Pharma Science Monitor 9(4),Oct-Dec 2018

PHARMA SCIENCE MONITOR

AN INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES

Journal home page: http://www.pharmasm.com

IDENTIFICATION OF GYPENOSIDE BY USING NMR SPECTROSCOPY

Vaghela Yavantika1* and Pragnesh Patani[2]

[1]Student of master of pharmacy, Department of Quality assurance, A-one Pharmacy College, Enasan, Ahmedabad, Gujarat, India.
[2]Principal, Department of pharmacology, A-one Pharmacy College, Enasan, Ahmedabad, Gujarat, India.

ABSTRACT

From the cucurbitaceae family *Zeheneria scabra* is an important Climber, and that plant having the different many traditional uses in the traditional medical system. Zeheneria scabra is used to treat different medicinal conditions like fever, diarrhoea, skin diseases, stomach pain and livestock. So for the treatment of all the condition plants having such chemical compounds and those chemical compounds are identified by using Nuclear Magnetic Resonance spectroscopy (NMR) having ability to identified the bioactive chemical compound. The proton nuclear magnetic resonance spectra of the root samples were identified by the presence of Gypenoside. So we can conclude that this active pharmaceutical ingredient having the capability to cure the vast condition and some disease.

KEYWORDS: Cucurbitaceae, Gypenoside, Nuclear Magnetic Resonance, Phytochemistry, Pharmaceutical ingredient, Root, *Zeheneria scabra*.

INTRODUCTION

All of the pharmacologically active compounds are obtained from the plants and number of active pharmaceutical ingredients are used from the beginning of the 19TH century [1]. Until the 19TH century the healing properties of the active pharmaceutical ingredient is not known which are obtained from the Natural plant and their plant parts. Medicinal plants having different active pharmaceutical ingredients and from that few of them are major active ingredients. Active principles in the plant and plant parts re mainly found by using Modern pharmaceutical researches. All the active ingredients are obtained from the plants are different from other plants, even different in other organs of the same plant and that is just because of their diversity.

There are different plant parts used as herbal drugs like Roots, barks, turings, flowers, leaves, fruits and seed and by obtaining from the nature these all having lots of adulterants. For the identification of the plant parts their Morphological, histological and Pharmacognostic information is required. For the identification of active pharmaceutical ingredient, whatever it is known or Unidentified, Required to standardized the compound by using their suitable and Appropriate chemical methods like Chromatographic and Spectra study [2].

One of the plant *Zeheneria scabra* (L.F) having greater importance just because of the high medicinal value in the herbal and its therapeutic action. This plant having different activities to heal the disease like stomach pain, fever and skin disease etc. It is most important drug to heal livestock in various ailments. Fruits are used for curing Stomach pain. Some of the peoples used the root of *Zeheneria scabra* for hanging in front of their house and they are hoping like this plant will prevent the disease entry in their house which are caused by different pathogens. To treat Fever and Diarrhoea the roots of the Zeheneria scabra (L.F) is used with milk [3]. So here we are going to give review on Active pharmaceutical ingredient identification by using Nuclear Magnetic Resonance (NMR) spectroscopy.

MATERIALS AND METHODS

Sample Source

Zeheneria scabra (L.F) is the plant that is found in many types from different Natural forests and the plants are not easily found and not in a wide spread condition. With the help of the local peoples around that forest area where the plants are found the roots of the *Zeheneria scabra* (L.F) identified. After collection of the root, The material is washed under running water many times. After washing the roots were cut into a small-small pieces and then allow to dry under sun light for 03 days. After this 03 days allow the roots to completely dried for 12 days. After proper drying of the roots they are grinded into a fine powder. By using suitable Organic solvent like Ethyl Acetate, Extraction of the pharmaceutical active compound done by using the soxhlet apparatus, and after the collection of this extract the NMR analysis of this particular ingredient is carried out.

NMR *Studies:*

A Nuclear Magnetic Resonance (NMR) gives number of information about the structure of the active compound. In the NMR Spectroscopic method our compound is placed in the strong magnetic field and here that field is affecting the spin of the Atomic nuclei. The nuclei this reorients when a Radio waves are passes through the compound. When the source of this radio waves turns off at that time the Central nuclei release the Energy pulses and that Energy pulses give the information about the Physical and Chemical Structure of the Compound and by using the modern technologies this information is transferred to the connected Computer into an Image form [4]. The NMR studies were carried out in Southern petrochemical industries corporation (SPIC), Tuticorin, Tamilnadu, India.

After the purification of the sample compound the sample was placed in an inert solvent like Tri-chloro (deuterio) methane ($CDCL_3$), Deuterium oxide (D_2O), carbon tetrachloride (CCl_4) and

then between the two powerful magnets the compound was placed. According to the molecular environmental condition of the compound molecule the different chemical shift of that proton were measured in the NMR apparatus relative to a standards, usually Tetramethylsilane (TMS).

All the Chemical shifts are measured in ppm unit,

$\delta = \Delta v \times 10^6 / v_{op}$

Δv being the difference in absorption frequency of the sample and the reference compound (TMS) in Hertz units and v_{op} in the Operating frequency.

How many protons are resonating at the same frequency is integrated by the intensity of the impacted signal. Each chemical shift value corresponds to a set of protons in a particular environment.

RESULT AND DISCUSSION

The chemical shift values are given in the following table for their various signals and their functional group.

Table: NMR data and their assignments for the plant extract of *Zeheneria scabra* (L.F)

Chemical shift (δ ppm)	**Nature of proton**
0.99	$-CH_3$
1.3 – 1.7	$-CH_3$ & $-CH_2-$
2.07	$-CH_3$
2.33	-CH-
2.88	-CH-
3.75	$-OCH_3-$
5.10	-OH
5.3	-CH=CH-

In highly shielded environment at 0.99 ppm indicates the presence of methyl protons ($-CH_3$). Between the range of 1.3 to 1.7 ppm indicates the presence of methyl & methylenic proton in Polycyclic ring. At 2.07 ppm is indicating the presence of methyl protons in the slightly deshielded environment a singlet signal at 2.33 ppm and 2.88 ppm indicating the methynic proton in the deshielded environment. At 3.75 ppm the methoxy protons ($-OCH_3$) gives a singlet signals. At 5.10 ppm the presence of the hydroxy proton (-OH) is identified. The doublet signal at 5.3 ppm the presence of ethylenic proton is Identified [5&6].

The *Zeheneria scabra* plant is also containing other cucurbitaceae member like Gynostemna pentaphyllum other than Gypenoside [7&8].

Figure 1 NMR spectrum of the extract of Zehneria scabra

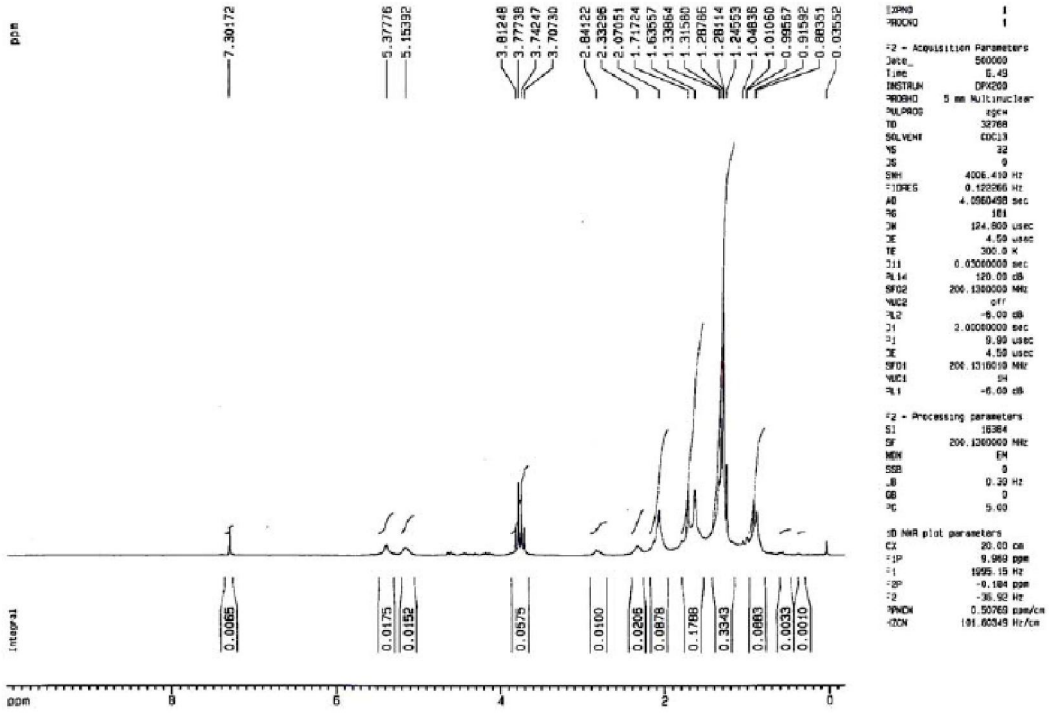
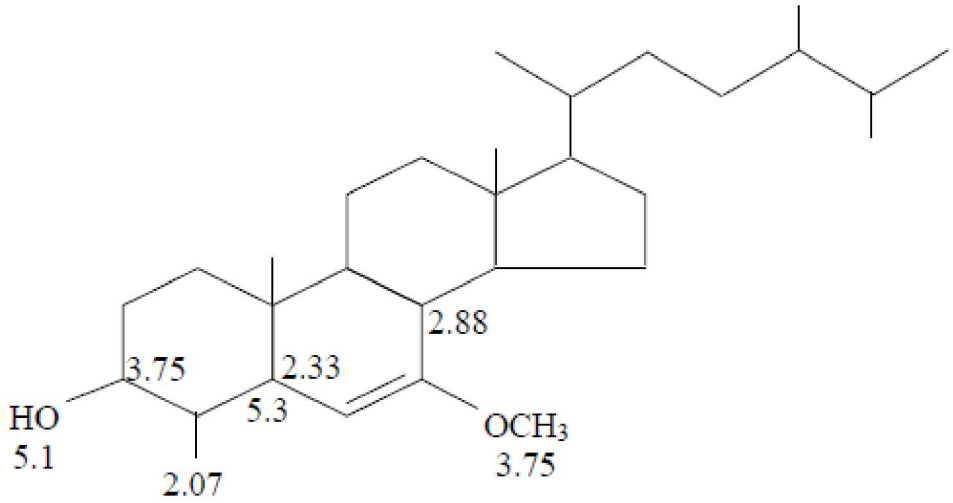


Figure 2 – Structure of Gypenoside



China Pharmaceutical Company is the Manufacturer of the Gypenoside. They formulate it in the tablet dosage form. The Gypenoside is used as a tonic for health support and nourishment. The tablets are also used as supplemental medicines for treating different disease. By dissolving or mixing the powdered Gypenoside in water then it transferred to the liquid dosage form of the Gypenoside.

Phytochemical study of the *Zeheneria scabra* reveals the identification and presence of the Active ingredients, Gypenoside and their therapeutic importance. And the clinical study of this Active pharmaceutical ingredients would giving a profile in herbal medicines.

CONCLUSION

From this review we can conclude that by using the Nuclear Magnetic Resonance spectroscopy we can easily get information about the physical and chemical structure of the Gypenoside an active pharmaceutical ingredient obtained from the *Zeheneria scabra*(L.F).

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