

# Acceptability of Sundried *Dal Vadi* Incorporated with Underutilized Green Leafy Vegetables

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**Abstract:** *Dal vadi* is a popular sundried food very famous pan India. The present study was taken up to see the acceptability of *dal vadi* incorporated with underutilized green leafy vegetables bengal gram leaves, drumstick leaves and curry leaves. An experimental research design consists of control samples of green gram *dal vadi* and black gram *dal vadi*. The treatment samples were formulated by incorporating selected underutilized green leafy vegetables at 10% and 20% level. All the control and treatment samples of green gram *dal vadi* and black gram *dal vadi* were evaluated by a panel of judges on the basis of sensory characteristics. The results indicated that the incorporation of bengal gram leaves, drumstick leaves and curry leaves at 10% level to sundried green gram *dal vadi* and black gram *dal vadi* was very well accepted.

**Keywords:** Sun drying, *Dal vadi*, green leafy vegetables, incorporation, acceptability

## 1. Introduction

*Dal vadi* is a famous sundried food preparation also known as *dal badi*, *dal bari*, *badiyan*, *wadiyan*, *mungodi*, *mangodi*, lentil drops or nuggets or dumplings or chunks. Sun drying, a traditional method of food preservation is practiced in most of Indian homes for preserving fruits, vegetables, cereals, pulses, animal foods, etc. Various food products like potato chips, papad, *kurodi*, *vadi* etc are made by sundrying method. India is having abundant sunlight and initial summer temperatures are enough for sun drying and storage for food and food products. Method of sun drying is simple and easy, free of cost, hassle-free, needs no machines or types of equipment and retains most of the nutrients. Though sun drying is a slow process, foods can be preserved with this method as moisture level drops down to such a low level that microorganisms cannot grow. Such foods can be stored safely for years and utilized whenever needed.

For *dal vadi* the pulses used are dehusked split green gram and black gram dal. Different types of dals are also mixed to prepare mix *dal vadi*. Vegetables like spinach and fenugreek leaves are added to have variety. Many cuisines can be prepared with *dal vadi* like spicy curry, boiled and seasoned *vadi*, pulao, vegetable preparations etc.

Pulses are an important part of our diets. They are a good source of proteins and along with cereals, improve the protein quality of the diets. Apart from proteins, pulses provide carbohydrates, fibers, vitamins, and minerals. Pulses add variety to the diets as they can be processed and prepared in many ways. Green leafy vegetables are rich source of carotenes, calcium, iron, vitamin C; a fairly good source of riboflavin, folic acid and many other micronutrients and fiber (Park, 2009).

Various acceptability studies were carried out using green leafy vegetables. Banka et al. (2017) developed iron rich value added products from underutilized leaves which were palatable and recommended to use these food products as a dietary approach to prevent iron deficiency anemia. Seema

and Khatwal (2018) supplemented food product *sev* with dried bengal gram leaves at 10, 15 and 20% level and reported that supplementation of bengal gram leaves to *sev* was highly successful. Kachhawa and Chawla (2017) carried out a study in which drumstick leaves were incorporated in commonly consumed foods and concluded that 30% incorporation of drumstick leaves into selected foods had significantly high nutritional value and were very well accepted. Khatoon et al. (2011) evaluated selected food products added with dehydrated curry leaves and found them suitable and nutritionally better. Arora (2017) prepared fortified bread by adding curry leaves at a 3% level and noted enhanced flavor and taste of the bread. Nambiar and Parnani (2008) organoleptically evaluated pulse based recipes incorporated with fresh drumstick leaves and found them acceptable and rich in micronutrients.

The present study was taken up with the aim to incorporate selected underutilized green leafy vegetables into traditional sundried *dal vadi* for value addition and see their acceptability.

## 2. Materials and Methods

### Ingredients

Two types of basic *dal vadi* were made with green gram (*Vignaradiata*) dal and black gram (*Vigna mungo*) dal. To these fresh and tender bengal gram (*Cicer arietinum*) leaves, drumstick (*Moringaoleifera*) leaves and curry leaves (*Murrayakoenigii*) were incorporated. All the pulses were bought from the local market and the green leafy vegetables selected for the study were taken from the local source.

### Composition and method of preparation

**Table 1:** Composition of control and treatment samples of dal vadi

Samples	Basic ingredient Pulses (g)	Green leafy vegetables for incorporation (g)	Codes
<b>Green gram dal vadi</b>			
Control	Green gram dal (100)	-	GC
Treatment	Green gram dal (90)	Bengal gram leaves (10)	GE1
	Green gram dal (80)	Bengal gram leaves (20)	GE2
	Green gram dal (90)	Drumstick leaves (10)	GE3
	Green gram dal (80)	Drumstick leaves (20)	GE4
	Green gram dal (90)	Curry leaves (10)	GE5
	Green gram dal (80)	Curry leaves (20)	GE6
<b>Black gram dal vadi</b>			
Control	Black gram dal (100)	-	BC
Treatment	Black gram dal (90)	Bengal gram leaves (10)	BE1
	Black gram dal (80)	Bengal gram leaves (20)	BE2
	Black gram dal (90)	Drumstick leaves (10)	BE3
	Black gram dal (80)	Drumstick leaves (20)	BE4
	Black gram dal (90)	Curry leaves (10)	BE5
	Black gram dal (80)	Curry leaves (20)	BE6

The pulses were cleaned, washed and soaked in water for 8 hours and then drained to remove water. A thick paste was obtained by grinding pulses into the grinder without adding water and salt was added for taste. A wide, flat steel plate was smeared with little oil. By taking a handful of wet dal mixture, small round *vadi* were placed on a plate with fingers. The plate was then kept in the sunlight to dry the *vadi*. For experimental samples, selected green leafy vegetables were added after cleaning and thorough washing. Only curry leaves were roughly chopped before adding to the pulse mixture for *vadi*.

**Sensory evaluation**

For sensory evaluation, all the samples of sundried *dal vadi* were first boiled in water for 20 min at simmering temperature, drained and then served with water to a panel of 10 judges along with the score card which had desired parameters for assessment of the sensory characteristics of the *dal vadi* i.e., appearance, taste, texture, flavor, and overall acceptability. A maximum score of 10 was assigned to the highly desirable parameter and a minimum score of 4 for the least desirable parameter of sensory characteristics. Scores obtained for three consecutive trials were averaged. Mean was calculated for each sensory characteristic and t-test was used to determine any significant difference between the control and treatment samples.

**3. Results and Discussion**

**Table 2:** Mean scores of sensory evaluation and t value

Samples	Appearance	Taste	Texture	Flavor	Overall Acceptability	t-test value #
<b>Green gram dal vadi</b>						
GC	9.55	9.0	9.1	9.5	9.05	-
GE1	9.15	8.95	8.92	8.64	8.9	2.26
GE2	7.74	7.20	8.25	7.18	7.22	7.20*
GE3	8.52	9.0	8.33	8.66	9.0	2.51
GE4	7.66	7.29	8.12	7.63	7.39	9.73*
GE5	9.3	9.15	8.46	9.65	9.16	0.61
GE6	8.10	7.99	8.29	8.39	8.12	9.76*
<b>Black gram dal vadi</b>						
BC	9.4	8.65	9.1	8.2	8.71	-
BE1	8.0	8.15	8.65	8.88	8.2	1.31
BE2	7.86	7.33	8.89	7.22	7.13	4.56*

BE3	8.12	8.45	8.25	8.12	8.46	1.93
BE4	7.66	7.1	8.0	7.13	7.10	10.63*
BE5	8.39	8.99	8.53	8.95	8.55	0.41
BE6	7.93	7.86	8.55	8.12	7.93	3.11*

# Values for comparison between control and each treatment sample

\*Significantly different at 0.05 level of significance

It was observed from the table 2 that among all the samples of green gram *dal vadi*, for the sensory characteristics appearance and texture, sample GC got the highest mean scores 9.55 and 9.1 respectively and the sample GE4 received the lowest mean scores 7.74 and 8.12 respectively. Sample GE5 received maximum mean scores respectively 9.15, 9.65 and 9.1 and the sample GE2 received minimum mean scores respectively 7.20, 7.18 and 7.22 for taste, flavor and overall acceptability.

Among the control and treatment samples of black gram *dal vadi* the sample BC had the highest mean score of 9.4 for appearance, 9.1 for texture and 8.71 for overall acceptability whereas the sample BE5 had the highest mean score 8.99 and 8.95 for taste and flavor respectively. It was observed that the sample BE4 received lowest mean scores for all the sensory characteristics evaluated among all the samples of black gram *dal vadi*.

It was observed from table 2 that treatment samples of 10% incorporation of curry leaves received better mean scores for all the sensory characteristics than bengal gram leaves and drumstick leaves incorporated samples in both green gram and black gram *dal vadi*. It enhanced taste and had pleasant flavor which masked the beany flavor of the *dal vadi*.

All the treatment samples were compared with the respective control samples to see any significant difference. The calculated t-test value showed the insignificant difference between GC vs. GE1, GE3, GE5 and BC vs. BE1, BE3, BE5. These samples were very accepted in comparison with control. However, a significant difference was found between GC vs. GE2, GE4, GE6 and BC vs. BE2, BE4, BE6 which indicated that these samples were not acceptable.

The results indicated that the incorporation of green leafy vegetable bengal gram leaves, drumstick leaves and curry leaves into dal vadi at 10% level was well accepted but at 20% level of incorporation they were not acceptable.

The nutritive value was calculated for control and accepted treatment samples of *dal vadi* which showed increase in the values of calcium, iron, folic acid, vitamin c, and beta carotene in all the treatment samples. Regarding cost, it was noted that underutilized green leafy vegetables selected for the study were available at very cheaper prices hence didn't increase the cost when compared to control samples.

**4. Conclusion**

Incorporation of bengal gram leaves, drumstick leaves, and curry leaves at 10% level to make sundried green gram *dal vadi* and black gram *dal vadi* was highly acceptable. An Increase in nutritional aspects was noted and the preparations were cost-effective. Intake of these

underutilized green leafy vegetables could be encouraged through different recipes prepared using developed *dal vadi*. To tackle the problem of nutritional deficiencies among the population of different age groups, these incorporated *dal vadi* can be used therapeutically. In rural areas, these green leafy vegetables are available free of cost so they can be used for nutritional advantage.

## References

- [1] Banka R., Sharma B., Sharma S. and Goyal A., Development of Iron Rich Value Added Products from Underutilized Leaves: A Dietary Approach to Prevent Iron Deficiency Anemia, International Journal of Pure and Applied Biosciences, 5 (3): 415-420 (2017) doi: <http://dx.doi.org/10.18782/2320-7051.5112>
- [2] Arora Harshika, Attempting The Development of A Fortified Bread- By Incorporation Of Curry Leaves And Analysing Its Impact On The Nutritional And Sensory Quality, International Journal of Research in Medical Sciences and Technology, 2017, Vol. No. 4, Issue 1, Jul-Dec, 12-21  
URL [http://www.ijrmst.com/images/short\\_pdf/1515490822\\_Harshika\\_Arora\\_2.pdf](http://www.ijrmst.com/images/short_pdf/1515490822_Harshika_Arora_2.pdf)
- [3] Kachhawa K. and Chawla P., Improvement in nutritional quality of commonly consumed products with supplementation of drumstick leaves (*Moringa oleifera* L.), International Journal of Home Science 2017; 3(2): 478-485 retrieved from <http://www.homesciencejournal.com/archives/2017/vol3issue2/PartH/3-1-84-972.pdf>
- [4] Khatoon J., Verma A., Chacko N. and Sheikh S., Utilization of dehydrated curry leaves in different food products, Indian Journal of Natural Products and Resources, 2(4) 2011, pp. 508-511, URL <https://pdfs.semanticscholar.org/7a1c/a6f7d445d65229134904bd4a757d2870209a.pdf>
- [5] Park, K. 2009, Parks's Textbook of Preventive and Social Medicine, 20th Edition, M/S Banarsidas Bhanot Publishers, Jabalpur, 544.
- [6] Seema and Rajesh Khatwal, Supplementation of food products by dehydrated leaves of desi and kabuli varieties of chickpea: A recent way to ameliorate the nutritional deficiency in India, 5<sup>th</sup> International Conference on Recent Advances in Engineering and Management, 2018, retrieved from <http://data.conferenceworld.in/3FEBYMCAICRAESM/45.pdf>
- [7] Vanisha S. Nambiar and Shilpa Parnami Standardization and Organoleptic Evaluation of Drumstick (*Moringa oleifera*) Leaves Incorporated Into Traditional Indian Recipes Standardization Recipes, Trees for Life Journal 2008, 3:2, 1-7 Retrieved from <http://www.tfljournal.org/article.php/200804071334376>  
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