

Original Research Article

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## Effect of Different Seed Sources on Tamarind Kernel Powder and Seed Gum Yield

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### ABSTRACT

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Tamarind seeds are rich source of polysaccharide which is obtained from tamarind seed kernels. Present study was carried to examine the variation in Tamarind Seed Powder (TSP) yield with respect to different seed sources collected from Tamil Nadu (19), Kerala (3), Karnataka (13) and Andhra Pradesh (5). 100 seed weight were measured and seeds were roasted and Kernel and testa content and gum yield were measured. The maximum 100 seed weight was obtained in Aasan and which also recorded in highest gum yield. The percentage yield was about 50 %. This study showed that the seed source have great influence in gum yield.

### Introduction

Tamarind seed is a by-product of the tamarind pulp industry. Tamarind seed consists of the seed coat or testa (20-30%) and the kernel or endosperm (70-75%) (Coronel, 1991; Shankaracharya, 1998). Tamarind seed is a typical underutilized material (Kumar & Bhattacharya, 2008). Tamarind seed coat contains tannin, this presence of tannins and other dyeing matters in the seed testa make the whole seed unsuitable for consumption, but they become edible after removing seed testa by soaking in water and roasting. Tamarind seed is also used as raw material in the manufacture of polysaccharide (jellose), adhesive and tannin. Seeds and kernels are

high in protein content, while the seed coat is rich in fibre and tannins (anti-nutritional factors). Seeds are gaining importance as an important source of natural polymer and as an alternative source of proteins, and are besides a good source of fatty acids and rich in some essential minerals, such as Ca, P, Mg and K (Caluwe, *et al.*, 2010).

Tamarind kernel powder (TKP) has versatile applications in various industries hence, TKP being manufactured in large quantities. Textile and Jute industries are major consumer of Tamarind kernel Powder due to its good thickening properties uses this

powder as textile thickeners while dyeing industry uses it for textile sizing. Many Other industries such as printing, jute, paper, explosives, plywood, mining, cosmetic, oil drilling, gas, tobacco and others also use tamarind kernel powder in different aspects. The product has various uses.

Consequently, TKP is used in cotton wraps, as soil stabilizer in mining industries and also for manufacturing of paints. Tamarind Kernel powder is rich in carbohydrates as well as protein. It is also used for producing adhesives.

The seeds are varies in variety of sizes and the polysaccharide content of the seeds differs in source wise. Hence, with this backdrop following study has been to taken to know the variation based on seed size and source.

## **Materials and Methods**

The seeds from 44 sources were collected, cleaned, roasted and decorticated separately. The decorticated tamarind kernels were powdered using Pulverizer. The seeds were stored in clean and dried basket and utilized for all future research purposes.

### **100 seed weight**

Determination of 100 seed weight was computed as described by ISTA (1996). The tamarind seeds (100 Nos.) were taken randomly from all sources separately were weighed in top pan balance and recorded in gram (g).

### **Tamarind seed coat to kernel content**

Removal of testa from the seed is a difficult process, the testa was tenaciously held to the endosperms and it should be removed without damage to endosperm. The peeling of testa from the seeds was done by roasting of seeds at 110°C for 5 minutes and decortication

process. The content of seed kernel to testa was estimated using method described by Doucette *et al.*, (2001)

## **Characterisation of tamarind kernel powder**

After the separation of seed coat from seed, the endosperm obtained was subjected for preparation of tamarind kernel powder. The decorticated endosperm was pulverised and tamarind kernel powder was prepared.

### **Cold water soluble TSP preparation**

Weighed 20 g of tamarind Kernel powder and transfer it into 500 ml Beaker and prepared slurry using 250 ml of acetone. The beaker with aluminium foil was closed to avoid evaporation of acetone. This slurry was kept in magnetic stirrer for 12 hours to remove oil and fat contents in Tamarind kernel powder. After 12 hours of stirring filter the slurry using normal filter paper and take the filter paper and remove the filtrate in petri dish and dry it overnight. This filtered powder is free of oil and fat. Weigh 5 g of oil and fat free TKP powder and 100 ml of distilled water. Slurry added into 400 ml boiling water and boiled it for 20 min in 80°C. After boiling, this solution was stirred for 2 hours by using magnetic stirrer. Centrifuge was done to remove the fibre and other residues from this slurry for 60 min at 5000-8000 rpm. The supernatant was extracted, poured into petri dishes and dried using freeze dryer. This method of cold water soluble TKP preparation is suggested by Nandhkishore which is unpublished method.

## **Results and Discussion**

The seeds were roasted at 110°C for 5 minutes and roasted seeds were decorticated using tamarind seed decorticator. The weight of the kernel and testa were recorded in 100 g seeds.

The decorticated seeds without seed coat were pulverized using Tamarind Seed Pulverizer and the yield of Tamarind Kernel Powder in 100g Kernel was estimated. The source wise kernel weight, testa weight and tamarind kernel powder yield data were estimated.

### **100 seed weight**

With respect to 100 seed weight, 40 seed sources varied between 95.9g to 52.41 and Karnataka based seed source Aasan recorded with highest weight (96.89g) followed by TN Arur 162 (95.9g), TN Ariyalur (90.88g).

The minimum 100 seed weight was recorded in TN Kadambur. It is evident from table 1 (100 seed weight) in *Tamarindus indica* was recorded were vary with source.

These findings are in conformity with *Pongamia pinnata* wherein 100 seed weight has been reported in different Agro- Climatic zones of Southern Karnataka (Santhosh, 2007). Variability based on seed sources in 100 seed weight was observed in cluster bean by Mishra *et al.*, 100 seed weight (1.5g -5.3 g).

### **Kernel weight**

The seeds were roasted and seed coat was separated manually to record the seed testa and kernel ratio. The highest kernel weight was recorded in TN Ariyalur (82.13 g) succeed by Gundur (78.18 g) and TN Tuticorin (76.43 g). Even though, Aasan source recorded maximum 100 seed weight the kernel weight of 74.11g was lowest.

Parameshwari and Srimathi (2009) have reported influence of seed source on recovery percentage on Tamarind of different Agro- Climatic zones of Tamil Nadu. Which shows that seed weight and kernel weight is highly influenced by growing area in Tamarind seeds.

### **Testa content**

The testa content is the negative factor for gum yield. The more amount of testa obviously leads to low content of kernel. The testa content was less in Arur (18.42) followed by Gundur.

### **Kernel powder**

The roasted and decorticated seeds were powdered thorough pulverizer and the yield was recorded with respect 100 g kernel to powder. The kernel to powder ratio is depend on the pulverizer and mesh size. Hence, there was no significant difference recorded in 40 seed sources.

### **Oil and fat free TKP**

Totally 40 sources from Tamil Nadu (19), Kerala (3), Karnataka (13) and Andhra Pradesh (5) were subjected to seed powder outturn and gum yield. Previously, the oil and fat free TKP were measured and obtained following results.

The highest oil and fat free TKP (13.91) was recorded in Aasan of Karnataka source which was followed by Uriham (12.94 g), Thenkanikottai (12.77g). This results shows that oil content of tamarind kernel powder is significantly higher.

### **Tamarind Seed Polysaccharide (TSP)**

The polysaccharide content of tamarind kernel powder is the major focus of this study. The Tamarind seed polysaccharide was significantly higher in all sources. It varied from 39 % to 50.36% and Aasan recorded highest Polysaccharide content 50.36% with the value of 2.54 g in 5 g of Tamarind Kernel Powder followed by Gundur (2.39g), Dindigul 2.31 g which is about 48.72 %.

**Table.1** Effect of different seed sources on tamarind kernel powder and seed gum yield

S.No.	Source	100 seed weight	Kernel weight/100 g seeds	Testa weight/100 g seeds	Seed powder in 100 g kernel	Oil and fat free powder / (20g)	Gum yield / 5g
<b>TAMIL NADU SOURCE</b>							
1.	TN TUTICORIN	73.66	76.52	23.31	97.50	12.45 (62.27)	2.27 (41.87)
2.	TN ARIYALUR	90.85	67.19	32.52	94.97	11.18 (55.92)	2.34 (40.80)
3.	TN ARUR 162	95.64	82.33	18.42	94.43	12.65 (63.23)	2.00 (41.00)
4.	TN COIMBATORE	85.81	64.00	32.36	94.46	12.89 (64.47)	2.13 (46.73)
5.	TN DHARMAPURI	78.00	63.26	36.42	98.03	11.17 (55.83)	2.14 (43.13)
6.	TN DINDIGUL	66.81	67.50	72.54	97.48	12.60 (63.02)	2.31 (48.27)
7.	TN KRISHNAGIRI	72.16	65.38	34.45	94.64	10.27 (51.35)	2.08 (42.60)
8.	TN MADURAI	72.40	68.30	31.99	98.05	12.15 (60.77)	2.05 (40.93)
9.	TN PERAMBALUR	86.29	68.42	31.75	98.96	11.61 (58.05)	2.03 (40.60)
10.	TN POLLACHI	77.64	67.25	32.46	97.03	12.52 (62.58)	2.05 (40.93)
11.	TN SALEM	87.20	68.99	31.04	96.06	11.54 (57.68)	2.31 (47.07)
12.	TN THENKANIKOTTAI	71.23	65.44	33.56	98.82	12.42 (62.08)	2.11 (41.87)
13.	TN HASANUR 9	71.61	70.45	29.38	97.78	11.21 (56.07)	2.31 (45.00)
14.	TN ARUR 110	73.77	67.63	33.12	96.25	12.51 (62.57)	2.03 (40.53)
15.	TN GOPICHETTIPALAYAM	59.65	68.24	31.66	95.56	12.49 (62.43)	2.06 (42.13)
16.	TN URIHAM 112	68.67	69.02	30.50	98.04	12.30 (61.48)	1.98 (39.33)
17.	TN VELLORE 29	80.19	70.25	28.34	97.76	12.51 (62.55)	2.25 (44.47)
18.	TN VELLORE	69.74	67.24	32.43	95.03	12.29 (61.45)	2.01 (39.93)
19.	TN KADAMPUR	52.30	70.48	29.17	97.03	12.33 (61.67)	2.30 (45.00)
<b>II KERALA SOURCE</b>							
20.	PATHARI	67.55	67.46	32.34	97.88	12.42 (62.08)	2.26 (43.93)
21.	VELANTHA VALEM	78.34	64.43	35.50	95.34	11.45 (57.25)	2.25 (43.40)
22.	PALAKKAD	74.92	68.28	29.92	95.83	12.29 (61.45)	2.21 (38.47)
<b>III ANDHRA PRADESH SOURCE</b>							

23.	GUNDUR	89.57	78.52	21.34	97.13	11.76 (58.78)	2.39 (48.00)
24.	HOSUR	75.50	65.32	34.12	98.19	10.57 (52.83)	2.09 (41.20)
25.	NELLORE	78.18	65.16	34.38	98.76	11.43 (57.15)	2.27 (45.13)
26.	BANGADUPETTY	76.57	66.59	32.82	94.05	12.32 (61.62)	2.23 (43.73)
27.	TIRUPATHI	69.58	65.38	34.49	97.13	10.91 (54.57)	2.25 (44.53)
IV	<b>KARANATAKA SOURCE</b>						
28.	NOKKANUR	65.38	70.37	29.37	98.35	10.03 (50.13)	1.98 (38.73)
29.	SORRANKARAI	70.37	60.70	38.96	93.18	11.41 (57.05)	2.06 (40.40)
30.	AASAN	60.70	74.33	26.69	96.12	12.33 (61.67)	2.54 (50.60)
31.	ANADAPUR	74.33	64.80	35.66	94.15	13.91 (69.55)	2.34 (47.07)
32.	GUNDELPET	64.80	68.61	31.66	97.13	11.91 (59.53)	2.04 (41.13)
33.	IRRIYUR	68.61	65.58	34.39	97.67	11.38 (56.88)	2.31 (47.33)
34.	KOLLEGAL	65.58	61.45	38.61	96.0	10.54 (52.70)	2.13 (46.20)
35.	THUMKUR	61.45	64.63	34.42	98.05	12.13 (60.67)	2.01 (40.13)
36.	PARAMBIKULAM	64.63	60.35	39.17	96.87	12.56 (62.78)	2.16 (43.47)
37.	CHITRADURGA	60.35	65.31	35.57	95.95	12.67 (63.37)	2.07 (41.13)
38.	UDAYARPALAM	65.31	70.47	29.49	97.67	11.33 (56.65)	2.31 (46.27)
39.	UMLI	70.47	71.36	28.76	97.14	11.63 (58.15)	2.21 (45.00)
40.	HP KOTTAI	71.36	69.09	32.95	95.14	10.71 (53.55)	2.06 (41.07)
	<b>Mean</b>	<b>67.90</b>	<b>67.90</b>	<b>32.90</b>	<b>96.75</b>	<b>11.87</b>	<b>2.13</b>
	<b>SEd</b>	<b>0.2077</b>	<b>0.5336</b>	<b>0.3402</b>		<b>0.2447</b>	<b>0.0698</b>
	<b>CD (0.05)</b>	<b>0.4134</b>	<b>1.0620</b>	<b>0.6771</b>		<b>0.4870</b>	<b>0.1389</b>

The lowest amount of TSP found in Nokkanur (1.98 g) preceded by Thumkur and Vellore (2.01 g). The maximum 100 seed weight was not influenced on kernel weight and seed gum yield which shows that kernel weight and gum yield is not directly related.

Highest percentage of gum yield was obtained from seed sources were mostly dry tracts. It shows that tamarind kernel powder contains

about 50% of starch which is known as polysaccharide. Similarly, wide variation in different biochemical parameters of cluster bean seed endosperm (30.4–46.3 %) and gum content reported in Pathak *et al.*, 2011.

In conclusion owing to the wide demand for Tamarind kernel powder and their value addition, present study shows that seed from different sources possess variation in 100 seed

weight, kernel content and testa content. The seeds from Aasan can be utilized for maximum gum out turn and other sources can utilized for tamarind kernel powder production.

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