

Original Research Article

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**Shelf-life of *Passiflora ligularis* A. Juss, *Passiflora quadrangularis* L.,  
*Passiflora edulis* Sim and *Passiflora edulis* f. *flavicarpa* at Ambient Room  
Temperature Found in North East Region of India**

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Under the study during 2018/19 in which *Passiflora edulis* f. *flavicarpa* Deg, *Passiflora edulis* Sim, *Passiflora ligularis* A. Juss and *Passiflora quadrangularis* L. were collected from Arunachal Pradesh, Assam, Manipur, Nagaland, Mizoram, Sikkim and Tripura for shelf-life evaluation at ambient room temperature among which these two species (*Passiflora ligularis* A. Juss and *Passiflora quadrangularis* L.) are rare species and collected first time for analysis from this region. Maximum shelf-life at ambient room temperature was recorded 27.33 days for *Passiflora quadrangularis* L. (P14) whereas least days were recorded for *P. edulis* f. *flavicarpa* Deg (P13) at ambient room temperature. Shelf-life of fruit is directly correlated with the qualitative characters so that this study have certain importance with respective to selection of superior genotypes of passion fruit for North East Region of India.

**Introduction**

Passion fruit have potential to enrich the tribal community of NE Region of India which is lies between coordinate 25<sup>o</sup>57' N, 93<sup>o</sup>24' E with specific soil and climatic conditions which suitable for growth and development of certain *Passiflora* species. Commercially grown passion fruits are yellow type (*Passiflora edulis* f. *flavicarpa*) and purple type (*Passiflora edulis* Sim) which is

originated in Brazil and regarded as capital of passion fruit (Ferreira, 1994).

During 18<sup>th</sup> century passion fruit was introduce in south India and spread to other parts. Shelf-life plays an important role for biochemical activities to maintain the organic acids in specific condition.

The *Passiflora* term is originated from Latin word "Passio" which means "Passion of

Christ" (Kinghorn, 2001; Dhawan *et al.*, 2004). Family Passifloraceae comprises 16 genera with 700 species or more (Feuillet, 2004) and about 520 species of genera *Passiflora* and the majority of which are distributed to Neotropics and Africa (Ulmer and MacDougal, 2004) with diploid chromosome number as  $2n = 18$  (Ferreira, 1994).

The existence of certain *Passiflora* species in North East Region of India and their introduction is unknown. Report of Giant granadilla and sweet granadilla found wild in hilly areas which indicates its natural existence in North east Region of India. Under this study shelf-life of different species at ambient room temperature has studied.

The biochemical parameters of fruit crops are directly related to the shelf-life of the fruits. Maximum shelf-life of the fruit have long durability in the term of storage as well as qualitative characters (Charan *et al.*, 2017). Storage of yellow and purple passion fruit at ambient room temperature or under natural condition is superior to modified atmospheric packaging (Maniwarra *et al.*, 2015).

Under this study we reported two rare species *i.e.*, *Passiflora ligularis* A. Juss and *Passiflora quadrangularis* L. which is not reported from India till date with complete information regarding natural storage conditions are summarized.

### **Materials and Methods**

Twenty fruits from each replication *Passiflora edulis* f. *flavicarpa* Deg (yellow type), *Passiflora edulis* Sim (purple type), *Passiflora ligularis* A. Juss (sweet granadilla) and *Passiflora quadrangularis* L. (giant granadilla) were kept at ambient room temperature to evaluate the shelf-life.

### **Experimental site and materials**

The experimental material for the present study comprised of six genotypes of *P. edulis* f. *flavicarpa* Deg, six of *Passiflora edulis* Sim, two of *Passiflora ligularis* A. Juss and one of *Passiflora quadrangularis* L of passion fruit in which collection and survey was achieved from the North-East Hill Regions of India *viz.* Arunachal Pradesh, Mizoram, Manipur, Nagaland, Tripura, Sikkim and Assam as wide variability specifically exists all through these particular areas. The detail sources of collection of the collected *Passiflora* species along with their geographical locations are given in Table 1.

### **Experimental methods**

#### **Survey, selection and identification of superior genotypes with maximum shelf-life**

Survey work was carried out in the seven states of North East Region of India *viz.* Arunachal Pradesh, Assam, Manipur, Nagaland, Mizoram, Sikkim and Tripura.

#### **Collection of ripened fruits for shelf-life evaluation**

Mature, fully mature and ripe fruits are observed visually at the site and collected for the evaluation.

### **Results and Discussion**

Significant result was obtained in all the species in contest with shelf-life parameter at ambient room temperature. Maximum shelf-life at ambient room temperature was recorded for genotype P14 (27.33 days) followed by P4 (14 days) and P12 (12 days) whereas least shelf-life was recorded in P13 (6 days) followed by P6 (6.33 days) and P1 (7 days) (Table 4.12).

**Table.1** List of *Passiflora edulis* f. *flavicarpa* Deg, *Passiflora edulis* Sim, *Passiflora ligularis* A. juss and *Passiflora quadrangularis* L. species, code, sources, latitude, longitude and altitude for shelf-life evaluation at ambient room temperature

Sl. No	Species	code	Sources	Latitude	Longitude	Altitude
1.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>1</sub>	Andro, Manipur	24 <sup>0</sup> 73' N	94 <sup>0</sup> 04' E	815 m
2.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>2</sub>	West Imphal, Manipur	24 <sup>0</sup> 47' N	93 <sup>0</sup> 58' E	906 m
3.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>6</sub>	Sutamura, west Tripura, Tripura	23 <sup>0</sup> 62' N	91 <sup>0</sup> 26' N	20 m
4	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>15</sub>	College of Agriculture, Biswanath Cherali, Assam	26 <sup>0</sup> 43' N	93 <sup>0</sup> 08' N	82 m
5.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>7</sub>	Notun Basti, Dimapur, Nagaland	25 <sup>0</sup> 55' N	93 <sup>0</sup> 43' N	154 m
6.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>13</sub>	CHF, Pasighat, Arunachal Pradesh	28 <sup>0</sup> 04' N	95 <sup>0</sup> 19' N	162 m
7.	<i>Passiflora edulis</i> Sim	P <sub>3</sub>	Kangpokpi, Manipur	24 <sup>0</sup> 42' N	93 <sup>0</sup> 46' E	1510 m
8.	<i>Passiflora edulis</i> Sim	P <sub>5</sub>	ICAR-NOFRI, East Sikkim	27 <sup>0</sup> 17' N	88 <sup>0</sup> 36' N	882 m
9.	<i>Passiflora edulis</i> Sim	P <sub>9</sub>	Aizawl, Mizoram	23 <sup>0</sup> 43' N	92 <sup>0</sup> 44' N	786 m
10.	<i>Passiflora edulis</i> Sim	P <sub>10</sub>	CHF, Campus, Pasighat, Arunachal Pradesh	28 <sup>0</sup> 04' N	95 <sup>0</sup> 19' N	168 m
11.	<i>Passiflora edulis</i> Sim	P <sub>11</sub>	Ziro, Lower Subansiri, Arunachal Pradesh	27 <sup>0</sup> 32' N	93 <sup>0</sup> 48' N	1566 m
12.	<i>Passiflora edulis</i> Sim	P <sub>12</sub>	Pasighat, Arunachal Pradesh	28 <sup>0</sup> 03' N	95 <sup>0</sup> 20' N	154 m
13.	<i>Passiflora ligularis</i> A. Juss	P <sub>4</sub>	Lunghar Village, Ukhrul, Manipur	25 <sup>0</sup> 16' N	94 <sup>0</sup> 42' E	1633 m
14.	<i>Passiflora ligularis</i> A. Juss	P <sub>8</sub>	Sakhabama, Kohima, Nagaland	25 <sup>0</sup> 39' N	94 <sup>0</sup> 11' N	1077 m
15.	<i>Passiflora quadrangularis</i> L.	P <sub>14</sub>	Pasighat, Arunachal Pradesh	28 <sup>0</sup> 03' N	95 <sup>0</sup> 20' N	156 m

**Table.2** Maximum days for storing the ripe fruit at ambient room temperature of different species with their code

Sl. No	Species	Code	Maximum days (Ambient room tem.)
1.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>1</sub>	9.33
2.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>2</sub>	8.20
3.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>6</sub>	6.30
4	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>15</sub>	7.00
5.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>7</sub>	11.67
6.	<i>P. edulis</i> f. <i>flavicarpa</i> Deg	P <sub>13</sub>	6.00
7.	<i>Passiflora edulis</i> Sim	P <sub>3</sub>	10.33
8.	<i>Passiflora edulis</i> Sim	P <sub>5</sub>	10.00
9.	<i>Passiflora edulis</i> Sim	P <sub>9</sub>	12.00
10.	<i>Passiflora edulis</i> Sim	P <sub>10</sub>	9.30
11.	<i>Passiflora edulis</i> Sim	P <sub>11</sub>	9.80
12.	<i>Passiflora edulis</i> Sim	P <sub>12</sub>	13.00
13.	<i>Passiflora ligularis</i> A. Juss	P <sub>4</sub>	14.00
14.	<i>Passiflora ligularis</i> A. Juss	P <sub>8</sub>	12.00
15.	<i>Passiflora quadrangularis</i> L.	P <sub>14</sub>	26.67

In the present experiment, it was observed that significant result was obtained in the

collected passion fruit genotypes in contest with shelf-life at ambient room temperature.

Maximum shelf-life at ambient room temperature was recorded for genotype P14 (27.33 days) followed by P4 (14 days) and P12 (12 days). This finding is parallel with the one reported as 4 days by Lemtur *et al.*, (2013) and 7 days for ripe fruit and half-ripe fruits can be stored under similar conditions till the 14<sup>th</sup> days by Correa (1995). Passion fruit (*Passiflora* species) is an important minor fruit crops in India and lying in the homestead garden or in the uncultivated area which one day can become a potential standard crop. Genotypes P14 (27.33 days), P4 (14 days) and P12 (12 days) were identified for maximum shelf-life at ambient room temperature may be further tested over locations and years as well as multi-location trials to know their stability. Selected elite parents with maximum shelf life can be involved in multiple crossing schemes to get elite passion fruit.

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### References

Charan, S.M., S., Gomez, K.B., Sheela, P.B., Pushpalatha and Suman, K.T. 2017. Effect of storage conditions and duration on quality of passion fruit (*Passiflora edulis* Sims.) nectar. *Asian*

*J. Dairy Food R.*, 36(2): 161-165.

Correa, R.M. 1995. Identification of volatile constituents and postharvest physiology of yellow passionfruit (*P. edulis* f. *flavicarpa*). M.Sc thesis, Federal University of Paraiba, Jao Pessea, Brazil.

Dhawan, K., S. Dhawan and Sharma A. 2004. *Passiflora*: a review update, *J. Ethnopharmacol.*, 94: 123.

Ferreira, F.R. 1994. Passion flower germplasm in Brazil. p. 24-26. In: *Passion fruit: production and market*. Sao Jose, A.R. (ed.). UESB, Vitoria da conquista.

Feuillet, C. 2004. *Passifloraceae* (Passion flower family). p. 286-287. In: *Flowering Plants of the Neotropics*. N., Mori, S.A., Henderson, A., Stevenson, D.W. and Heald, S.D. (eds.). Oxford, USA.

Kinghorn, G.R. 2001. Passion, stigma and STI. *Sex. Transm. Inf.*, 77(5): 370-375.

Lemtur, K., P.K. Biswas and Sema, A. 2013. Juice percentage and shelf-life of passion fruit, *Passiflora edulis* as affected by post-harvest treatments and storage conditions. *Int. J. Farm Sci.*, 3(1): 18-21.

Maniwara, P., D., Boonyakiat, P.B., Poonlarp, J. Natwichai and Nakano K. 2015. Changes of post harvest quality in passion fruit (*Passiflora edulis* Sims) under modified atmosphere packaging conditions. *Int. Food Res. J.*, 22(4).

Ulmer, T. and MacDougal J.M. 2004. *Passiflora: Passion flowers of the World*. Timber Press Portland, p. 430.

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