

**AYURVEDA AND YOGA MEDICINE PATIENTS PRESENTING UNUSUAL MEDICAL CASES****Purnima Datey<sup>2</sup> and Alex Hankey<sup>1\*</sup>**<sup>1</sup>Department of Yoga and Physical Science, S-VYASA Eknath Bhavan, 19 Gavipuram Circle, Kempe Gowda Nagar, Bengaluru, Karnataka 560019.<sup>2</sup>286, 2A Saket Nagar, Bhopal, Madhya Pradesh 462024.**\*Corresponding Author: Dr. Alex Hankey**

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**ABSTRACT**

This article presents five unusual cases of chronic disease treated using integrative Ayurveda *Rasahara* and Yoga medicine treatments. All the cases benefited greatly from the Ayurveda *Rasahara* and *Ahara-Vihara*, diet and lifestyle, recommendations. (1) a male aged 43 with highly elevated triglyceride levels at 4,800 units that reduced to 400 units; (2) a male now aged 89 with blockages in 9 arteries since 2006, who first consulted in 2008. Today, he is still without pain, having had no heart surgery of any kind; (3) a female aged 38 with ultra-low sodium levels in her blood which cause her no problems; (4) a male aged 76 with 3<sup>rd</sup> stage oral cancer due to 50 years chewing tobacco, but who leads an almost normal life; (5) a male aged 69 who consulted when taking 25 units insulin daily and with an initial HbA1c of 9.0 percent. In 40 days HbA1c reduced to 6.7 percent, while insulin intake was reduced to 16 units daily. Apart from their success, these cases also illustrate how regular Yoga practice reduces the degree of pain and problems usually experienced by other, non-Yoga patients, allowing them to lead normal lives.

**KEYWORDS:** Rasahara, Yoga, Pranic Energy, Anomalous Pathology.**INTRODUCTION**

Chronic diseases present a large burden to the health costs of any country.<sup>[1]</sup> Non-communicable diseases (NCDs) that are not curable by drug treatments are termed chronic; they are largely responsible for the huge cost burdens that are straining the finances of many nations today, with large percentages of GDP being lost to health expenditures and associated costs.<sup>[2]</sup> The solution to this problem may be held by systems of traditional complementary and alternative medicine (TCAM) such as Ayurveda and Yoga Medicine in India<sup>[3]</sup>, and traditional Chinese medicine (TCM) in China.<sup>[4]</sup> In both countries reports circulate at a popular level of cases successfully treated<sup>[5]</sup>; systematic reviews of randomized controlled trials (RCTs) are increasingly published.<sup>[6]</sup> This paper presents a set of five unusual cases of various NCDs that illustrate the potential importance of TCAM in finding a solution to the present problem of chronic disease.

For 12 years since early 2006, the first author has been receiving clients for a unique, integrative program of treatment, health promotion, and preventative care. The clinics utilize a combination of Ayurveda herbal juices (*Rasahara*), Yoga Medicine and Naturopathy, in all of which she has qualifications and experience. During that time, the clinics have gained a reputation such that many

experienced medical personnel have either sent clients to attend the clinics, attended themselves, or both. As a result, many interesting patients have been assessed, including for their attitudes to Yoga, *Rasahara*, disease, and life in general. They always like the idea of taking freshly prepared herbal juices, *Rasahara*, as they contain no preservatives or other contaminants.

Among clients who have presented, various interesting cases have been recorded. All cases have offered opportunities to observe clients' attitudes to different aspects of treatment, such as Yoga and Naturopathy practices and lifestyle management, to taking Ayurvedic *Rasahara*, herbal juices, to their disease condition, and attitudes to life itself. In this context, twelve years of practice have afforded time to establish strong correlations between sincerity of clients' Yoga practice and their adherence to lifestyle recommendations, as illustrated in the five cases presented here. Similar correlations between adherence to Yoga practice and interest in spirituality are also seen. Cogent evidence of these things have been seen in many cases, of which the five presented here have also obtained remarkable success.

Relationships between client compliance and changes in medical condition have demonstrated efficacy of

treatment on many occasions; papers have been published in peer-reviewed scientific journals.<sup>[7,8]</sup> Results are in accordance with many other studies on Ayurveda and Yoga programs; the treatments' unique power to reduce variances of patient distributions has been emphasized,<sup>[8]</sup> since this presents a major new understanding of the power and mode of action of integrative AYUSH treatments. Regarding spiritual development, that should be regarded as the real purpose of the practice of Yoga's outer and inner limbs, *Bahirangas* and *Antarangas*<sup>[9]</sup>, such as *Yoga asanas* and *pranayama*<sup>[10]</sup> on the one hand, and meditation practices on the other.<sup>[11]</sup>

Similar observations show that it is wrong to be blindly idealistic about Yoga practice. The idea that Yoga practitioners don't develop new diseases is a false hypothesis, but what seems to be true to say, is that their ability to stay functional and enjoy life seems greatly increased, even when medical data and reports suggest that they should be taking extra medication. Our data suggest that Yoga clientele seem to stay 'healthy' despite medical assessments indicating pathology. They do not seem to experience the same degree of pain as others with similar conditions. The purpose of this communication is to review and discuss some such cases, which seem particularly remarkable and representative; to frame hypotheses as to why this phenomenon occurs; and to discuss its possible importance for furthering our scientific understanding of disease and disease processes.

## METHODS AND MATERIALS

Our Ayurveda *Rasahara* and Yoga methods recommend three modes of treatment, daily routine and meal times from Ayurveda, Yoga practices, and Naturopathy recommendations for raw food etc. Details are:

**Ayurveda:** Freshly prepared *Rasahara*, herbal juices, to be taken on an empty stomach early in the morning, just after Yoga practice. Juices are prepared at each clinic and delivered to the client's home, unless the client chooses to come and drink them at the clinic nearest to them. The juices are provided with complete advice according to the client's problem and the season. Some clients may be given different herbs during hot, cold, and rainy (monsoon) seasons etc. Also, recommendations for food habits, *pathya* and *apatya* (Do's and Don'ts), and other considerations including quantity, water intake, and meal timings, are taken from Ayurveda's *Charaka Samhita*<sup>[12]</sup> and the more lengthy *Ashtanga Sangraha*.<sup>[13]</sup>

The herbal juices, individually selected for each client, are prepared in accordance with the recommendations of the late Vaidya P.Y. Vaidya (*Khadivale*) of the city of Pune, with specifications in his various texts on the subject.<sup>[14]</sup> One addition is that the water used in preparation of juices is first boiled and then treated in accordance with certain recommendations for increasing its vital properties.<sup>[13]</sup> A list of the 14 most used herbs is given in Table 1.

**Yoga:** The clinics recommend practices from the Integrated Approach to Yoga Therapy (IAYT) developed as a system of Yoga Medicine.<sup>[16]</sup> Practices include *Asanas* such as *Bhujangasana*, *Ardha Matsyendrasana*, and *Vajrasana*, and the *Viparitkarni mudra*<sup>[9]</sup>; preparatory warming up exercises, such as *Sukshma Vyayama* and *Surya Namaskara*<sup>[16]</sup>; and end with *Savasana* or advanced relaxation techniques such as the Cyclic Meditation<sup>[15]</sup> that many clients include. *Pranayama* and *Yoga* breathing exercise practices may include, *Nadi Suddhi*, *Bhramari*, *Shodhana Kriya*, and *Sudarshana Kriya*.<sup>[17]</sup>

**Naturopathy:** recommendations include raw foods, such as sprouted pulses and grains, fresh fruits and salads, and soaked dried fruits and nuts.<sup>[18]</sup> Clients may also be recommended Mud Therapy, Steam Baths, Hip Baths, and various kinds of hydrotherapy, such as alternating hot and cold water treatments to stimulate circulation.<sup>[19]</sup>

## RESULTS OF UNUSUAL CASES

When patients with anomalous levels of biochemical markers participate in powerful health-promoting programs personalized for them, using appropriate selections from the treatment modes detailed above, they are able to live apparently normal lives. The following cases have been selected for the remarkable evidence they provide that this is true under extreme conditions.

**Case 1:** A man aged 43 reported to the first clinic with persistent Triglyceride levels at more than 4800 mg/dl, compared to healthy levels of 150–199 mg/dl and LDL 900 compared to healthy levels of 100–150 mg/dl (the other lipid parameters HDL and VLDL were normal). His GP had prescribed conventional medications, with which the client had not felt comfortable and refused to take. He decided to report to the clinic in October 2006. He was advised to cease intake of all oils and cooked food; a combination of Wheatgrass (*Triticum Aestivum*)<sup>[20]</sup>, Aloe vera (*Aloe Barbadensis Mill.*)<sup>[21]</sup>, Giloye (*Tinospora Cordifolia*)<sup>[22]</sup> and Tulsi (*Ocimum tenuiflorum*)<sup>[23]</sup> was prepared for him twice daily because his case was so acute.

After 9 days of special treatment at *Navaratri*, including traditional fasting, *Upavasa*<sup>[19]</sup>, his triglyceride levels were again tested and found to have reduced to less than 400 mg/dl, while his LDL had returned to its normal range. Three months later, his triglyceride levels were at 200 mg/dl, and the client had effectively been restored to normal lipid levels.

**Case 2:** In late 2017, a male, aged 89, reported with nine or ten arteries blocked by 90 to 100%, including four of the main arteries to the body. Despite this, the client was still living without any apparent physical problems. He had been an allopathic doctor who taught anatomy and physiology at a medical college until retirement, but who had also practiced yoga regularly since his youth. Several years previously, in 2008, he had heard of the clinics and come for consultation. He had been advised to take fruits

or fruit juices in morning, and only to eat light food, and that only twice daily; also to take Giloye (*Tinospora Cordifolia*)<sup>[22]</sup> after meals. In addition, he had been practicing *Sukshma Vyayama* and an hour of meditation daily.

Since his consultation, he had been teaching anatomy and physiology to Yoga students. During earlier checkups, which he had had annually, he came to learn of his gradually increasing blockages. At the time of reporting, he still didn't feel any symptoms of blocked arteries. His GP advised him not to go for surgery, as it would introduce complications. His sense of well-being, and apparent health, can only be attributed to his continuing Yoga practices, the Giloye, and eating meals at the correct times.

**Case 3:** In August 2017, a female, aged 38, with low sodium levels at 20 mEq/dl, but without any of the usual resulting mental imbalance, reported complaining of reduced sodium, potassium and iron. She had been regularly practicing yoga, since she first came to seek advice at a Rasahara Kendra clinic in 2013. She had stopped taking juices after some months; now she was advised to take coconut milk followed by Amla (*Emblica Officinalis Gaertn.*)<sup>[24]</sup> and Wheatgrass (*Triticum Aestivum*)<sup>[20]</sup> juice every morning. After a month on this regime, she had recovered fully. Four months later, she was still taking juices, and is still feeling well.

**Case 4:** In May 2015, a male aged 76 reported to a Rasahara Kendra Clinic. He was an intense nationalist and devoted social worker, but also a tobacco addict, who had been chewing tobacco for 50 years. A consultant in a cancer hospital had told him that he had 3<sup>rd</sup> stage esophageal cancer. Rather than take chemotherapy, he opted for Rasahara therapy. Pomegranate juice was prescribed for him, to be followed by a mixture of Wheatgrass (*T. Aestivum*)<sup>[20]</sup>, Giloye (*T. Cordifolia*)<sup>[22]</sup>, Alovera (*Barbadensis Mill.*)<sup>[21]</sup>, and Tulsi (*O. Tenuiflorum*)<sup>[23]</sup> juices, in morning as his breakfast. He was also advised to wrap a wet cloth around his neck as hydrotherapy treatment, which he did not follow as he was too busy with his social work.

His esophagus became increasingly blocked as his cancer grew larger, but no other problems arose. Later, he went for a surgery to put a stent in his esophagus to decrease the difficulty of swallowing food. He worked for another 6 months without any physical problem continuing all his social work activities, and also *Japa* and prayer. He only became bed-ridden 15 days before his death on 4<sup>th</sup> September, 2016. He had continued taking his Rasahara until mid-August when he could only just manage to swallow them. The decision not to undergo an operation for reduction or removal of the carcinoma was entirely his own, and he was content to accept the consequences of his decision.

**Case 5:** On 8th October 2014, a male aged 69 who was practicing yoga regularly reported to the main Rasahara Kendra Clinic. He was a cheerful person who was well-known in his area of the city for helping other people. He used to solve others' problems in a very intelligent manner. He had a very positive attitude towards life. He was vegetarian though he had been careless about such things earlier in his life. His HbA1c had increased to 9 (normal value up to 6) without any physical complications, only learning this during a routine check-up with his GP, who as his son-in-law had taken extra care of details. His GP's concern led him to start insulin therapy: 16 units in the morning, and 9 units in the evening. Soon he started feeling very uncomfortable with his high insulin doses, and being a friend of the family decided to start Rasahara treatment. He came and stayed in the main Rasahara clinic for 40 days.

The client was prescribed raw breakfast after taking his juice mixture consisting of: Adusa (*Adhatoda Vasica Nees*)<sup>[25]</sup>, Alovera (*Barbadensis Mill.*)<sup>[21]</sup>, Belpatra<sup>[26]</sup> (*Aegle Marmelos*), Giloye (*T. Cordifolia*)<sup>[22]</sup>, Gudmar<sup>[27]</sup> (*Gymnema Sylvestris*), and Neem<sup>[28]</sup> (*Azadirachta Indica*), the usual six herbs used in such cases; with the following three herbs added in addition: Wheatgrass (*T. Aestivum*)<sup>[20]</sup>, Haldi (*Curcuma Longa*)<sup>[29]</sup> and Bhui Amla (*Phyllanthus Niruri*).<sup>[30]</sup> Also he received Giloye (*T. Cordifolia*)<sup>[22]</sup> alone in the evening. Regarding meal times: lunch was served in the second *prahara*, i.e. between 10.00 and 12.00 noon; and he was given dinner between 18.00 and 20.00 hours. Over the course of his 40-day stay, his HbA1c reduced to 6.7; at the same time, his daily insulin dosage was reduced from 25 to 16. He also learned IAYT Cyclic Meditation, and started practicing yoga, for 2 hours in the morning and evening. Today, five years later, the client is still practicing most of his yoga, and taking juices. His HbA1c has reduced to below 6 where it remains stable; his GP now maintains his insulin dosage at 16 units daily, but has reduced other pills like vitamins and lipid-lowering drugs by half.

**Table 1: Fourteen Herbs Most Commonly Used in Rasahara.**

Hindi Name of Herb	Common Name of Herb	Botanical Name	Usual Dose
AfUsa	Adusa*	<i>Adhatoda Vasica</i>	50 ml from 10 leaves 4 gm
GvarpaQa	Aloe Vera*	<i>Barbadensis Mill.</i>	50 ml leaf pulp
Aa~vla	Amla*	<i>Embllica Officinalis Gaertn</i>	8 gm powder 50 ml water
belpÇ	Belpatra*	<i>Aegle Marmelos</i>	4 gm leaves in 50 ml water
_a&<graj	Bringaraja	<i>Eclipta prostrata</i>	4 gm leaves in 50 ml. water
_au\$ Aa~vla	Bhui Amla*	<i>Phyllanthus Niruri</i>	6 gm or 5 plants in 50 ml water
meWal	Fenugreek	<i>Trigonella foenum-graecum</i>	4 gm leaves in 50 ml water
iglae@	Giloye*	<i>Tinospora Cordifolia</i>	15 gm vine in 50 ml water
gufmar	Gudmar*	<i>Gymnema Sylvestris</i>	4 gm leaves in 50 ml water
hris—gar	Harsingar	<i>Nyctanthes arbor-tristis</i>	4 gm leaves in 50 ml water
nIm	Neem*	<i>Azadirachta Indica</i>	4 gm leaves in 50 ml water
tulsI	Tulsi*	<i>Ocimum Tenuiflorum</i>	4 gm leaves in 50 ml water
hLdI	Turmeric*	<i>Curcuma Longa</i>	25 ml juice from 50 gm fresh root
geh<U ke jvare	Wheatgrass*	<i>Triticum Aestivum</i>	25 gm grass in 50 ml water

**Table 1 Caption:** Table 1 gives the Hindi, English and Botanical names of the fourteen herbs most commonly used in *Rasahara*. Those used in each case described here are marked with an asterisk.

## DISCUSSION

One important feature of the above five cases is that all the individuals concerned remained fully functional in their daily lives, even when suffering from their acute medical conditions. Although Case 4 eventually succumbed to his esophageal carcinoma, it can be strongly argued that the herbal juices and Yoga practices enabled him to stay healthier and with a greater sense of well-being than if he had not been on his prescribed regime. The other four cases either managed to greatly reduce the level of their pathology, or effectively to recover their health:

- Case 1 – 3 months treatment reduced Lipid levels of 4,800 mg/dl to normal.
- Case 2 – 9 blocked arteries at 90%+ have caused no overt problem for 10 years
- Case 3 – Sodium at 20 mEq/dl restored to normal in one month
- Case 5 – HbA1c reduced from 9 to 6.7 in 40 days, and below 6.0 after 3 months. Insulin dosage reduced from 25 to 16 units and halved doses of other drugs.

The five cases show strong similarities. All were very spiritually oriented and regular in their yoga practice; they naturally ate light, *Sattvika* food, and were entirely regular in taking their daily *Rasahara*, herbal juices. They also showed very positive attitudes to life. These common traits were as striking as the severity of their disorders, and lead to the following tentative generalizations.

- Yoga practice combined with *Sattvika* food reduces levels of suffering that is normally generated by disease.
- Ill health can be avoided by increasing pranic energy level, a hypothesis in keeping with several other studies at S-VYASA.

Many physicians may occasionally have observed similar kinds of case. The remarkable aspect of these five

cases, however, was that the patients were able to continue their normal daily routine, outwardly behaving as if they had no physical problem. Even Case 4 who eventually succumbed to his cancer led a life of fulfilling service to within three weeks of his passing. Such increased sense of personal well-being and physical energy is a common feature of all who take *Rasahara* regularly (including both authors) whether for preventative or therapeutic reasons.

The remarkable similarities between these five cases emerged from the forms filled out at initial consultations, together with personal interviews and meetings with each client. All were highly spiritual, and regularly practicing yoga, either in the form of *Ashtanga Yoga*, i.e. *Asanas*, *Pranayama*, and *Dhyana* (meditation), or *Bhakti Yoga*, i.e. worship. All ate very light, *Sattvika* food, and took their *Rasahara*, fresh herbal juices, regularly. Finally, each manifested a positive approach towards life, not dwelling on their problems, but maintaining a courageous, positive outlook towards the future.

Another point should be made: all five cases complained initially that they were not getting results, because, compared to modern drugs, *Rasahara* take time to act, whereas clients' expectations are based on experience of modern medicine. However, results start being very clearly felt after 10 days of so, at which point all complaints cease. The first author has never had a client who did not experience improvements in this way becoming enthusiastic for the treatments. Integrative *Rasahara* therapy combined with Yoga and lifestyle is entirely reliable, in contrast to modern drugs. The last two are needed to maintain the status quo of recovery.

**Strength:** Though only a case series study, the similarities between the different cases suggest the existence of a previously unrecognized, unusual phenomenon of adequate well-being for some with

biomedical parameter values greatly removed from ranges designated as 'normal'.

**Weaknesses:** Although figures are given, this is really only a qualitative study, and the number of cases is relatively small. It does not form the basis for rigorous conclusions. But the observations may indicate a more widespread phenomenon requiring further investigation.

**Future Research:** The natural understanding is that *Sattvika* individuals may naturally have higher levels of pranic energy, and that increased levels of *prana* afford them protection from the usual miseries of pain from chronic ailments. These generalizations, together with points A and B above form grounds for future research. From them may come hypotheses to guide our next stages of research on the effects of Rasahara and Yoga practices on health.

### CONCLUSIONS

Although various pains and debilitating ailments are normally generated by a given pathological condition, those who take *Rasahara*, only *Sattvika* food, and regularly practice Yoga, may, in certain cases, not experience any such problems, and continue to lead productive and satisfying lives up to the time of their passing on.

### REFERENCES

- McPhail SM. Multimorbidity in chronic disease: impact on health care resources and costs. *Risk management and healthcare policy*, 2016; 9: 143.
- Sorrel AL. states target chronic disease to trim health care costs. *American Medical News*, Mar 19, 2012; 55(12).
- Dasgupta R, Pillai R, Kumar R, Arora NK. Sugar, salt, fat, and chronic disease epidemic in India: is there need for policy interventions?. *Indian journal of community medicine*, Apr, 2015; 40(2): 71.
- Fu H, Li Y, Peng W, Gao J, Qian H, Dai J, Zheng P. To curb the "blowout" of chronic diseases China should change the traditional disease-oriented thinking mode first [J]. *Fudan University Journal of Medical Sciences*, 2012; 4: 003.
- <https://economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/five-reasons-for-india-to-lead-in-universal-health-care-with-ayurveda/articleshow/67057710.cms>
- Cramer H, Lauche R, Langhorst J, Dobos G. Yoga for depression: A systematic review and meta-analysis. *Depression and anxiety*, Nov, 2013; 30(11): 1068-83.
- Datey P. Hankey A. Nagendra H.R. Combined Ayurveda and Yoga Practices for newly Diagnosed Type 2 Diabetes Mellitus: A Controlled Trial. *Forschende Komplementärmedizin*, 2017; 24.
- Datey P. Hankey A. Nagendra HR. Ayurveda Herbal Juices and Yoga for Blood Pressure and Pulse Rate: a Controlled Trial. *Int J Complement Altern Med.*, 2016; 4(3): 00121.
- Pātanjali Yoga Pradīpa, trans. Omananda pradīpa, Gita press Gorakhpur, 2004. (In Hindi)
- Swami Svatmaram, Hathapradeepika, Kaivalyadhama Shrimanmadhav Yogmandir Samiti, 1980. (In Hindi and English)
- Yogi M. M. Science of Being and Art of Living: Transcendental Meditation. Plume, New York, 2001.
- Caraka Samhitā part 1, Sūtra sthāna, trs. Śarmā PV, Caukhambā Saṁskrit Pratiśthān, New Delhi, 1998. (In Hindi)
- Aṣṭāṅga Saṅgraha Sūtra sthāna, trans. Chhāṅgani G, chapter 1, Doṣa avasthā p7, Caukhambā Saṁskrit Pratiśthān, New Delhi, 2010. (In Hindi)
- Vaidya Appashastrī Shastree Sathe. Gharghuti Aushadhe, Vaidhyak Sanshodhan Sanstha Shaniwar Peth, Pune 1970. (In Marathi).
- Nāgendra HR, Nagaratnā, Integrated approach of yoga therapy for positive health. SVYP, 2013.
- Nagendra H.R. Nagarathna R. Yoga for Diabetes. SVYP, 2001.
- Zope SA, Zope RA. Sudarshan kriya yoga: Breathing for health. *Int J Yog*, Jan, 2013; 6(1): 4-10.
- Chavan, J. K., Kadam, S. S., & Beuchat, L. R. Nutritional improvement of cereals by sprouting. *Critical Reviews in Food Science & Nutrition*, 1989; 28(5): 401-437.
- Saxena OP, Vrihad Pratikritik Chikitsa, Bhasha Bhavan, Mathura, 2005.
- Shakya, G., Randhi, P. K., Pajaniradje, S., Mohankumar, K., & Rajagopalan, R. Hypoglycaemic role of wheatgrass and its effect on carbohydrate metabolic enzymes in type II diabetic rats. *Toxicology and industrial health*, 2016; 32(6): 1026-1032.
- Mohamed, A. E., et al. "Anti-diabetic effect of Aloe vera juice and evaluation of thyroid function in female diabetic rats." *Bioscience Research*, 2009; 6.1: 28-34.
- Guduci, The Ayurvedic Pharmacopoeia of India, Govt. Of India, Ministry of Health and Family Welfare, Department of AYUŚ, 2007; 1(98).
- Prakash, P., and Neelu Gupta. "Therapeutic uses of Ocimum sanctum Linn (Tulsi) with a note on eugenol and its pharmacological actions: a short review." *Indian journal of physiology and pharmacology*, 2005; 49.2: 125.
- Amalaki (Fresh Fruit), The Ayurvedic Pharmacopoeia of India, Govt. Of India, Ministry of Health and Family Welfare, Department of AYUŚ, 2007; 1(98).
- Ahmad, S., Garg, M., Ali, M., Singh, M., Athar, M. T., & Ansari, S. H. (2009). A phytopharmacological overview on *Adhatoda zeylanica* Medic. syn. *A. vasica* (Linn.) Nees. (See <http://nopr.niscair.res.in/handle/123456789/6358>).
- Sabu, M. C., and Ramadasan Kuttan. "Antidiabetic activity of Aegle marmelos and its relationship with

- its antioxidant properties." *Indian Journal of physiology and pharmacology*, 2004; 48.1: 81-88.
27. Persaud SJ, Al-Majed H, Raman A, Jones PM. Gymnema sylvestre stimulates insulin release in vitro by increased membrane permeability. *Journal of Endocrinology*, Nov 1, 1999; 163(2): 207-12.
  28. Atangwho, I. J., et al. "Comparative chemical composition of leaves of some antidiabetic medicinal plants: *Azadirachta indica*, *Vernonia amygdalina* and *Gongronema latifolium*." *African Journal of Biotechnology*, 2009; 8: 18.
  29. Ammon, Hermann PT, and Martin A. Wahl. "Pharmacology of *Curcuma longa*." *Planta medica*, 1991; 57.01: 1-7.
  30. Bagalkotkar G, Sagineedu SR, Saad MS, Stanslas J. Phytochemicals from *Phyllanthus niruri* Linn. and their pharmacological properties: a review. *Journal of pharmacy and pharmacology*, Dec, 2006; 58(12): 1559-70.