingredients used to enhance the taste of lassi are :	55	0.65
What are the uses of lassi ?	95	0.1
Coagulation of milk forms _____	68.33	0.75
The milk prepared for the preparation of paneer is _____	65	0.8
The milk is cooled to the temperature of _____ after heating	60	0.95
Material used as coagulant. _____	66.67	0.75
Indication to stop addition of coagulant _____	70	0.75
Temperature at which coagulation is done. _____	46.67	0.95
Weight applied on the top of paneer block. _____	50	0.45
The time period for which weight is applied on the paneer block _____	30	0.45
The amount of coagulant used in coagulation of 1litre milk. _____	51.67	0.95
The amount of starter culture used for inoculation. _____	70	0.3
The starter culture used for inoculation are. _____	98.33	0
Time required for inoculation. _____	85	-0.2
The temperature required for inoculation	86.67	0.1
Dahi is stored in temperature of _____	40	0.8
What should be done to avoid scorching of milk?	83.33	0.3
What milk is preferred for <i>khoa</i> preparation?	45	-0.15
Thermal evaporation of milk produces _____	81.67	0.2
What is the texture & colour of <i>khoa</i> ?	55	0.2
How much <i>khoa</i> is produced from milk?	53.33	0.1
Gulab Jamun is prepared from _____	25	0.7
Gulab Jamun is prepared from _____ <i>khoa</i> variety.	3.33	0.1
Gulab Jamun is flavoured with _____ water.	0	0
In Gulab Jamun preparation amount of maida used _____	13.33	0.4
Baking Powder is used _____% of total mixture for the preparation of Gulab Jamun.	16.67	0.5
_____ amount of milk is added in making of Gulab Jamun per 100g mixture	6.67	0.2
GulabJamun balls are cooked for time period of _____ min at a temperature of _____ æ% C.	20	0.6
The Gulab Jamun Balls are soaked in sugar syrup for a time period of _____	0.7	37

Table 3. Item difficulty and discrimination indices values of the selected knowledge statements about the method of preparation of TDP

Items	Difficulty Index	Discrimination Index
What is done to prevent scorching in the process of conversion of butter into <i>ghee</i> ?	76.67	0.55
The layers after sedimentation of the butter at high temperature	78.33	0.35
Ingredients used to taste <i>lassi</i> are	55	0.65
Coagulation of milk forms	68.33	0.75
The milk prepared for the preparation of <i>paneer</i> is	65	0.8
Material used as coagulant.	66.67	0.75
Indication to stop addition of coagulant	70	0.75
Weight applied on the top of <i>paneer</i> block.	50	0.45
The time period for which weight is applied on the <i>paneer</i> block	30	0.45
The amount of starter culture used for inoculation	70	0.3
<i>Dahi</i> is stored in temperature.	40	0.8

Reliability : The selected 11 items were administered to 96 respondents selected randomly in sample areas. The responses to all the 11 items were scored as 1 if correct and 0 if incorrect. Cronbach alpha (Cronbach, 1951) was used to calculate the reliability coefficient and it was found as 0.68 which indicate higher level of internal consistency of the developed knowledge test. Cronbach alpha was calculated by using SPSS version 23 analytical software.

Validity: The validity of this test was established through content validity. All possible care was taken on including the statements covering all aspects of Traditional Dairy Products. The items selected were collected through consulting specialists and experts in dairy technology. Also relevant literatures regarding traditional dairy products were reviewed in order to select the items.

Hence, it was logical to assume that the test satisfies representation as well as sensible method of test construction, the criteria for content validity.

CONCLUSION

In order to test the knowledge level of the respondents regarding method of preparation of Traditional Dairy Products, a total of 11 statements were being selected, which could easily differentiate the knowledgeable persons from the poorly knowledgeable persons. Therefore, this developed knowledge test may be used to assess knowledge level of the farmers reading method of preparation of traditional dairy products. After assessing their knowledge level, different interventions may be arranged to upgrade their knowledge level.

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