INTRODUCTION

Energy treatment is an innovative area of research to improve the crop yield. It initiates physiological and biochemical changes, which reflect the plant growth and development processes and ultimately improve the yield and quality of produce. Energy treatment includes magnetic, sound, heat, light and energy healing (Govindaraj, Masilamani, Alex Albert, & Bhaskaran, 2017). Among energy healing, various types namely Meditation (Pandey et al., 2015), Pranic Agriculture (Nagendra Prasad & Jois, 2019), and Biofield (Lee & Wu, 2019; Sances, Flora, Patil, Spence, & Shinde, 2013; Shinde, Sances, Patil, & Spence, 2012) has been proved to enhance seedling growth and yield.

Pranic agriculture (PA) works on holistic concept of environment-friendly farming systems. It consists of the entire invisible subtle energy which is an essential and significant part of nature system. PA can be applied to plants to produce faster growth, to increase yield, and improve physical, nutritional and sensory qualities of fruits (Krell & Riebessel, 2015). This can be done by treating the plants with pranic agriculture technique for a few minutes. Pranic agriculture can be implemented by anybody with a basic knowledge of Pranic Healing techniques which is complimentary in nature. Pranic healing is an ancient science and art which uses prana or vital energy to enhance the health of the body (Sui, 2015). Prana is that essential energy which keeps the body alive and in healthy conditions (Sui, 2015). There are three major sources of prana namely, solar prana (from sunlight), air prana (from the air) and ground prana (from soil). Water absorbs prana from sunlight, air and the ground. Plants and trees absorb prana from the sun, air, water and ground (soil). All living things, including people and animal obtain prana from sunlight, air, water, ground and food. Prana can also be referred to as Chi or Ki. Every object including human beings, plants and trees are surrounded by an energy field (Kafatos et al., 2015). People can feel, interact with this energy, heal, transfer energy to people and plants (Sui, 2015).

By adopting the pranic agriculture technique, numerous advantages were reported by many farmers who have practiced PA technique for a few minutes. To study the effects of PA in papaya growth, the researchers prepared a control group and an experimental group. The control group was not exposed to PA technique whereas the experimental group was exposed to PA technique and was grown under greenhouse conditions. The results showed that the papaya seedlings in the experimental group had better growth characteristics than the control group. Further studies are needed to compare the differences in their nutritional composition and also find out the mechanism for this improved growth in experimental group.
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authors recently. Studies on storage keeping qualities of brinjal (Jois, Nagendra Prasad, & Shalini, 2019) were reported to be significantly higher in the pranic treated group when compared to control. There was an increase in germination, shoot length, flowers and yield of pole beans, tomatoes and European cucumber (Jois et al., 2016; Yathindra, Jois, & D’Souza, 2017; Yathindra, Jois, Nagendra Prasad, & D’Souza, 2017). Moreover, PA treatment is safe and under the current scenario of agrarian crisis, there is a need to adopt green and eco-friendly techniques to enhance the productivity of the crop.

Papaya (*Carica papaya* L.) is an economical and medicinally important fruit crop cultivated in tropical and subtropical regions worldwide. India is the largest producer of papaya in the world. Papaya fruit is rich source of vitamin A, vitamin C, potassium, folate, niacin, thiamine, riboflavin, iron, calcium and fibre. Papain, a proteolytic enzyme is produced by papaya fruit and is commonly used in food processing and can also be used to treat digestion, reduce fever and in treatment of ulcers. Papaya fruits can be eaten as such, in salad, as juice, jams, jellies, candies, tulty-fruity. Raw papaya can be used as vegetable (Meena, Varma, & Mehta, 2012).

Whole part of papaya such as seeds, fruit, pulp, root and leaves have medicinal importance. It is used for the treatment of several diseases such as constipation, lower blood pressure, cancer, diabetes, arthritis, reduce inflammation, cardiovascular diseases, dengue and chickengunya (Zanotti, dos Santos Dias, Barros, da Silva, & Sekita, 2014). The use of papaya leaves increases the platelet count in dengue patients. In view of the importance of papaya, there is a need to enhance its productivity. Hence, the PA technique was chosen in this study. The main objectives were to appraise the papaya by PA treatment and to study its effect on germination and growth characteristics during early seedling stages.

**MATERIALS AND METHODS**

Papaya (*Carica papaya*) var. Arka Surya seeds were procured from Indian Institute of Horticulture Research, Bengalure. The seeds free from any deformity and disease were handpicked and used for this study. This research was conducted at World Pranic Healing Foundation India Research Centre in the year August, 2018.

**Pranic Treatment**

Papaya seeds and cocopeat were given pranic treatment, thrice each lasting for five minutes. Untreated seeds were considered as control. Control and pranic seeds were treated with Gibberlic acid (GA3) with concentration of 200 ppm for 6 hours before sowing (Yogeesha, Bhanuprakash, & Naik, 2008). Pranic and control seeds were sown in cocopeat and grown under greenhouse conditions. Both groups consist of 10 plants each and the whole experiment was repeated thrice.

**Sowing and Growing Conditions**

A greenhouse of 3.048 m × 3.048 m was constructed in an open space. The greenhouse was divided into two parts, in one part of the greenhouse pranic group plants were kept and on another part of the greenhouse control group plants were kept. Seeds were sown in coco peat at depth of 2 cm taken in plastic pots. Each pot was watered three times weekly. The pots were kept in a greenhouse maintained at 26-35°C and under visible light with relative humidity of 80%. After 30 days, the plants were harvested and growth parameters of individual plants and vigour indices were estimated. Both treatments (control and pranic) consisted of ten replicates with one seed in each pot and the entire experiment was repeated thrice.

**Growth Parameters**

Seed germination was evaluated on the 15th day. Germination was considered complete when the hypocotyls emerged. Germination percentage was taken as the ratio of the number of seeds germinated to the total number of seeds sown and is expressed as a percentage. The number of days taken by each seed to germinate was noted down and the data were averaged to obtain Mean germination days. Seedling Vigor index I and Seedling vigor index II were calculated as described by Lay, Basvaraju, Pashte, & Gowri (2015):

Vigor index I = Germination (%) × seedling length (root + shoot) ............................... 1)
Vigor index II = Germination (%) × seedling dry weight (root + shoot) ............................... 2)

The root and shoot lengths (cm) were stretched and measured using measuring scale from the base to the tip as described by Rahmawati, Suwarti, & Agil (2019). The plants were separated into shoots and roots and their fresh and dry weight was obtained on a digital weighing scale. The
number of leaves per plant, leaf length and leaf breadth of biggest leaf in the plant was taken.

Statistical Analysis

Descriptive data analysis was applied in this research. All data from three experiments were presented as the mean value ± standard error (SE) of ten replicates. Analyses were performed using SPSS 21 and the mean variance of the data was analyzed using t-test at the 5% (p < .05) level of significance.

RESULTS AND DISCUSSION

The present research was conducted to investigate the effect of PA on C. papaya germination and seedling growth and the results revealed a significant difference in growth as shown in Fig. 1. C. papaya seeds treated with PA showed higher germination percentage of 92%, while the control recorded only 78% germination. It was observed that the mean germination days of Pranic was 11.3 ± 0.3 days, whereas control took more number of days to germinate (14.7 ± 1 days) and the results were statically significant (p < .004) (Table 1). These results are in close agreement with Anburani & Shakila (2010), where in papaya var. Surya seed germination was found to be 73%.

For the appraisal of PA effect on root and shoot lengths it was observed that PA treatment enhanced the seedling growth. The shoot length (7.3 ± 0.2 cm) and root length (16.1 ± 0.7 cm) increased in Pranic treatment against the control having values of only 5.6 ± 0.4 cm and 11.4 ± 1.2 cm respectively and the results were significant. An increase of 30% in shoot length and 41% in root length, when compared to control was noticed. Anburani & Shakila (2010) reported that the shoot length of 5.8 cm which is comparable to the research results obtained. The root length of 11.83 cm was reported by Chumpookam, Lin, & Shiesh (2012) in 30-day old papaya seedlings, which is in agreement to this research findings (11.4 ± 1.2 cm).

The numbers of leaves were also more in treated plants (7.6 ± 0.6) when compared to control (5.1 ± 0.5) and the results were found to be significant (p < .004). Thus, pranic had 49% more leaves, against the control. A similar trend was also observed in leaf length and leaf diameter of pranic, which showed higher values, when compared to control and the results were significant (p < .05) and the percentage increase in pranic for leaf length was 61%, while for leaf diameter was 70%, when compared to the control.

Remarks: (A) Control (B) Pranic

Fig. 1. Growth of 30 days old papaya seedlings
It was observed that plant weight, shoot and root weight was considerably higher in pranic treatment when compared to control, but the results found to be in-significant in shoot weight ($p < .092$). Similarly, dry shoot and root weight were also higher in pranic plants, however, for both, the results were found to be insignificant.

Vigor indices (VI) were also recorded to be higher in pranic treated plants when compared to control. The value of the vigor index is listed in Table 1 and the results were found to be significant ($p < .000$). Pranic had 44.5% more vigor when compared to control. Vigor index I of 1566, was reported by Lay, Basvaraju, Pashte, & Gowri (2015), for papaya var. Surya, which is in close agreement with this research. Vigor indices II was found to be more in pranic, and the results were significant ($p < .035$).

Healers have been shown to produce large magnetic fields from their hands (Beseme, Bengston, Radin, Turner, & McMichael, 2018). Magnetic fields have been shown to alter enzyme activity and will exert an effect by altering the pH of the enzyme solution (Strickland & Boylan, 2010). Seeds of beans when treated with distant intent healing along with pyramid, germinated faster since pyramidal structures may act as psychotronic generators that work together with consciousness and a form of energy to produce advantageous effects on plants (Rubik, 2016). Healing energy may influence the structure of a germination correlated gene, alter the structure of cellular organs like mitochondria and influence the metabolism of the cell, altering the molecular structure of treated cells, affect nucleotide polymerization, gene expression and enzyme activity (Kumar Trivedi et al., 2015). When Pranic agriculture protocol is applied to seeds, the Pranic energy level in seeds will increase thereby resulting in a greater germination percentage. It should also be noted that the application of energy would help in the increased rate of cellular growth and division. It also increases ATPase activity during seed germination of the dividing cells (Kumar Trivedi et al., 2015). These results are in more energy supply to the cells during cell division, growth and differentiation probably resulting in enhanced growth of pranic treated papaya. However, the exact mechanism needs to be investigated in the future. Further research is warranted to establish if a significant difference is obtained in control and pranic treated papaya grown in field conditions.

### CONCLUSION

Papaya seeds treated with PA has shown enhanced germination, seedling vigor, and vegetative growth. Overall, it can be concluded that PA treatment could be practiced by farmers to enhance plant growth. Further studies are needed to explore the mechanism behind the improved growth in pranic group and also to compare the nutritional composition.
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REFERENCES

Anburani, A., & Shakila, A. (2010). Influence of seed treatment on the enhancement of germination and seedling vigour of papaya. *Acta Horticulturae*, 851, 295–298. https://doi.org/10.17660/ActaHortic.2010.851.45

Beseme, S., Bengston, W., Radin, D., Turner, M., & Anburani, A., & Shakila, A. (2010). Influence of techniques on plants and all those who contributed to the present study directly and indirectly. *Influence of pranic treatment - an ancient technique for enhancing crop development*. *Techniques in Agriculture*, 4(3), 1251-1254. Retrieved from http://www.econf.brahmakumaris.org/publication/281710291_STUDIES_ON_EFFECT_OF_GIBERELLIC_ACID_GA3_AND_POTASSIUM_NITRATE_KNO3_ON_BREAKING_OF_SEED_DORMANCY_OF_PAPAYA_CARICA_PAPAYA_L_CV_SURYA*

Krell, R., & Riebessel, S. (2015). Pranic agriculture - Comparative trials from Germany, India and Colombia. In *Pranic Healing 2015 Research and Development Conference*. Bogota: Pranic Healing Research Institute. Retrieved from https://www.pranichealingresearch.com/pranic-agriculture

Kumar Trivedi, M., Branton, A., Trivedi, D., Nayak, G., Gangwar, M., & Jana, S. (2015). Morphological and molecular analysis using RAPD in biofield treated sponge and bitter gourd. *American Journal of Agriculture and Forestry*, 3(6), 284–270. https://doi.org/10.11648/j.ajafr.20150306.14

Lay, P., Basavaraju, G. V., Pashte, V. V., & Gowri, M. (2015). Studies on effect of gibberelic acid (GA3) and potassium nitrate (Kno3) on breaking of seed dormancy of papaya (Carica papaya cv. Surya). *The Ecoscan*, 9(1&2), 109–113. Retrieved from https://www.researchgate.net/publication/281710291_STUDIES_ON_EFFECT_OF_GIBERELLIC_ACID_GA3_AND_POTASSIUM_NITRATE_KNO3_ON_BREAKING_OF_SEED_DORMANCY_OF_PAPAYA_CARICA_PAPAYA_L_CV_SURYA*

Lee, C.-T., & Wu, H.-C. (2019). Effect of biofield treatment on growth and physiology of hydroponically grown lettuce and bok choy plants. *AGRIVITA Journal of Agricultural Science*, 41(3), 395-404. https://doi.org/10.17503/agrivita.v41i3.2337

Meena, B. S., Varma, L. R., & Mehta, R. S. (2012). Evaluation of papaya varieties under North Gujarat conditions. *Indian Journal of Horticulture*, 69(1), 114–116. Retrieved from https://www.indianjournals.com/ijor.aspx?target=ijor.ijh&volumeme=69&issue=1&article=023

Nagendra Prasad, K., & Jois, S. N. (2019). Pranic agriculture improves drumstick (Moringa olivera L.) germination and seedling growth. *Ecology, Environment and Conservation*, 25(4), 1752-1755. Retrieved from http://www.envirobiotechjournals.com/article_abstract.php?id=10134&iid=287&jid=3

Pandey, S. T., Verma, O., Kewalanand, Pandey, D. S., Gill, S., Patel, J. C., … Thakur, D. M. (2015). Yogic farming through Brahma Kumaris Raja Yoga meditation: An ancient technique for enhancing crop performance. *Asian Agri-History*, 19(2), 105–122. Retrieved from https://eco.brahmakumaris.org/wp-content/uploads/2019/10/Asian_Agri-History_2015_sm.pdf

Rahmawati, Suwartist, & Aqil, M. (2019). Maize seed quality evaluation at the temperature room storage with open package condition. *AGRIVITA Journal of...
