

## **Biodata of the Scientist**

Division/ Section: \_CROP PRODUCTION

### **Personal information**

**1. Name (With Title): Dr. (Mrs.) SUSAN JOHN KUZHIVILAYIL**

1. a. Qualification: MSc.(Ag), Ph.D

**2. Designation: Principal Scientist**

**3. Address (Personal):** TC. 8/288(1), Kalloppa Vilayil, Sarvathi Hills, Opposite Loyola School, Sreekariyam P.O. Thiruvananthapuram, Kerala 695 017

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**6. Countries visited:** France, Greece, China, Italy, Vatican City, UAE

### **B. Professional information**

**1. Area of specialization :** Soil Science and Agricultural Chemistry

**2. Area of interest :**

- a. Soil test based plant nutrient management
- b. Secondary and micronutrient management of tropical tuber crops
- c. Diagnosis and correction of nutritional disorders
- d. Screening nutrient efficient genotypes of cassava
- e. Nutrient efficient microbial isolates as substitutes to chemical fertilizers
- f. Cassava starch factory solid waste management for nutrient recycling

**3. Number of institute projects completed (Add list): 4**

1. Mineralization and immobilization of nutrients in tropical tuber crops growing soils
2. Long term effect of manures and fertilizers in an acid ultisol growing cassava (phase II)
3. Rapid appraisal of the nutrient status of cassava growing soils of Kerala
4. Mineral nutrition of Aroids

**4. Number of Institute projects being handled (Add list): 2**

1. Long term effect of manures and fertilizers in an acid ultisol growing cassava (phase III)
2. Screening potassium efficient cassava genotypes for domestic and industrial uses

**5. Number of externally funded projects completed (Add list): 1**

1. Integrated Nutrient Management Strategy for Tannia (*Xanthosoma sagittifolium* L. Schott) with Special Emphasis on Diagnosis of Nutritional Disorders

**6. Number of externally funded projects being handled (Add list):1**

1. Soil based plant nutrient management for agro ecosystems of Kerala

**7. Number of students guided for a) Ph.D: Nil b) M.Phil: Nil c) M.Sc:7****8. Number of students being guided for a) Ph.D: 2 b) M.Phil: Nil c) M.Sc: Nil****8. a. information about the students under your guidance**

Name of the student	Course undergoing (Ph.D/M.Phil/M.Sc)	Title of the project/Thesis	E-mail address
Ms. Shanida Beegum S.U	Ph.D	Low input management strategy for cassava: Implications of rhizosphere dynamics and carbon sequestration under global climate change	Siyas31@gmail.com
Ms. Chithra, S	Ph.D	Cassava Starch Factory Solid Waste (Thippi): Prospects on Utilization for Nutrient Recycling in Cassava Cultivation	r.chithra66@gmail.com

**9. Information on guide ship**

Guide ship for Ph.D/ M.Phil/ M.Sc	University	Subject
Ph.D	Kerala University	Environmental Science

**10. Number of Research papers (Add list): 38**

1. Susan John, K. and Suja, G. 2012. Optimum nutrient rate and nutritional constraints in tuber crops growing in Ultisol of India with special emphasis on tannia. *Commun. Soil Sci. and Pl Anal.*, 43 (22) : 2924-2934.
2. Suja, G., Sundaresan, S., Susan John, K., Sreekumar, J. and Misra, R.S. 2012. Higher yield, profit and soil quality from organic farming of elephant foot yam. *Agron. Sustain. Dev.*, 32:755-764.

3. Susan John, K., Bharathan, R., Manikantan Nair, M. And Suja, G. 2012. Soil based nutrient management plan for Pathanamthitta district of Kerala state. *J. Root Crops*, 38(1): 32-41.
4. Suja, G., Sreekumar, J., Susan John, K and Sundaresan, S. 2012. Organic production of tuberous vegetables: agronomic, nutritional and economic benefits. *J. Root Crops*, 38(2): 135-141.
5. Laxminarayana, K., Susan John, K., Ravindran, C.S. and Naskar, S.K. 2011. Effect of lime, inorganic and organic sources on soil fertility, yield, quality and nutrient up take of sweet potato in Alfisols. *Commun. Soil Sci. Pl. Anal.*, 42(20):2515-2525.
6. Suja, G., Susan John, K. and Sreekumar, J. 2011. Impact of nutrient management based on soil test data on biomass production and partitioning and growth indices of short duration cassava (*Manihot esculenta* Crantz). *Ind. J. Agric. Sci.*, 81(3): 247-251.
7. Susan John, K. 2011. Soil fertility management strategies for edible yams and aroids: a review. *J. Root Crops*, 37(1): 3-18.
8. Susan John, K. 2012. Soil-plant nutrition of sweet potato and minor tuber crops: a review. *J. Root Crops*, 37(2):111-124.
9. Suja, G., Susan John, K., Sreekumar, J. and Srinivas, T. 2010. Short-duration cassava genotypes for crop diversification in the humid tropics: Growth dynamics, biomass, yield and quality. *J. Sci. Food and Agric.*, 90:188-198.
10. Susan John, K. 2010. Integrated nutrient management strategy for tropical tuber crops. *Indian J. Fertilizers*, 6(11):88-96.
11. Susan John, K. 2010. Dynamics of nutrients under cassava (*Manihot esculenta* Crantz) grown in an Ultisol of Kerala. *J. Root Crops*, 36(1): 1-13.
12. Susan John K., Ravindran, C.S., Suja, G. and Prathapan, K. 2010. Soil test based fertilizer cum manurial recommendation for cassava growing soils of Kerala. *J. Root Crops*, 36(1): 44-52.
13. Suja, G., Susan John, K., Ravindran, C. S., Prathapan, K. and Sundaresan, S. 2010. On farm validation of organic farming technology in elephant foot yam (*Amorphophallus paeoniifolius* Dennst. Nicolson). *J. Root Crops*, 36(1): 59-64.
14. Susan John, K., Suja, G., Sheela, M.N. and Ravindran, C.S. 2010. Potassium: The key nutrient for cassava production, tuber quality and soil productivity- An overview. *J. Root Crops*, 36(2): 132-144.

15. Suja, G., Susan John K. and Sreekumar J.2010. Soil test based nutrient management for short-duration cassava (*Manihot esculenta*). Analysis of growth, biomass, yield, quality, nutrient uptake and soil nutrient status. *Ind. J. Agron.*, 55(4): 66-72.
16. Susan John, K., Ravindran, C.S. and Manikantan Nair, M.2009. Macronutrient status of cassava growing soils of Kerala. *J. Root Crops* 35 (1): 41-49.
17. Suja, G., Susan John, K. and Sundaresan, S. 2009. Potential of tannia (*Xanthosoma sagittifolium* L.) for organic production. *J. Root Crops* 35(1) : 36-40.
18. Susan John, K., Ravindran, C.S. and Manikantan Nair, M. 2009. Secondary and micronutrient status of cassava growing soils of Kerala. *J. Root Crops* 35(2):175-181.
19. Suja, G., Susan John, K., Ravindran, C. S., Prathapan, K. and Sundaresan, S. 2010. On farm validation of organic farming technology in elephant foot yam (*Amorphophallus paeoniifolius* Dennst. Nicolson). *J. Root Crops*, 36(1): 59-64.
20. Sheela. M.N., Radhika, V.S., Susan John, K. and Abraham, K. 2008.Variation in crude protein,dry matter and starch in inbred and backcross lines of cassava. *J. Root Crops*, 34(2): 115-119.
21. Susan John, K., Venugopal, V.K. and Saraswati, P. 2007. Yield maximization in cassava through a systematic approach in fertilizer use. *Commun. Soil Sci. Pl. Anal.*, 38 (5&6):779-794.
22. Susan John, K., Venugopal, V.K. and Maikantan Nair, M. 2007. Dry matter production, nutrient uptake, tuber quality and soil nutrient status as influenced by substitution of common salt for muriate of potash for cassava in an oxisol of Kerala. *J. Root Crops*, 33(1): 20-25.
23. Ramesh, V., Susan John, K., Ravindran, C.S.and Edison,S. 2007. Agro techniques and plant nutrition of tannia (*Xanthosoma* sp.): An overview. *J. Root Crops* 33(1):1-11.
24. Susan John, K. and Venugopal, V.K. 2006. Nutrient use Efficiency and balance sheet of nutrients under MYR in cassava. *J. Root Crops*, 32(2): 154-161.
25. Susan John, K. and Venugopal, V.K. 2006. Response of cassava to lime in a typic kandiuistult of Kerala. *J. Root Crops*, 32(1): 65-71.
26. Susan John, K. and Venugopal, V.K. 2005. Optimizing the nutritional status of a typic kandiuistult of Kerala, India using sorption study. *Commun. Soil Sci. and Pl Anal.*, 36 (17&18) 2329-2342.

27. Susan John, K., Venugopal, V.K. and Manikantan Nair, M. 2005. Crop growth, yield and quality parameters associated with maximum yield research (MYR) in cassava. *J. Root Crops*, 31(1): 14-17.
28. Susan John, K., Venugopal, V.K. and Saraswathi, P. 2004. Critical levels of phosphorus and potassium in a Typic kandiuustult of Kerala. *J. Root Crops*, 30(1): 37-40.
29. Susan John, K. and Venugopal, V.K. 2005. Soil fertility evaluation of a cassava growing Typic kandiuustult of Kerala. *J. Root Crops*, 30(2):151-153.
30. Susan John, K., Shalini Pillai, P., Nair, G.M. and Chitra, V.G. 2004. Phosphorus and potassium deficiency symptoms in sweet potato under a sand culture experiment. *J. Root Crops*, 30(1): 5-9.
31. Susan John, K., Ravindran, C.S. and Mohan Kumar, C.R. 2003. Cassava starch content as modified by continuous application of manures and fertilizers. *J. Root Crops*, 29(2):64-68.
32. Susan John, K., Venugopal, V.K. and Saraswathi, P. 2003. Effect of substitution of common salt for muriate of potash on growth, yield, yield components and economics of cassava production in a Typic kandiuustult of Kerala. *J. Root Crops*, 29(2):36-41.
33. Susan John, K., Shalini Pillai, P., Nair, G.M. and Chitra, V.G. 2001. Critical concentration as a reflect of potassium requirement of sweet potato in acid ultisol. *J. Root Crops*, 27(1): 223-228.
34. G. M. Nair., Potty, V.P. and Susan John, K. 2001. Influence of biofertilizer (*Azospirillum*) on the growth and yield of sweet potato. *J. Root Crops*, 27(1): 210-213.
35. Susan John, K., Ravindran, C.S. and Mohan Kumar, C.R.1998. Yield, dry matter production and uptake of phosphorous as influenced by sources of phosphatic fertilizers in cassava (*Manihot esculenta* Crantz) in an acid ultisol. *J. Root Crops*, 23(2):89-94.
36. Susan John, K., Kabeerathumma, S. and Potty, V.P. 1996. Nutrient availability in relation to soil microbial biomass in a long term manurial trial of cassava cultivated in an acid ultisol. *J. Root Crops*, 22(2) : 88-92.
37. Susan John, K. and Alice Abraham. 1996. Effect of seasons on microbial population and nutrient availability in cassava soil. *J. Root Crops*, 22(1):40-44.
38. Susan John, K. and Alice Abraham. 1995. Microbial immobilization and mineralization of nutrients during different seasons of the year. *J. Ind. Soc. Soil Sci.* 43(1):47-52.

**11. Number of Books/Book chapters (Add list): 5**

1. Susan John, K. and Suja, G. 2012. Tropical tuber crops: Response to acidic soil conditions and management. In: *Acid Soils of India: Distribution, Properties and Management for Sustainable Crop Production* (Eds. K. Sudhir, C.A. Srinivasamurthy, V.R. Ramakrishna Parama, N.B. Prakash, A. Sathish, S.C. Kotur), University of Agricultural Sciences, Bengaluru, pp. 79-94.
2. Priya Nair, Poornima, R., Misra, R.S. and Susan John K.2010. Potential phosphate solubilising bacteria from various soils of Kerala. In: *Organic Horticulture Principles, Practices and Technologies* (Eds. H.P.Singh & G.V.Thomas), Westville Publishing House, New Delhi, pp. 279-281.
3. Ravindran, C. S., Suja, G. and Susan John K. 2008. Agro-techniques and quality planting material production in minor tuber crops. In: *Advance Techniques in Quality Planting Material Production and Commercial Cultivation of Tropical Tuber Crops* (Ed.) Nedunchezhiyan, M. Regional Centre, Central Tuber Crops Research Institute, Bhubaneswar, Orissa, India, pp.53-59.
4. Susan John, K., Ravindran, C.S. and James George 2006. Long term effect of organic manures on cassava : Yield, quality, sustainability and economics. In: *Root and Tuber Crops: In Nutrition, Food Security and Sustainable Environment* (Eds.) Naskar, S.K. Nedunchazhiyan, M., Rajasekhara Rao, K., Siva Kumar, M., Ray, R.C., Misra, R.S. and Mukherjee, A. Bhubaneswar, Orissa. pp. 139-147.
5. Kabeerathumma, S., Susan John, K., Mohan Kumar, C. R. and Ravindran, C. S. 1996. Long term effect of organic manures on tuber yield and soil fertility build up in cassava grown in an acid ultisol. In: *Tropical Tuber Crops: Food Security and Nutrition*, (Eds., Balagopalan, C., Nayar, T.V.R., Sundaresan, S., Prem Kumar, T. and Lakshmi, K.R.), Oxford and IBH Publishing Co. Ltd., New Delhi, pp.298-305.

**12. Number of Technical Bulletins (Add list): 3**

1. Susan John K. 2012. Nutrient management plan for Elanthur block of Pathanamthitta district. A joint publication of Department of Agriculture, Govt. of Kerala, Kerala State Planning Board & Central Tuber Crops Research Institute, pp. 30.
2. Susan John, K. Suja, G., Edison, S. and Ravindran, C.S. 2006. Nutritional Disorders in Tropical Tuber Crops. Technical bulletin Series No. 48, Central tuber crops Research Institute, Thiruvananthapuram, Kerala, pp.74.
3. Susan John, K., Ravindran, C.S. and James George. 2005. Long term fertilizer experiments-Three decades experience in cassava. Technical bulletin Series No. 45, Central tuber crops Research Institute, Thiruvananthapuram, Kerala pp.89.

**13. Consultancies offered (Add list and give a brief description):**

1. Chemical analysis of soil, plant, water and organic manures
2. Soil test based application of manures and fertilizers including secondary and micronutrients

**14. Technologies developed (Add list and give a brief description):3**

1. Soil test based application of FYM for cassava
2. Soil test based application of Mg for cassava
3. Soil test based application of Zn for cassava

These technologies were developed after field validation of the data from the long term fertilizer experiment at CTCRI since 1977. The field trials were carried out in an area of 5.25 hectares in 13 locations of the districts of Kollam and Pathanamthitta involving 16 farmers with financial assistance from State Horticulture Mission, Kerala.

In the case of FYM application, the blanket dose of 12.5 t ha<sup>-1</sup> can be reduced, if there is rise in soil organic carbon status due to continuous application of FYM. The rate of application can be fixed as given Table 1.

Table 1. Rate of application of FYM based on soil organic carbon status

Organic carbon (%)	Rate of application of FYM(t ha <sup>-1</sup> )
<0.50	12.50
0.5-0.75	10.00
0.75-1.00	7.50
1.00-1.50	5.00
>1.50	2.50

In the case of Mg, the blanket recommendation is soil application of Mg as MgSO<sub>4</sub> @ 20 kg ha<sup>-1</sup> (1.62 g/plant). But when it is applied continuously, the rate can be fixed based on the soil status as given in Table 2.

Similarly, the blanket recommendation for Zn is soil application of ZnSO<sub>4</sub> @12.5 kg ha<sup>-1</sup> (1 g/plant). But when it is applied continuously for cassava the dose can be fixed as given Table 1.

Soil Mg status		Rate of application of MgSO <sub>4</sub>		Soil Zn status		Rate of application of ZnSO <sub>4</sub>	
meq 100g <sup>-1</sup>	kg ha <sup>-1</sup>	kg ha <sup>-1</sup>		µg g <sup>-1</sup>	kg ha <sup>-1</sup>	(kg ha <sup>-1</sup> )	
0.0-0.25	0- 67	20.0		<0.2	<0.45	12.5	
0.25-0.50	67-134	15.0		0.2-0.3	0.45-0.67	10	
0.50-0.75	134-201	10.0		0.3-0.4	0.67-0.90	7.5	
0.75-1.00	201-268	5.0		0.4-0.6	0.90-1.34	5.0	
>1.00	>268	2.50		>0.6	>1.34	2.50	

The mode of application is in small channels around the mounds within 2 months of planting cassava providing an interval of 2 weeks between the applications of Mg and Zn which in turn is good for enhancing tuber yield and tuber quality. Table 1. Application rate of Mg and Zn based on their status in the soil

These technologies are included in the Package of Practices recommendations of Kerala Agricultural University Crops-2011, pp. 58.

**15. Patents/Copyrights obtained (Add list and give a brief description): Nil**

**16. Any other information: Nil**



