

FTIR Spectroscopic features of Carica papaya and Acetaminophen

MYVIZHILP¹, R.VELAVAN²

¹Assistant Professor, ²Professor, Dept. of Physics, ²Department of Bioinformatics,

¹BIST, BIHER, Bharath university, Chennai-73,

myvizhi.phy@bharathuniv.ac.in

Abstract:

The application of spectroscopy for the study of biomedical compounds has been increased tremendously in recent years. This study aids the knowledge in associating chosen chemical compounds based on their FTIR behavior and their general medicinal properties to suit certain requirements for skin care and cosmetology. Since a successful mixture cannot be obtained from various chemical compounds on the foundation of their general properties alone, we could prove their combination is satisfactory basing our study on Fourier Transform InfraRed spectroscopy. Spectroscopic techniques can be effectively used as a diagnostics tool in clinical chemistry and it can be an alternative method in clinical analysis. In the present work FTIR spectroscopic techniques is used to study the spectral behavior of Carica papaya and Acetaminophen.

Key words:

FTIR ,Carica papaya, Acetaminophen ,Dengue.

Introductions:

FTIR :

FT-IR stands for Fourier Transform InfraRed, the preferred method of infrared spectroscopy. In infrared spectroscopy [1-9], IR radiation is passed through a sample. Some of the infrared radiation is absorbed by the sample and some of it is passed through (transmitted). The resulting spectrum represents the molecular absorption and transmission[10-16], creating a molecular fingerprint of the sample. Like a fingerprint no two unique molecular structures produce the same infrared spectrum[17-25]. This makes infrared spectroscopy useful for several types of analysis. We obtain a set of raw data from the above analysis , a Fourier transform (a

mathematical process) is required to convert this raw data into the actual spectrum. This pattern/spectrum is unique for every compound[26-32].

Dengue :

Dengue fever is a virus fever transmitted by Aedes mosquitoes namely A-egypti. They bite particularly in the early morning or during the sunset. After the bite it takes 4-7 days for the onset of the fever. The initial symptom is sudden onset of fever headache joint pain and rash dengue fever can be from mild to severe[40-45]. It can be simple as fever headache and pain or severe as lowering of blood platelets, low blood pressure and risk of bleeding. There is no exact treatment for dengue. Prevention and supportive care only keeps away dengue[33-39].

Because dengue fever is caused by a virus, there is no specific medicine or antibiotic to treat it. For typical dengue, the treatment is concerned with relief of the symptoms. Rest and fluid intake for hydration is important. Aspirin and nonsteroidal anti-inflammatory drugs should only be taken under a doctor's supervision because of the possibility of worsening bleeding complications. Acetaminophen (Tylenol) and codeine may be given for severe headache and for joint and muscle pain (myalgia)[46-50].

Platelets:

Platelets are tiny blood cells that have a very important job in your body. Whenever you get a cut or a bruise, platelets rush to the area, club together and form a clot that stops bleeding from the damaged blood vessel. Thrombocytopenia or a reduced platelet count can decrease the body's ability to clot blood in case of an injury and can lead to excessive bleeding. Certain viral infections, dengue, vitamin B12 and folic acid deficiencies and chemotherapy can cause a dip in platelets. Some painkillers and anti-inflammatory medicines can also affect platelet production. A platelet count of less than 150,000 platelets per microlitre of blood is considered lower than normal. Conventional treatment includes blood transfusion and medicines to improve platelet count, however recent research has shown promise in the use of papaya leaves in treating this condition. The Dengue virus affects the bone marrow, the flexible, soft tissue that fills up the hollow insides of our bones. Since platelets are produced in the bone marrow, dengue leads to a decrease in platelet count.

Papaya:

Papaya is a short-lived perennial growing to 30 ft (9.14 m) high. Its hollow, herbaceous stem is usually unbranched. The deeply lobed, palmate leaves are borne on long, hollow petioles emerging from the stem apex. Flowers occur in leaf axils. Older leaves die and fall as the tree grows. Papaya flowers are fragrant and have five cream-white to yellow-orange petals 1 to 2 in (2.5 to 5.1 cm) long. The stigmatic surfaces are pale green, and the stamens on some parts of the world, papaya leaves are made into tea as a treatment for malaria. Antimalarial and antiplasmodial activity has been noted in some preparations of the plant, but the mechanism is not understood and no treatment method based on these results has been scientifically proven. In belief that it can raise platelet levels in blood, papaya may be used as a medicine for dengue fever. Papain is also applied topically for the treatment of cuts, rashes, stings and burns. Papain ointment is commonly made from fermented papaya flesh, and is applied as a gel-like paste.

Paracetamol:

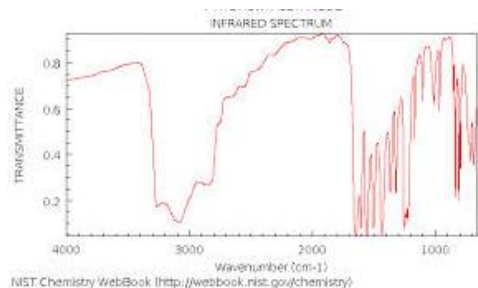
It is N-acetyl p-aminophenol and also known as acetaminophen. It is used to reduce fever, give relief to pains. It is believed that the metabolites of acetaminophen (NAPQI-N-acetyl p-benzoquinone imine) act on TRPA1 receptors (Transient receptor potential cation channel member 1 - best known as sensor for environmental irritants) in the spinal cord to suppress pain information to be carried to the brain.

Experimental:

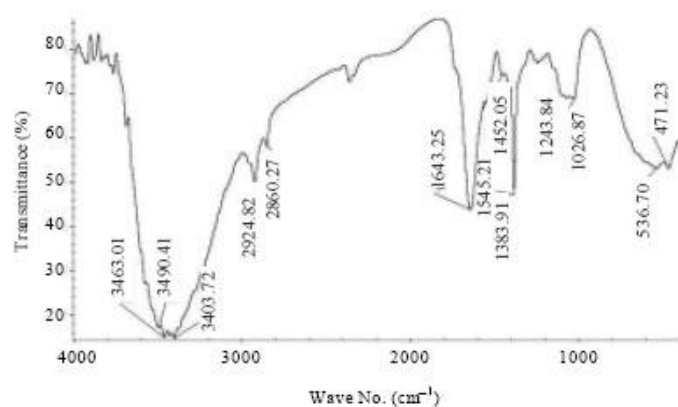
Sample powder: The cashew leaves sample is collected. It is dried in shade for 4 to 5 days in a paper towel so that the moisture will be absorbed (frequently change of paper towels is required). The leaves are checked for fungal or insect invasion and allowed to dry and then the dried leaves can be powdered.

FTIR spectrum:

FTIR of Acetaminophen:



FTIR of Carica papaya:



Conclusion:

Comparing the FTIR spectrum of Carica papaya and Acetaminophen, we note that both have transmittance peaks at 3000 to 3500cm⁻¹. It gives us an insight to support the role of papaya leaves acting as antipyretic, analgesic similar to paracetamol and also its role to improve the platelet counts for dengue affected patients.

REFERENCE

1. Ramamoorthy, R., Kanagasabai, V., Kausalya, R., Impact of celebrities' image on brand, International Journal of Pure and Applied Mathematics, V-116, I-18 Special Issue, PP-251-253, 2017
2. Ramamoorthy, R., Kanagasabai, V., Vignesh, M., Quality assurance in operation theatre withreference to fortis malar hospital, International Journal of Pure and Applied Mathematics, V-116, I-14 Special Issue, PP-87-93, 2017
3. Ramya, N., Arthy, J., Honey comb graphs and its energy, International Journal of Pure and Applied Mathematics, V-116, I-18 Special Issue, PP-83-86, 2017
4. Ramya, N., Jagadeeswari, P., Proper coloring of regular graphs, International Journal of Pure and Applied Mathematics, V-116, I-16 Special Issue, PP-531-533, 2017
5. Ramya, N., Karunagaran, K., Proper, star and acyclic coloring of some graphs, International Journal of Pure and Applied Mathematics, V-116, I-16 Special Issue, PP-43-44, 2017
6. Ramya, N., Muthukumar, M., On coloring of 4-regular graphs, International Journal of Pure and Applied Mathematics, V-116, I-16 Special Issue, PP-491-494, 2017
7. Ramya, N., Muthukumar, M., On star and acyclic coloring of graphs, International Journal of Pure and Applied Mathematics, V-116, I-16 Special Issue, PP-467-469, 2017
8. Ramya, N., Pavi, J., Coloring of book and gear graphs, International Journal of Pure and Applied Mathematics, V-116, I-17 Special Issue, PP-401-402, 2017
9. Ramya, P., Hameed Hussain, J., Alteration framework for integrating quality of service in internet real-time network, International Journal of Pure and Applied Mathematics, V-116, I-8 Special Issue, PP-57-61, 2017
10. Ramya, P., Sriram, M., Tweet sarcasm: Peep, International Journal of Pure and Applied Mathematics, V-116, I-10 Special Issue, PP-231-235, 2017
11. Sabarish, R., Meenakshi, C.M., Comparision of beryllium and CI connecting rod using ansys, International Journal of Pure and Applied Mathematics, V-116, I-17 Special Issue, PP-127-132, 2017
12. Sabarish, R., Rakesh, N.L., Outcome of inserts for enhancing the heat exchangers, International Journal of Pure and Applied Mathematics, V-116, I-17 Special Issue, PP-419-422, 2017
13. Sangeetha, M., Gokul, N., Aruls, S., Estimator for control logic in high level synthesis, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-425-428, 2017
14. Sangeetha, M., Gokul, N., Aruls, S., Image steganography using a curvelet transformation, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-417-422, 2017
15. Saraswathi, P., Srinivasan, V., Peter, M., Research on financial supply chain from view of stability, International Journal of Pure and Applied Mathematics, V-116, I-17 Special Issue, PP-211-213, 2017
16. Saravana Kumar, A., Hameed Hussain, J., Expanding the pass percentage in semester examination, International Journal of Pure and Applied Mathematics, V-116, I-15 Special Issue, PP-45-48, 2017

17. Saravana, S., Arulselvi, S., AdaBoost SVM based brain tumour image segmentation and classification, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-399-403, 2017
18. Saravana, S., Arulselvi, S., Dynamic power management monitoring and controlling system using wireless sensor network, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-405-408, 2017
19. Saravana, S., Arulselvi, S., Clustered morphic algorithm based medical image analysis, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-411-415, 2017
20. Saravana, S., Arulselvi, S., Networks, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-393-396, 2017
21. Saritha, B., Chockalingam, M.P., Adsorptive removal of heavy metal chromium from aqueous medium using modified natural adsorbent, International Journal of Civil Engineering and Technology, V-8, I-8, PP-1382-1387, 2017
22. Saritha, B., Chockalingam, M.P., Adsorptive removal of brilliant green dye by modified coconut shell adsorbent, International Journal of Pure and Applied Mathematics, V-116, I-13 Special Issue, PP-211-215, 2017
23. Saritha, B., Chockalingam, M.P., Photodegradation of eriochrome black-T dye from aqueous medium by photocatalysis, International Journal of Pure and Applied Mathematics, V-116, I-13 Special Issue, PP-183-187, 2017
24. Saritha, B., Chockalingam, M.P., Photodradation of malachite green DYE using TiO_2 /activated carbon composite, International Journal of Civil Engineering and Technology, V-8, I-8, PP-156-163, 2017
25. Saritha, B., Chockalingam, M.P., Synthesis of photocatalytic composite Fe-C/TiO₂ for degradation of malachite green dye from aqueous medium, International Journal of Pure and Applied Mathematics, V-116, I-13 Special Issue, PP-177-181, 2017
26. Saritha, B., Chockalingam, M.P., Removal of heavy $\text{X}^{\text{X}}\text{l}$ from aqueous medium using modified natural adsorbent, International Journal of Pure and Applied Mathematics, V-116, I-13 Special Issue, PP-205-210, 2017
27. Saritha, B., Chockalingam, M.P., Degradation of malachite green dye using a semiconductor composite, International Journal of Pure and Applied Mathematics, V-116, I-13 Special Issue, PP-195-199, 2017
28. Sartiha, B., Chockalingam, M.P., Photocatalytic decolourisationof textileindustry wastewaterby TiO₂, International Journal of Pure and Applied Mathematics, V-116, I-18 Special Issue, PP-221-224, 2017
29. Sartiha, B., Chockalingam, M.P., Study on photocatalytic degradation of Crystal Violet dye using a semiconductor, International Journal of Pure and Applied Mathematics, V-116, I-18 Special Issue, PP-209-212, 2017
30. Shanthi, E., Nalini, C., Rama, A., The effect of highly-available epistemologies on hardware and architecture, International Journal of Pharmacy and Technology, V-8, I-3, PP-17082-17086, 2016
31. Shanthi, E., Nalini, C., Rama, A., Drith: Autonomous,random communication, International Journal of Pharmacy and Technology, V-8, I-3, PP-17002-17006, 2016

32. Shanthi, E., Nalini, C., Rama, A., A case for replication, International Journal of Pharmacy and Technology, V-8, I-3, PP-17234-17238, 2016
33. Shanthi, E., Nalini, C., Rama, A., Elve: A methodology for the emulation of robots, International Journal of Pharmacy and Technology, V-8, I-3, PP-17182-17187, 2016
34. Shanthi, E., Nalini, C., Rama, A., Autonomous epistemologies for 802.11 mesh networks, International Journal of Pharmacy and Technology, V-8, I-3, PP-17087-17093, 2016
35. Sharavanan, R., Golden Renjith, R.J., Design and analysis of fuel flow in bend pipes, International Journal of Pure and Applied Mathematics, V-116, I-15 Special Issue, PP-59-64, 2017
36. Sharavanan, R., Jose Ananth Vino, V., Emission analysis of C.I engine run by diesel, sunflower oil, 2 ethyl hexyl nitrate blends, International Journal of Pure and Applied Mathematics, V-116, I-14 Special Issue, PP-403-408, 2017
37. Sharavanan, R., Sabarish, R., Design of built-in hydraulic jack for light motor vehicles, International Journal of Pure and Applied Mathematics, V-116, I-17 Special Issue, PP-457-460, 2017
38. Sharavanan, R., Sabarish, R., Design and fabrication of aqua silencer using charcoal and lime stone, International Journal of Pure and Applied Mathematics, V-116, I-14 Special Issue, PP-513-516, 2017
39. Sharmila, G., Thooyamani, K.P., Kausalya, R., A schoolwork on customer relationship management with special reference to domain 2 host, International Journal of Pure and Applied Mathematics, V-116, I-20 Special Issue, PP-199-203, 2017
40. Sharmila, S., Jeyanthi Rebecca, L., Anbuselvi, S., Kowsalya, E., Kripanand, N.R., Tanty, D.S., Choudhary, P., Swathy Priya, L., GC-MS analysis of biofuel extracted from marine algae, Der Pharmacia Lettre, V-8, I-3, PP-204-214, 2016
41. Sidharth Raj, R.S., Sangeetha, M., Data embedding method using adaptive pixel pair matching method, International Journal of Pure and Applied Mathematics, V-116, I-15 Special Issue, PP-417-421, 2017
42. Sidharth Raj, R.S., Sangeetha, M., Android based industrial fault monitoring, International Journal of Pure and Applied Mathematics, V-116, I-15 Special Issue, PP-423-427, 2017
43. Sidharth Raj, R.S., Sangeetha, M., Mobile robot system control through an brain computer interface, International Journal of Pure and Applied Mathematics, V-116, I-15 Special Issue, PP-413-415, 2017
44. Sivaraman, K., Sundarraj, B., Decisive lesion detection in digital fundus image, International Journal of Pure and Applied Mathematics, V-116, I-10 Special Issue, PP-161-164, 2017
45. Sridhar, J., Sriram, M., Cloud privacy preserving for dynamic groups, International Journal of Pure and Applied Mathematics, V-116, I-8 Special Issue, PP-117-120, 2017

