Curriculum Vitae

Name: C. B. Rajashekar
Phone: 785-532-1427
Fax: 785-532-6949
e-mail crajashe@ksu.edu

Education:

Ph.D. Colorado State University, Research focus; Environmental stress physiology
M.S. University of Agricultural Sciences, India, Research focus; Soil science and Plant Nutrition
B.S. University of Agricultural Sciences, Agricultural Science, India

Professional Experience:

1994- present **Professor**, Department of Horticulture, KSU, research and teaching, **Research focus:** Phytochemicals and human health **Teaching:** Graduate level courses- Health-promoting Phytochemicals; Plant Environmental Stress; Horticulture Physiology; Sustainable Agriculture

1996-2008 **Research Program Coordinator**, coordinating research in department, developing research areas of focus, and funding

1992-2008 **Director of Graduate Programs**, developing graduate program policies and requirements and admission

1989-1994 **Associate Professor**, Department of Horticulture, KSU, research and teaching, plant environmental stress-temperature, water stress and hypoxia

1983-1989 **Assistant Professor**, Department of Horticulture, KSU, teaching and research, fruit science and physiology, plant environmental stress

1981-1983 **Research Associate**, 1980-1983, Plant Cold Hardiness Lab, Department of Horticultural Science, University of Minnesota, Cold tolerance, plant adaptations

Current Research Interests: Our research efforts have been to understand mechanisms and causes by which plants switch from primary metabolism to secondary metabolism. As many of the products of secondary metabolism are also phytochemicals which have a number health-promoting qualities, we have been exploring possibilities of enhancing phytochemicals in many vegetables including tomatoes, lettuce and pac-choi. Our studies have focused on using abiotic stresses in turning on the secondary metabolism and have examined key genes involved in the biosynthesis of phenolic compounds and vitamins. Light characteristics have a large effect on upregulating some of these genes which can impact on the accumulations of several phytochemicals. We are examining the role of UV and visible spectrum on the accumulation of phytochemicals in leafy vegetables. We are

also developing strategies to incorporate specific spectral characteristic in high tunnel production and crop management practices to improve the health-promoting qualities in commonly consumed fruits and vegetables. We are also working on pro-oxidant phytochemicals in controlling the foodborne pathogens in fresh produce to improve food safety. Another major area of our interest is to explore the effects of elevated carbon dioxide on the nutritional quality of vegetable crops and human health. We are examining the major nutrients, phytochemicals and biosynthetic pathways as affected by elevated carbon dioxide.

Selected Publications:

Selected Publications:

C.B. Rajashekar, 2018, Elevated CO2 levels affect phytochemicals and nutritional quality of food crops, Amer. J. Plant Sci. 9: 150-162.

A. Giri, B. Armstrong and C. B. Rajashekar, 2016, Elevated cabon dioxide level suppresses nutritional quality of lettuce and spinach, Amer. J. Plant Sci. 7: 246-258

Y. Hu, Q. Wu, S. Sprague, J. Park, M.M. Oh, C. B. Rajashekar, H. Koiwa, P.A. Nakata, N. Cheng, K.D. Hirschi, F. White, and S. Park, 2015, Tomato expressing Arabidopsis glutarecdoxin gene ATGRXs17 confers tolerance to chilling stress via modulating cold responsive components, Horticulture Research- Nature publication 2, 15051; doi:101038/hortes.2015.51

C. B. Rajashekar and Kwang-Hyun Baek, 2014, Hydrogen peroxide alleviates hypoxia during imbibition and germination (*Phaseolus vulgaris* L.), Amer. J. Plant Sci. 5: 3572-3584.

C. B. Rajashekar and M. Panda, 2014, Water stress is a component of cold acclimation process essential for inducing full freezing tolerance in strawberry, Scientia Horticulturae 174: 54-59.

C. B. Rajashekar and J. Fu and A. Giri, 2014, Exogenous vitamin K_3 and peroxide can alleviate hypoxia in bean seedlings (*Phaseolus vulgaris* L.), Amer. J. Plant Sci. 5: 3396-3407.

C. B. Rajashekar, M. M. Oh and E. E. Cary, 2012, Organic crop management enhances chicoric acid content in lettuce, Food and Nutrition Sciences 3: 1296-1302.

O. Wu, J. Lin, X. Wang, W. Lim, M. M. Oh, J. Park, C. B. Rajashekar, S. A. Witham, N. H.

Cheng, K. D. Hirschi and S Park, 2012, Ectopic expression of Arabidopsis glutaredoxin AtGRXA17 enhances thermotolerance in tomato, Plant Biotechnology Journal 10: 1-11.

M. M. Oh, E. E. Carey and C. B. Rajashekar, 2011, Antioxidant phytochemicals in lettuce in high tunnels and open field, Hort. Environ. Biotechnology 52:133-139.

D. O. Okeyo, J. D. Fry, D. B. Bremer, C. B. Rajashekar and M. Engleke, 2010, 2010, Freezing tolerance and seasonal color in experimental Zoysiagrass, Crop Sci. 51 idol:102135/cropssci 11/01.0049

M. M. Oh,, E. E. Carey, and C. B. Rajashekar, 2009, Environmental stresses induce health-promoting phytochemicals in lettuce, Plant Physiol. Biochem. 47: 578-583.

M. M. Oh and C. B. Rajashekar, 2009, Antioxidant content of edible sprouts: effects of environmental shocks, J. Sci. Food Agric. 89: 2221-2227.

C. B. Rajashekar, E. E. Carey, X. Zhao and M.M Oh, 2009, Helath-promoting production practices, Functional Plant Sci. Biotech. 3: 30-38.

Q. Zhang, J. Fry, C. B. Rajashekar, D. Bremer and M. Engelke, 2009, Membrane polar lipid changes in Zoysiagrass rhizomes and their potential role in freezing tolerance, J. Amer. Soc. Hort. Sci. 134: 322-328.

Q. Zhang, J. Fry, X. Pan, C. B. Rajashekar, D. Bremer, M. Engelke and X. Wang, 2009, Cold acclimation of zoysia japonica and z. matrella changes in rhizome abscisic acid levels, Int. Turfgrass Soc. J. 11: 883-892

M. M. Oh, H. N. Trick, and C. B. Rajashekar, 2008, Secondary metabolism and antioxidants are involved in environmental adaptation and stress tolerance in lettuce, J. Plant Physiol. 166: 180-191.

C. B. Rajashekar, Han-E Zhou, Y. Zhang, W. Li, X. Wang, 2005, Suppression of phospholipase D□1 induces freezing tolerance in Arabidopsis: Response of cold-responsive genes and osmolyte accumulation, J. Plant Physiol. 163: 916-926.

X. Zhao, E. E. Carey and C. B. Rajashekar, 2006, Does organic production enhance phytochemical content of fruit and vegetables: Current knowledge and prospects for research, Hort. Technology 16:449-256.

C. B. Rajashekar, 2006, Molecular responses and mechanisms to cold and freezing stress, In Plant-Environment Interactions, (ed. B. Huang),CRC Press, Boca Raton, FL.

R. Welti, W. Li, Y. Sang, H. Biesiada, H. E. Zhou, C. B. Rajashekar, T. D. Williams, X. Wang, 2002, profiling membrane lipids in plant stress response: Role of Phospholipase D □ in

freezing-induced lipid changes in Arabidopsis, J. Biol. Chem. 277: 31994-32002.

W. Xing and C. B. Rajashekar, 2002, Glycine betaine involvement in freezing tolerance and water stress in *Arabidopsis thaliana*, Environ. Exp. Bot. 46:21-28.

C. B. Rajashekar, 2000, Cold response and freezing tolerance in plants, In Plant-Environment Interactions, Vol. 1 (Ed. R. E. Wilkinson), p. 321-342, Marcel Dekker, New York.

C. B. Rajashekar, H. Zhou, and K. B. Marcum, 1999, Glycine betaine accumulation and induction of cold tolerance in strawberry (*Fragaria X ananassa* Duch.), Plant Sci. 148: 175-183.

W. Xing and C. B. Rajashekar, 1999, Alleviation of water stress in beans by exogenous glycine
betaine, Plant Sci. 148:185-192

C. B. Rajashekar, 1997, Cell tension and cavitation in plants during freezing: Their role in injury, In: Plant Cold Hardiness, Eds. P. H. Li and T. H. H. Chen, Plenum Press, New York.

M. Abbas and C. B. Rajashekar, 1996, Characterization of heat injury in grapes using ^{1}H nuclear magnetic resonance methods: Changes in transverses relaxation times, Plant Physiol. 96: 957-961.

C. B. Rajashekar and M. J. Burke, 1996, Freezing characteristics of rigid plant tissues: Development of cell tension during extracellular freezing, Plant Physiol. 111: 597-603.

C. B. Rajashekar and Lafta, 1996, Cell wall changes and cell tension in response to cold acclimation and exogenous abscisic acid in leaves and cell cultures, Plant Physiol. 111: 605-612.