

# Physico-Chemical Qualities of Tomato Fruits as Influenced By Pranic Treatment - an Ancient Technique for Enhanced Crop Development

Srikanth N. Jois<sup>1\*</sup>, Kaunain Roohie<sup>2</sup>, Lancy D'Souza<sup>3</sup>, Florence Suma<sup>4</sup>, C. S. Devaki<sup>4</sup>, Asna Urooj<sup>4</sup>, Rainer Krell<sup>5</sup> and K. Nagendra Prasad<sup>1</sup>

<sup>1</sup>World Pranic Healing Foundation, Research Centre, 44, 4th Main 1st Cross Rd, Saraswathipuram, Mysuru - 570009, Karnataka, India; srikanth@pranichealing.co.in, knag76@gmail.com

<sup>2</sup>Department of Biotechnology, University of Mysore, Mysuru - 570006, Karnataka, India; rooh.raheem@gmail.com

<sup>3</sup>Maharaja's College, University of Mysore, Mysuru - 570006, Karnataka, India; lancyd@ymail.com

<sup>4</sup>Department of Food Science and Nutrition, University of Mysore, Mysuru - 570006, Karnataka, India; florencesuma71@gmail.com, devaki.s.kiran@gmail.com, asnau321@gmail.com

<sup>5</sup>Food and Agriculture Organization, Rome, Italy; rainer.krell@fao.org

## Abstract

**Objectives:** The aim of the present study was to understand the agronomic impact of pranic agriculture on tomato.

**Methods:** Assessment of pranic treated tomatoes against the control group were done for their quality and quantity by measuring the overall yield, plant height, diameter of the stem, flowers, flowers per truss and also shelf life of tomatoes.

**Findings:** Increase in height of 18.5% was noticed in pranic group plants as compared to control group. Also, pranic group plants had 12% more stem diameter than control group. Additionally, pranic group plants had 31.7% more flowers per plant when compared to control. When group-wise yield was verified, Pranic group yielded significantly with 31% more than control group. In addition, pranic treatment played a very useful role in controlling the fruit weight loss, shrinkage, titrable acidity and total soluble solids content of tomatoes during storage at room and refrigerated temperatures.

**Applications:** Pranic agriculture impacted the quality, quantity and shelf life aspects of tomatoes, when compared to control.

**Keywords:** Pranic Agriculture, Titrable Acidity, Total Soluble Solids, Tomato, Yield

## 1. Introduction

Pranic treatment is an ancient science which utilizes *prana* or life energy to heal ailments in the body. Prana or ki is that essential energy which keeps the body alive and in healthy conditions<sup>1</sup>. Prana is also called bioplasmic energy. The word bio-plasmic comes from bio which means life and plasma which means the fourth state of matter. Plasma can be defined as ionized gas having both positive and negatively charged particles. The three major source of prana is sun prana, air prana, ground prana<sup>1</sup>. Water absorbs prana from sunlight, air and the ground. Plants and trees absorb prana from the sun, air, water and

ground. People and animal obtain prana from sunlight, air, water, ground and food. Prana can also be projected to another person for healing. With the aid of Kirlian photography, researchers have been able to take pictures, observe and study pictures of Prana or small bioplasmic articles like bioplasmic leaves<sup>2</sup>.

According to Master<sup>1</sup>, founder of pranic healing, we can feel or scan the aura and use this to diagnose problem areas. Once we are able to interact with this energy we can use it for many things, we can heal and send energy to people, places, since energy is everywhere. Pranic healing can be applied on depression, anxiety disorders, in improving general immunity of the body, in treating

\* Author for correspondence

headache, stomach ache, arthritis, asthma, in healing birthing process among others<sup>1,3</sup>. It is getting increasing scientific attention in biology, physics, health and agriculture. The application of Pranic healing technique in agriculture is not a substitute, rather complimentary in nature. It increases the agriculture yield, improves nutritional quality and shelf-life. Pranic treated cucumber storage keeping qualities increased significantly, compared to control. In addition, antioxidant and polyphenol content were also higher of pranic treated cucumber<sup>4</sup>. Germination and seedling vigour test also improved significantly in pranic treated green gram seeds, when compared to control<sup>5</sup>.

Tomato (*Lycopersicon esculentum*) belongs to *Solanaceae* family. Among tomato production, India ranks second after China. The plants typically grows up to 3–10 ft in height and have a weak stem that often takes support of other plants or ground. Cultivated tomatoes vary in size, ranging from toberberries, about 5 mm in diameter, up to beef steak tomatoes which is 10 cm in diameter<sup>6</sup>. It is a wholesome fruit rich in vitamin A, vitamin C, potassium and folic acid. It is also rich in protein and fiber and also has protective properties owing to the occurrence of lycopenes<sup>7</sup>. Some studies have indicated that lycopene present in tomatoes help in preventing cancer. There has been some research interest in lycopene in tomatoes might help in managing human neurodegenerative diseases<sup>8</sup>. The lycopene from tomatoes relieve the oxidative stress of people who already have diabetes<sup>9</sup>. The present study compares the impact of Pranic healing on the physico-chemical quality of tomatoes determined by measuring, storage characteristics of tomatoes at two storage temperatures, as well as the quality, quantity, yield, growth of pranic healed tomatoes against control group.

## 2. Materials and Methods

### 2.1 Materials

Variety of Tomatoes-SHIVAM FI, Hybrid, HY veg-rasi seeds were procured from the market. The tomato seeds, land and seedlings were given pranic treatment 10 to 20 minutes totalling to 270 minutes for the whole study, while the remaining seeds which did not receive any Pranic treatment were referred to as control. The tomatoes were subjected to conventional agriculture practice. Assessment of tomatoes were done for their

quality and quantity by measuring the overall yield, plant height, diameter of stem, flowers, flowers per truss and also shelf life of tomatoes.

### 2.2 Physical Parameters

The Plant height was measured using scale, the diameter of the stem was measured using vernier calipers. Overall yield was measured using weighing scale.

### 2.3 Storage Studies

Tomatoes were stored at two different temperatures; Refrigerated condition (4°C) and Room temperature (26°C) for a period of 15 days. The physiochemical observations such as physiological loss in weight, titrable acidity, total soluble solids and visual and textural characteristics such as firmness, colour, decay, gloss and shrivelling were recorded.

#### 2.3.1 Physiological Loss in Weight (PLW)

For determining the physiological loss in weight, weight of tomatoes were taken during day 0 (initial weight) and day 15 (final weight). The loss in weight was recorded at 2 days interval for a period of 15 days. The physiological loss in weight (PLW) was calculated using the following formula and expressed as percentage<sup>7</sup>.

$$PLW(\%) = \frac{\text{Initial weight} - \text{weight on the day observation}}{\text{Initial weight}} \times 100$$

#### 2.3.2 Total Soluble Solids (TSS)

Total soluble solids were measured using hand refractometer. A small amount of juice was used to record the TSS values and results were expressed as °brix.

#### 2.3.3 Titratable Acidity

Titrate acidity was determined as follows: A known volume of filtered tomato juice was diluted with a known volume of distilled water. An aliquot was taken from this sample and titrated against alkaline 0.1 N NaOH with phenolphthalein used as indicator. Light pink colour appearance was marked as the end point and the results are expressed as percent citric acid<sup>10</sup>.

$$\% \text{ acid} = \frac{\text{Titre value} \times \text{Normality} \times \text{M.eqWt. of acid} \times 100}{\text{Volume of sample}}$$

$$\text{Milli-equivalent weight of Oxalic acid} = 0.063$$

### 2.3.4 Observations

Physiochemical observations like firmness, color, decay, gloss and shriveling of tomato fruits as specified by<sup>10</sup> were recorded on 0, 2, 4, 6, 9, 11, 13, 15 days of storage.

### 2.4 Statistical Analysis

The data collected have been analysed under repeated measure Chi Square test, contingency coefficient analysis and the results obtained have been tabulated and interpreted using Microsoft Excel and SPSS software.

## 3. Results and Discussion

### 3.1 Effect of Pranic Healing on Physical Parameters

#### 3.1.1 Effect of Pranic Healing on Height of Tomatoes

As far as the height of the tomato plants was considered (Table 1), repeated measure ANOVA revealed a significant

difference from visit 1 to 9 ( $F=3432.659$ ;  $p<.001$ ). Further, when group-wise height was verified, pranic healing group obtained a height of 114.2 cm compared to control group which had a height of only 92.9 cm on visit nine. It was clear that plants which were treated with Pranic energy had significantly more height than control group.

#### 3.1.2 Effect of Pranic Healing on Diameter of Stem

Repeated measure ANOVA discovered a significant difference from visit 1 to 9, where ( $F=1382.006$ ;  $p<.001$ ), pranic healing group stem had a diameter of 16.0 mm and control group had 14.0 mm on visit nine (Table 2). It was clear that plants which have treated with pranic energy had significantly more stem diameter than control group.

#### 3.1.3 Effect of Pranic Healing on Number of Flowers and Flowers per Truss

Using repeated measure ANOVA revealed a significant difference from visit 2 to 9 (Table 3) ( $F=406.643$ ;  $p<.001$ ). Further, when group-wise flowers was verified, pranic

**Table 1.** Mean scores of tomato plant Height in Pranic and Control Groups

Height (Cm)		Visit no.								
Groups	Visit	1	2	3	4	5	6	7	8	9
Pranic	Mean	29.925	43.070	58.405	67.575	85.805	96.160	105.685	111.040	114.245
	SD	4.167	4.804	37.202	6.145	7.367	7.674	6.780	6.250	6.486
Control	Mean	26.085	34.040	42.755	52.045	64.915	79.055	89.455	91.975	92.950
	SD	6.073	6.118	6.253	6.197	6.455	6.785	7.340	7.734	7.977

F (overall increase) :  $F= 3432.659$  ;  $p<.001$   
F (overall increase x Groups) :  $F=34.162$  ;  $p<.001$

**Table 2.** Mean scores of Stem Diameter of Tomato plant in Pranic and Control Groups

Diameter (mm)		Visit no.								
Groups	Visit	1	2	3	4	5	6	7	8	9
Pranic	Mean	8.946	10.697	12.558	14.339	15.570	15.315	15.045	16.085	16.070
	SD	0.864	0.952	1.366	1.330	1.339	1.278	1.327	1.259	1.234
Control	Mean	8.444	9.553	11.091	12.138	12.645	14.040	13.825	14.100	14.025
	SD	0.676	1.046	1.358	1.936	1.677	1.759	1.720	1.889	1.874

F (overall increase) :  $F= 1382.006$  ;  $p<.001$   
F (overall increase x Groups) :  $F= 33.264$  ;  $p<.001$

**Table 3.** Mean scores of flowers in tomato plant in Pranic and Control Groups

Flowers/ plant		Visit no.								
Groups	Visit	2	3	4	5	6	7	8	9	
Pranic	Mean	1.710	3.640	8.070	20.205	24.490	21.670	16.825	10.145	
	SD	1.082	1.975	4.849	7.078	6.689	6.874	6.812	6.042	
Control	Mean	0.495	10.075	10.495	10.505	10.005	10.410	10.505	10.360	
	SD	0.680	8.757	9.662	9.000	8.899	9.068	9.085	9.169	

F (overall increase)  $F= 406.643$  ;  $p<.001$   
F (overall increase x Groups)  $F= 183.014$  ;  $p<.001$

healing group plants had 24.4 flowers per truss on visit six and control group had 10.0 flowers per truss. It was clear that plants which were treated with pranic energy had significantly more flowers per plant than control group.

### 3.1.4 Effect of Pranic Healing on Flowers per Truss

A significant difference from visit 3 to 9 (Table 4) ( $F=306.039$ ;  $p<.001$ ) was observed using repeated measure ANOVA. Further, when group-wise flowers was verified, pranic healing group plants had 3.8 flowers per truss on visit five and control group had 1.7 flowers per truss. It was clear that plants which were treated with pranic energy had significantly more flowers per truss than control group.

### 3.1.5 Effect of Pranic Healing on Overall Yield

As far as the yield is considered (Table 5), repeated measure ANOVA revealed a significant difference from visit 10 to 18 ( $F= 61.925$ ;  $p<.001$ ). Further, when group-wise yield was verified, pranic healing group obtained a yield of 117.07 kgs compared to control group which yielded only 80.58 kg. It is clear that plants which have treated with pranic energy yielded significantly more with

an increase of 31.1% as compared to control group.

## 3.2 Effect of Pranic Healing on Shelf Life of Tomatoes

### 3.2.1 Physiological Loss in Weight (PLW) (%)

Weight loss of fresh tomatoes is mainly due to respiration and transpiration process. During transpiration water is lost due to differences in vapour pressure of water present in the atmosphere and the transpiring surface. During respiration weight reduction is noticed because a carbon atom is lost each time a carbon-dioxide molecule is formed from an absorbed oxygen molecule and evolved into atmosphere<sup>11,12</sup>. The data on physiological loss in weight as influenced by treatment and the storage conditions are presented in Table 6 which indicated significant differences among treatment and storage conditions. It was observed in general, that the PLW was lower under refrigerated storage compared to those stored at room temperature. Loss of weight in pranic treated samples was lesser when compared with the control samples. Refrigerated stored tomatoes had a lower loss in weight since temperature effects on vapour pressure difference

**Table 4.** Mean scores of tomato plant Flower per Truss in Pranic and Control Groups

Groups	Visit	Visit no.						
		3	4	5	6	7	8	9
Pranic	Mean	1.990	2.200	3.875	3.295	3.430	2.990	1.945
	SD	0.845	0.750	1.007	0.867	0.938	0.862	0.925
Control	Mean	1.085	1.915	1.705	3.125	3.020	2.955	0.880
	SD	0.707	0.769	1.314	0.956	0.879	1.048	1.054
F (overall increase) $F= 306.039$ ; $p<.001$								
F (overall increase x Groups) $F= 69.833$ ; $p<.001$								

**Table 5.** Mean scores of overall yield per row in tomato plant in Pranic and Control Groups

Groups	Visit	Overall Yield in Kg									Total
		10	11	12	13	14	15	16	17	18	
Pranic	Mean	1.1286	2.0875	10.1042	24.1667	22.6667	29.375	12.5	10.6667	4.375	117.07
	SD	.49316	.55507	2.46708	3.31881	2.8233	5.34719	3.59952	3.45992	1.13492	
Control	Mean	1.3987	2.0396	14.0208	21.9167	18.1667	11.875	6.2500	4.9167	.0000	80.584
	SD	.67586	.70572	2.35205	3.64652	4.87823	3.67497	2.41823	.97431	.0000	
F (overall increase) $F= 505.671$ ; $p<.001$											
F (overall increase x Groups) $F= 61.925$ $p<.001$											

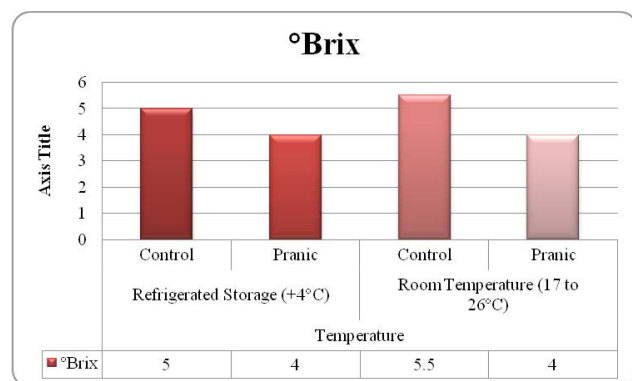
and improved water retention.

**Table 6.** Physiological loss in weight of tomatoes at different storage temperatures

Days	Physiological loss in weight of tomatoes			
	Refrigerated Storage (4°C)		Room Temperature (26°C)	
	Control	Pranic	Control	Pranic
0	0	0	0	0
2	0	0	0.9	0.7
4	3.7	3.6	1.6	1.9
6	3.7	3.6	2.7	3.2
9	3.7	3.6	4.5	4.5
11	3.7	3.6	5.5	5.1
13	4.2	3.9	6.9	6.1
15	5.6	4.3	9.1	6.7

### 3.2.2 Total Soluble Solids (°Brix)

The total soluble solids (TSS) of control and pranic treated samples are presented in Figure 1. The control samples had higher total solids control to pranic treated.



**Figure 1.** Total Soluble Solids of Tomato Samples.

### 3.2.3 Titratable Acidity

Acidity is an important factor in determining the fruit maturity. Titratable acidity gives the total acidity of any particular sample. It is a measure of all total acids and sum of all volatile and fixed acids<sup>13</sup>. Pranic treated tomatoes had lowest titratable acidity (Table 7) at both the temperatures when compared to control. The titratable acidity of the tomatoes differed significantly during the storage period. A steady decline in the titratable acidity was noticed by the end of storage period and the decrease was due to the

changes in organic acids during ripening.

**Table 7.** Titratable Acidity of tomatoes expressed as Oxalic acid (%) of samples

Storage conditions	Control	Pranic
Refrigerated Storage (4°C)	0.59	0.50
Room Temperature (26°C)	0.54	0.42

### 3.2.4 Effect of Pranic Healing on Physical Parameters Related to Shelf-Life

The data on physical characteristics (firmness, decay, colour, gloss, shrivel) are presented in Table 8. For these characteristics no significant differences between the two samples of tomatoes were noticed. Shriveling is one of the sign of deterioration, degrading the quality and reducing the quantity. Shrivel occurred in both the samples stored at ambient temperatures. Pranic treated samples showed less shrinkage as compared to control sample. The most important factor after external appearance in tomato quality is firmness which is closely associated during ripening stage. Tomatoes softened progressively during storage temperature and time. Firmness decreased during storage period. The greater amount of growth, in terms of its height and diameter and number of flowers per truss can be attributed to the fact that external pranic healing can alter the molecular structure, change DNA nucleotide polymerization, protein crystallization and enzyme activity<sup>14</sup>. The improved shelf life of tomatoes can also be attributed to the above observations.

**Table 8.** Physical parameters of control and pranic tomatoes at extended storage

Character-istics	Treat-ment	Days of storage							
		0	2	4	6	9	11	13	15
Firmness	Control	5	5	5	5	5	4	4	4
	Pranic	5	5	5	4	4	4	3	3
Decay (Black spots)	Control	5	5	5	5	5	5	4	4
	Pranic	5	5	5	4	4	3	3	3
Colour	Control	5	5	5	5	5	4	4	4
	Pranic	5	5	5	5	5	4	4	4
Gloss	Control	5	5	5	5	5	4	4	4
	Pranic	5	5	5	5	4	4	4	4
Shrivel	Control	5	5	5	4	4	4	3	3
	Pranic	5	5	5	5	4	4	4	4

Score: 5- Very good; 4- Good; 3-Satisfactory; 2-Poor; 1-Very Poor

## 4. Conclusions

Pranic Group plants had an overall increase in height, flowers and yield of tomato than the control group. Pranic Treatment played a very effective role in controlling the weight loss, shrinkage percentage and other compositional changes such as acidity, total soluble solids content of tomatoes stored at both room and refrigerated temperature. It was concluded that pranic agriculture impacted the quality, quantity and shelf life aspects of tomatoes.

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