



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2018; SP1: 2853-2855

**TA Maske**

Department of Animal  
Husbandry and Dairy Science,  
Vasantarao Naik Marathwada  
Krishi Vidyapeeth, Parbhani  
India

**BC Andhare**

Department of Animal  
Husbandry and Dairy Science,  
Vasantarao Naik Marathwada  
Krishi Vidyapeeth, Parbhani),  
India

**VS Dhumal**

Department of Animal  
Husbandry and Dairy Science,  
Vasantarao Naik Marathwada  
Krishi Vidyapeeth, Parbhani),  
India

**SP Shinde**

Department of Animal  
Husbandry and Dairy Science,  
Vasantarao Naik Marathwada  
Krishi Vidyapeeth, Parbhani,  
India

**Correspondence****TA Maske**

Department of Animal  
Husbandry and Dairy Science,  
Vasantarao Naik Marathwada  
Krishi Vidyapeeth, Parbhani  
India

## Studies on sensory attributes of *paneer* prepared by toned milk using sago powder

TA Maske, BC Andhare, VS Dhumal and SP Shinde

**Abstract**

*Paneer* was prepared from toned milk and different levels of sago powder added on the weight basis of milk. The investigation was undertaken to explore the possibilities of utilizing *sago powder* in *paneer* manufacture to improve the health benefits of product and use also as a fast food over the year. The temperature level for addition of sago powder was optimized by conducting sensory test for three levels of temperature i.e. at room temperature, at 72<sup>0</sup> C and 87<sup>0</sup> C on the basis of sensory test recorded for test/ mouth feel only by semi expert panel of judges. In all treatments, the maximum score for test/ mouth feel was recorded at 72<sup>0</sup> C temperature level which is optimized for preparation of *sago paneer*. It was observed that the overall acceptability score for sensory was 8.63, 7.88, 7.13 and 6.38 respectively for T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>. As the level of sago powder increased, the overall acceptability score was decreased. The highest score for overall acceptability was found 8.63 (like very much) in T<sub>1</sub> and lowest score was found 6.38 (like slightly) in T<sub>4</sub> treatment.

**Keywords:** *Paneer*, Sago powder, Toned milk etc.

**Introduction**

*Paneer* is an indigenous coagulated milk product prepared by addition of citric acid to milk and coagulated at higher temperature followed by pressing of the coagulum. This product is extensively used as an ingredient for preparing cooked meat and vegetable dishes as well as the fast food in North West Frontier Province (N.W.F.P.) of Pakistan (Athar *et al.* 1989). This *paneer* product is mostly prepared from buffalo milk, because it contains higher level of casein and minerals (calcium and phosphorous) which helps to produce *paneer* with hard and rubbery body so technologist claimed that buffalo milk can be utilized for preparation of high grade *paneer*.

Tapioca sago is generally known as SAGO (SABUDANA in Hindi or Javarishi in Tamil) in India. Sago is a produce, prepared from the milk of 'Tapioca root'. Its botanical name is "*Manihot Esculentacrantz Syn. Utilissima*" It's have a several name in the various regions where it is consumed. It is known as Yuca, Rumu or Manioca in Latin America, Manioc in French speaking Africa and Madagascar Cassava in English speaking (Flach *et al.* 1996). Research by Ahmad and William (1998) found that sago starch contains 27 % of amylase with 30 um of its particle size. Sago's gelatinization temperature range is similar to corn starch while its hot paste properties are almost the same as potato starch.

Sago grains are about 2 mm in diameter. They are a source of pure carbohydrates with very little protein, vitamin 'C' and minerals, a 100 gm of dried sago yields about 355 calorie with an inclusion of 94 gm of carbohydrates, 0.2 grams of protein, 0.5 grams of dietary fiber, 10 mg of calcium, 1.2 mg of iron and negligible amounts of fat, carotene, thiamine and ascorbic acid and fats. It does not offer any significant quantity of vitamins or minerals. As a starch, the health benefits of sago come primarily from carbohydrates. This carbohydrate content allows sago to function as a staple food in several regions of the world. Sago is also low in fat and has no protein. Since, the nutritional content of sago is quite low; people often mix sago with other ingredients that offer essential vitamins and nutrients, such as milk or fruits and vegetables. So, sago cultivation is often the most ecological appropriate form of land-use and the nutritional deficiency of the food can often be compensated for with other readily available foods (Lie, Goan-Hong, 1980).

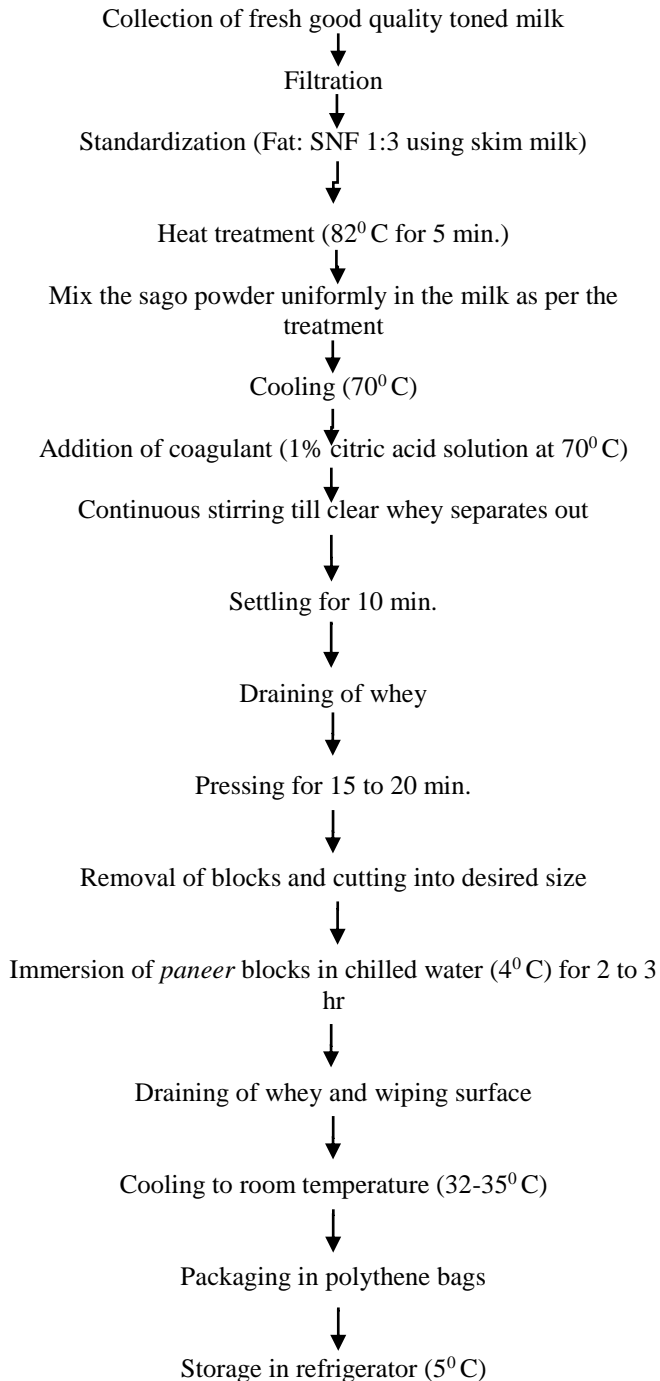
Sago powder is the starch and starch included in the hydrocolloids. Hydrocolloids are the substance which dissolve or disperse in water to give a thickening or gelling effect. The use of hydrocolloids as food modifiers has become an accepted practice in the food industry. The hydrocolloid used in food products provides shape, form, texture and functionality to the product. The hydrocolloids have also been widely used in milk and milk products for improving textural quality and the sensory characteristics of the final product. In coagulated

In coagulated milk product such as *cheese*, *chhana*, *paneer*, hydrocolloids have been used to improve the body and texture of the finished product and to reduce the loss of solids in whey (Bhadekar, 2003).

## Material and Methods

### Preparation of sago paneer:

Following method/procedure was followed during experiment



**Fig 1:** Flow diagram for manufacture of sago *paneer* (Bhadekar, 2003)

### Optimization of stage of addition of sago powder to toned milk

- Adjustment of temperature for preparation of sago *paneer* was selected at 37<sup>o</sup> C, 72<sup>o</sup> C and 87<sup>o</sup> C.
- Sago powder was added in *paneer* on the weight basis of milk.
- A trial was conducted to decide the stage of addition of sago powder.

1. At 37<sup>o</sup> C temperature stage
2. At 72<sup>o</sup> C temperature stage
3. At 87<sup>o</sup> C temperature stage

Optimization of stage and temperature of addition of sago powder in toned milk

### On the basis of test and mouth feel evaluation by the experts

Treatment	37 <sup>o</sup> C	72 <sup>o</sup> C	87 <sup>o</sup> C
T <sub>1</sub>	7.60	9.00	8.50
T <sub>2</sub>	7.20	8.50	8.20
T <sub>3</sub>	6.80	8.40	7.90
T <sub>4</sub>	6.50	8.35	7.30

The values are the average of 4 replication.

### Preparation of sago paneer

The toned milk was heated up to 82<sup>o</sup> C for 5 min and then mixed the sago powder as per treatment level and cooled the milk at 70<sup>o</sup> C and coagulated at this temperature in a steel vat as per Bhadekar (2003). Then complete coagulation the stirring was stopped and the curd allowed settling down for 5 min. The whey was then drained through a stainless steel stainer. The curd was collected and filled in wooden blocks lined with strong and clean muslin cloth. The blocks used was a rectangular wooden blocks (7 x 6 x 4 inches) with holes on its side to facilitate the expulsion of whey. This frame was rested on a wooden blocks, filled with curd and mounted with another plank pressure was applied on the top of the hoop by placing a 35 kg/cm<sup>2</sup> for 15-20 min. The pressed block of curd was removed from the hoop, cut into pieces and immersed in chilled water for 2 to 3 hours. The chilled *paneer* was then removed from water to drain out and stored for cooling to room temperature (37<sup>o</sup> C) and packed in polythene bag and finally storage in refrigerator (5<sup>o</sup> C).

### Treatment details

The *sago* powder was optimized for the preparation of *paneer* from toned milk taking its proportion 2.5, 5.0 and 7.5 per cent as per following treatments combinations.

T<sub>1</sub> - 100 Parts of toned milk

T<sub>2</sub> - 97.50 Parts of toned milk + 2.50 Parts of sago powder

T<sub>3</sub> - 95.00 Parts of toned milk + 5.00 Parts of sago powder

T<sub>4</sub> - 92.50 Parts of toned milk + 7.50 Parts of sago powder

The sago powder so obtained was added in toned milk at the time of heating process.

The different levels were tried and compared with control (T<sub>1</sub>)

### Sensory evaluation

Various treatment combinations of the finished product were subjected to sensory evaluation by panel of judges using 9-point Hedonic scale (Gupta, 1976).

### Statistical method

The data were analyzed statistically by using Completely Randomized Design (CRD) as per Panse and Sukhatme (1985). The significance of the result was evaluated on the basis of critical difference. In all four replication was carried out.

### Result and Discussion

#### Sensory evaluation

Sago *paneer* was evaluated for its colour and appearance, flavour, body and texture, taste by a panel of five judges using a nine-point Hedonic scale. The numerical score given by judges for individual quality attributes were computed to get the mean and these mean wlassiere then subjected to the

statistical analysis. The results obtained for sensory evaluation of sago *paneer* are presented in Table 1.

From above Table 1, it is clear that the average score for colour and appearance was ranged between 6.38 to 8.75 for T<sub>4</sub> and T<sub>1</sub>, respectively. Sago *paneer* prepared under control treatment (T<sub>1</sub>) was found to be superior over the rest of the treatments. Statistically the colour and appearance score for all the treatments were differ significantly with each other. The maximum score was found in T<sub>1</sub> whereas minimum score was recorded in T<sub>4</sub>. It is observed that more levels of sago powder lowered the score of *paneer* for colour and appearance. It indicated that up to 2.5 parts of sago powder did not have any masking effect on the finished product as far as colour and appearance was concerned.

Flavour is the main parameters for liking the product. In the present study though there was a decreasing trend in the flavour score, it could be predicted that the product would be acceptable to consumer with the preference given to the control (T<sub>1</sub>) which had a score of 8.75 followed by (T<sub>2</sub>) with a score of 7.75. Statistically the flavour score for all the treatments were differ significantly with each other. Flavour is the main parameters for liking the product. In the present study though there was a decreasing trend in the flavour score, it could be predicted that the product would be acceptable to consumer with the preference given to the control (T<sub>1</sub>) which had a score of 8.75 followed by (T<sub>2</sub>) with a score of 7.75. Statistically the flavour score for all the treatments were differ significantly with each other.

The taste scores for mouthfeel of sago *paneer* ranged 6.25 to 8.75 for T<sub>4</sub> to T<sub>1</sub>. The sago *paneer* prepared from toned milk (T<sub>1</sub>) had average scores of 8.75 followed by 8.00(T<sub>2</sub>), 7.25(T<sub>3</sub>) and 6.25(T<sub>4</sub>), respectively. The results indicated that the taste scores of T<sub>1</sub> and T<sub>2</sub>, T<sub>2</sub> and T<sub>3</sub> and T<sub>3</sub> and T<sub>4</sub> are differed significantly over each other. It means that the taste of *paneer* added with varied per cent age sago powder was not similar to the control. T<sub>3</sub> and T<sub>4</sub> combinations were not acceptable as compared to T<sub>2</sub>.

#### Overall acceptability of sago *paneer*

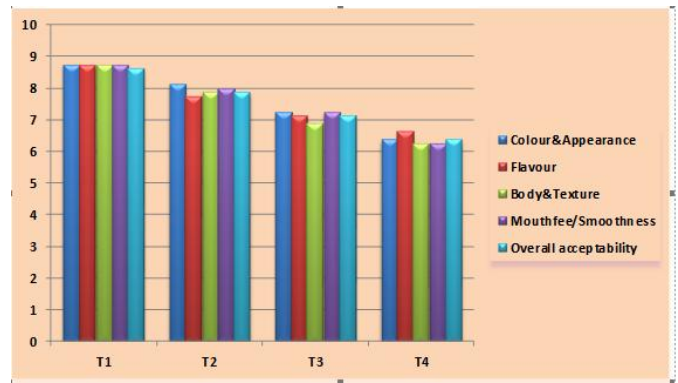
Treatments	Overall acceptability				
	Colour and appearance	Flavour	Body and texture	Mouth feel	Mean
T <sub>1</sub>	8.75	8.75	8.75	8.75	8.63 <sup>a</sup>
T <sub>2</sub>	8.13	7.75	7.88	8.00	7.88 <sup>b</sup>
T <sub>3</sub>	7.25	7.13	6.88	7.25	7.13 <sup>c</sup>
T <sub>4</sub>	6.38	6.63	6.25	6.25	6.38 <sup>d</sup>
SE ± 0.099 CD at 5% 0. 31					

The values with different small letters superscripts row wise differ significantly at 5 per cent level of significance.

From the Table 1 it is clear that the overall average score for the finished product including control ranged in between 6.38 and 8.63 i.e. T<sub>4</sub> to T<sub>1</sub> treatment combinations. The mean scores of overall acceptability showed a decreasing trend with increase in level of sago powder. There was a decrease in the acceptability of the finished product.

There were significant differences between T<sub>1</sub> and T<sub>2</sub>, T<sub>2</sub> and T<sub>3</sub> and T<sub>3</sub> and T<sub>4</sub> combinations.

The overall acceptability score is the average score worked out from the score given by the judges for the different characteristics of the product i.e. colour and appearance, flavour, body and texture and mouth feel. Thus the average score worked out as overall acceptability score is presented in Table 1.



Graphical presentation overall acceptability sago *paneer*

#### Conclusion

It can be concluded that, the addition of sago powder in the preparation of *paneer* @ 2.5 per cent in milk was found to be superior. In addition to this, the sensory attribute scores of sago added *paneer* was decreased for T<sub>2</sub> (7.88), which was found to be lower as compared to control but there is no much difference in sensory quality of *paneer* and provide also, a novelty product. Therefore, the addition of sago powder @ 2.5 per cent in the preparation of seemed to be economical from consumer point of view.

#### Reference

- AOAC. Official Method of Analysis, Association of Official Analytical Chemists, Washington, 4 D.C., 12<sup>th</sup> Edition, 1975, 1975.
- Ahmad FB, Williams PA. Rheological Properties of Sago Starch. Journal of Agricultural and food chemistry. 1998; 46:4060-4065.
- Bhadekar SV. Studies on Preparation of *Paneer* from Buffalo Milk Added with Sago Powder. M.Sc. (Agri.) Thesis Submitted to VNMAU, Parbhani, 2003.
- Goyal S, Goyal GK. Maximizing Shelf Life of *Paneer*- A review. Crit Rev Food Sci. Nutr. 2016; 56(8):1253-61.
- Jawalekar SD, Ingle UM, Waghmare PS, Zanjad PN. Influence of Hydrocolloids on Rheological and Sensory Properties of Cow and Buffalo Milk Yoghurt. Indian J Dairy Sci. 1993; 46(5):217-219.
- Lie Goan-Hong. The Comparative Nutritional Roles of Sago and Cassava in Indonesia. In: Stanton, W.R. and M. Flach, eds., Sago: The Equatorial Swamp as a Natural Resource. The Hague, Boston, London: Martinus Nijhoff, 1980.
- Masud T, Athar IH, Shah MA. Comparative Study on *Paneer* Making from Buffalo and Cow Milk. Pak. j sci. ind. Res. 2002; 31:355.
- Meena G, Tyagi SM, Usha B. Studies on *Soy Paneer*. J Fd. Sci. Technol., India. 1989; 26(4):194-197.
- Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers. ICAR Publication, New Delhi, 1985.
- Zanjad PN, Mathur BN. Storage Behavior of 'in package' Sterilized *Paneer* Sensory Quality and Texture Profile Analysis. Brief Communication of the 23 International Dairy congress, Montera. 1990; 2(10):471.