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To:chris dharmakirti

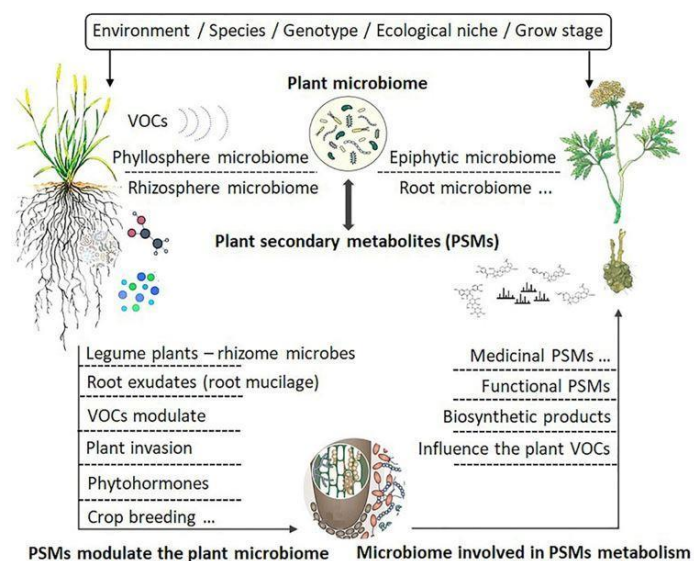
Cc:B. F. A. Basnayake,Gamini Seneviratne,Nimal Chandrasena,Chandra Dissanayake,Buddhi Marambe etc

Sat., Dec. 11 at 10:13 a.m.

Dear Chris

I think it will be useful to note in this discussion how the chemistry of plants behaves with respect to external inputs and the dynamics of micro-biota within the soil ecosystems that the plants grow, be it food plants, medicinal, exotic or otherwise, to understand how important it is to maintain a living soil to get the best out of the biodiversity what the nature has gifted to us.

Being working on bioactive natural products of both terrestrial and marine organisms and the influence of molecules therein on metabolic systems, we know how important it is to maintain plant biosynthesis at its optimum to get the biomedically, nutritionally and agriculturally important secondary metabolites. The unique taste, aroma, flavour, colour etc...etc that our tea is known for, our cinnamon is known for our other agricultural produces known for are due to the unique phytochemical profile of those plants which is primarily depend on the subterranean microbial diversity which our soil carried over the evolution. The simple diagram I extracted from Pang et al 2021 given below explains everything on the plant-soil microbiology dynamics on secondary metabolism.



- Pang Z, Chen J, Wang T, Gao C, Li Z, Guo L, Xu J and Cheng Y (2021) Linking Plant Secondary Metabolites and Plant Microbiomes: A Review. *Front. Plant Sci.* 12:621276. doi: 10.3389/fpls.2021.621276

My work on Sesame lignans on hepatic lipid metabolism showed how plant secondary metabolites can influence our metabolism by regulating our genes. Simple lignan, sesamin in sesame oil regulates liver genes to manage fatty acids metabolism in the liver. So these plant secondary metabolites are so smart that they can influence our gene expression. So, if by any means if we lose this lignan in sesame oil we will lose this metabolically important functional property of sesame oil.

You may read my publication for details: **Premakumara G. Arachchige**, Yoko Takahashi and Takashi Ide (2006). *Dietary sesamin docosahexaenoic and eicosapentaenoic acids synergistically increase the gene expression of enzymes involved in hepatic peroxisomal fatty acid oxidation in rats*. *Metabolism Clinical and Experimental*, 55(2006), 381-390.

Also, you may read my recent review in an NSF publication which covers the importance of phytochemistry in modern medicine and in plant based medical systems: **Premakumara G.A.S.** (2021). *Phytochemical and pharmacological aspects of indigenous medicine*. In COVID 19: Impact, Mitigation, Opportunities and Building Resilience “From Adversity to Serendipity” - Perspectives of global relevance based on research, experience and successes in combating COVID-19 in Sri Lanka. Editors: Prof. Ranjith Senaratne, Prof. Dilanthi Amaratunga, Prof. Shanthi Mendis, Prof. Prema-chandra Athukorala. Volume 1, P78-96, ISBN 978-624-5896-00-4, National Science Foundation, Sri Lanka.

In this article I have also shown how scientific our Ayurvedic knowledge (example on rat bite & vitiligo), the traditional knowledge (Kothalahimbutu story) and also how plant secondary metabolism responds to environmental factors with some examples.

So in essence, application of synthetic fertilizers, pesticides and other non eco friendly inputs are detrimental to soil-microbial dynamics that existed millennia in our gifted soils. If not now, we will lose our edge for all our produce forever and will only be eating rubbish just to get rid of hunger and also our traditional medicines will be of no use as there won't be the curative phytochemistry in the medicinal herbs used in the formulations.

Well... we cannot blame our Agricultural scientists for this as they are trained/mandated to concentrate on primary metabolism, that is the production of biomass. If they are educated, they will realize the importance of secondary metabolism and will definitely think about the importance of soil conservation and ecosystem management in agricultural lands and how important is toxin free ecological agriculture.

Thanks!

Dr.G.A.S.Premakumara