ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Analysis of Subcellular Localization Sites and Calculation of Isotopic Mass for *Catharanthus roseus.*

Ramanathan K[1], Arun N[2] and Kalaiselvan S[3]

[1] Department of Bioinformatics, Thanthai Hans Roever College, Perambalur, Tamil Nadu, India.
[2] Department of Biochemistry, Vysya College, Salem, Tamil Nadu, India.
[3] Department of Biotechnology, Thanthai Hans Roever College, Perambalur, Tamil Nadu, India.

ABSTRACT

The aim of the study is to investigate the sub cellular localization sites for *Catharanthus roseus* and calculate the isotopic mass value for the elements present in the sample. The Plant sequence was retrieved and the localization sites were predicted by using PSORT tool. It shows Chloroplast Thylakoid Membrane has the highest value of 0.780. Isotopic mass was calculated for the elements present in the sample and it shows the carbon has the mass of 36536.549. From these results, it could be possible to understand the activity of the plant and we suggest that this plant may address the problem of cancer and act as an antitumor agent.

Keywords: Sub cellular Localization sites, *Catharanthus roseus,* Isotopic Mass value, Elements, Antitumour agent

Corresponding author

ISSN: 0975-8585

INTRODUCTION

In the last century, the compounds derived from the plants and utilized for ornamental purpose and in the preparation of medicines. Nowadays, *Catharanthus roseus* is a popular and familiar plant and it has sumptuous medicinal activity. It belongs to the family *Apocynaceae.* Self compatibility and a relatively high tolerance of disturbance have enabled this species to spread from cultivation and naturalise in many parts of the world. As a consequence, this species is sometimes considered to be an invasive weed, although it does not normally proliferate sufficiently to eliminate native vegetation. [1]

The researchers found that the *Catharanthus roseus* have anti-diabetic properties due to the presence of several highly toxic alkaloids present in it. These alkaloids are used in the treatment of different types of cancer with one derived compound vincristine. The alkaloid Alstonine which has been used to reduce blood pressure. The anti cancer drug namely Vincristine and Vinblastine are produced from *Catharanthus roseus* and it has number of Pharmaceutical Activities. [2]

Anti cancer drug Vinblastine and vincristine are alkaloids found in *Catharanthus Roseus.* They are administered intravenously and these solutions are fatal if they are administered any other way and can cause a lot of tissue irritation if they leak out of the vein. Although these compounds are very similar in structure and have the same basic action and they have distinctly different effects on the body. [3]

Plant and phytochemical products continue to play an important role in medicine. The toxicological potentials of the aqueous leaf extract of *Catharanthus roseus* was used to treat cancer. [4] *Catharanthus roseous* produces phenols, chemicals to protect itself but resent research demonstrate that may phytochemicals can protect humans against diseases. [5]

In *Catharanthus roseus* is known to produce a distinct spectrum of terpenoid indole alkaloids. Since the invaluable anti neoplastic bis indole alkaloids are restricted to the aerial parts of the plant and do not occur in its underground tissues, identification of the structural and regulatory factors operating distinctly in the shoot and leaf of the plant. [6]*Catharanthus roseus* is very important and different parts of the plant used in the treatments of various diseases in many numbers of countries. Moreover, more than 130 alkaloids have been isolated from different parts in which two important alkaloids Vinblastine and Vincristine are used in cancer treatment present in very low concentrations. Thus, in present communication various in vitro biotechnological and biochemical approaches have been used all over the world. [7]

The preliminary cytotoxicity study demonstrated does independent cytotoxic activity of methanol extract of. *Catharanthus roseus* when screened (HCT116) colorectal carcinoma cell line. N-hexane, chloroform and methanol fractions showed does independent cytotoxic activity with chloroform fractions showing the highest activity. [8]

ISSN: 0975-8585

The antibacterial and antidiabetic activities of whole plant extract of *Catharanthus roseus* has been evaluated by the researchers. [9] The Exhibition of antioxidant and anti mutation that suggested the chemo preventive potential against various cancers including breast cancer. This research was conducted to investigate anticancer activity of *Catharanthus roseus.* [10]

METHODOLOGY

The *Catharanthus Roseus* sequence was collected from the database and submitted to PSORT tool for the analysis of Sub Cellular Localization Sites. The Localization sites were predicted and the values were retrieved for the regions. The sequence was also subjected to Isotopident tool for the calculation of isotopic mass. The mass values were calculated for the elements such as Carbon, Hydrogen, Oxygen, Nitrogen and Sulphur. Finally, the values were compared and discussed.

RESULTS AND DISCUSSION

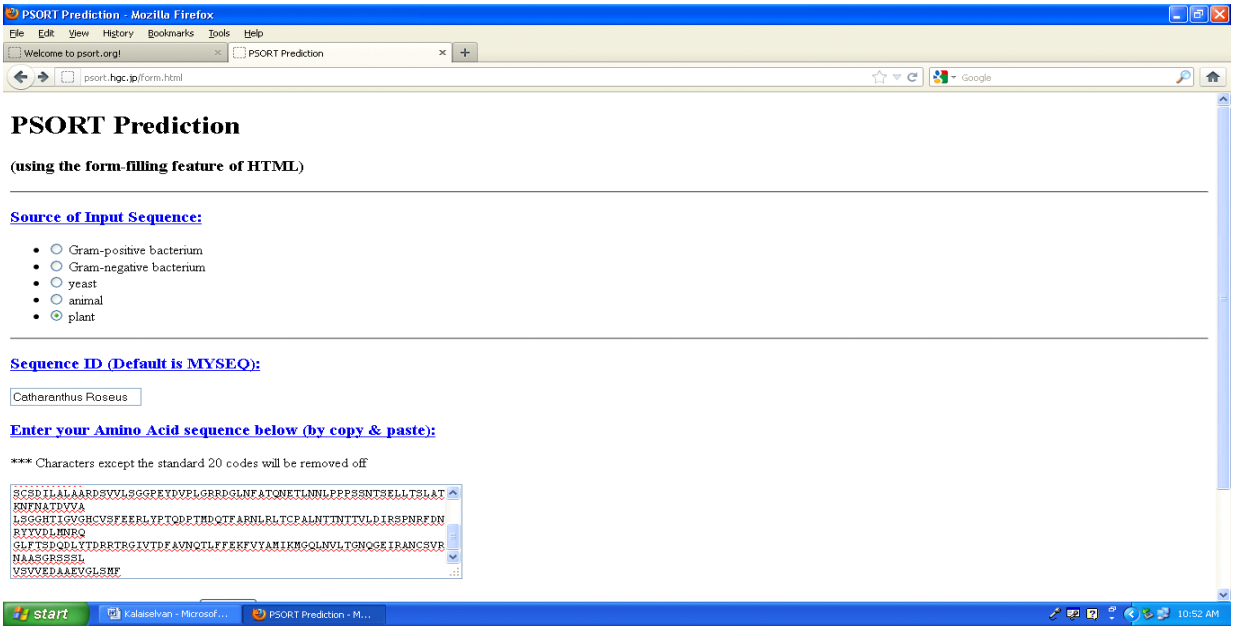


Fig 1: Submission of the plant sequence to the PSORT tool

Table 1: Analysis of Sub Cellular Localization

S.No.	Sub Cellular Localization	Composition
1	Chloroplasts Thylakoid Membrane	0.780
2	Mitochondrial Inner Membrane	0.749
3	Chloroplasts Stroma	0.666
4	Chloroplasts Thylakoid Space	0.666

ISSN: 0975-8585

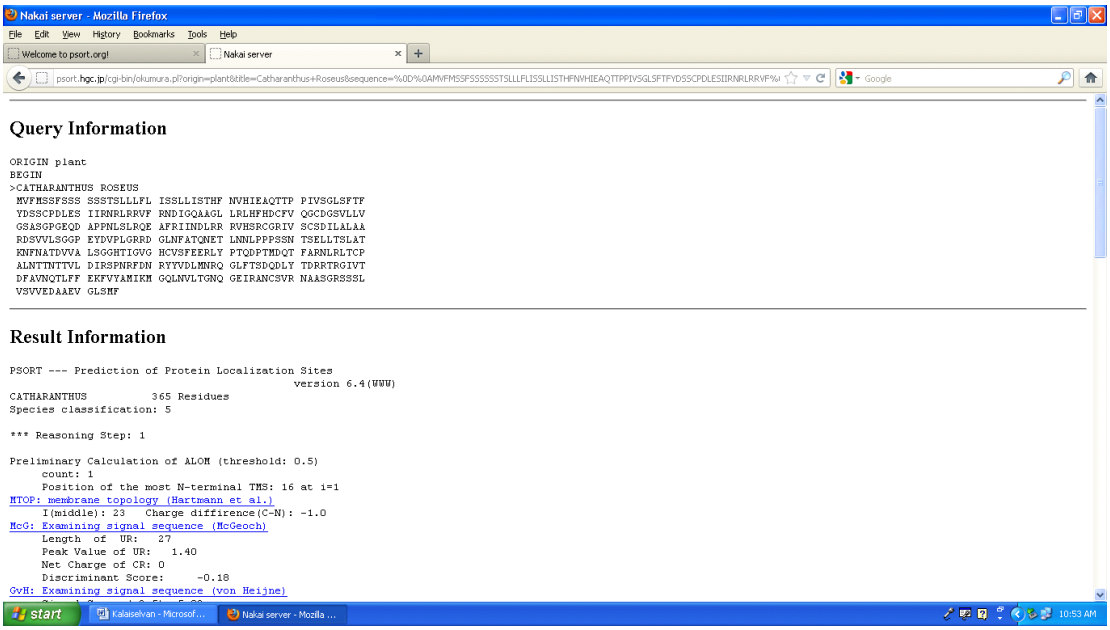


Fig 2: Prediction of Sub cellular Localization

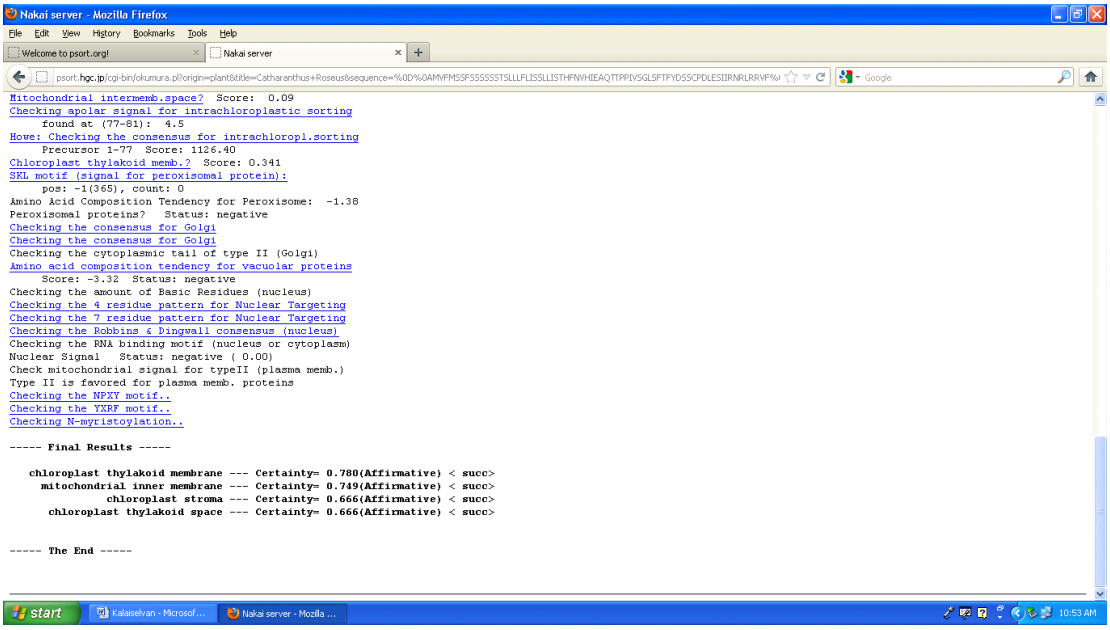


Fig 3: Composition of Sub cellular Localization

ISSN: 0975-8585

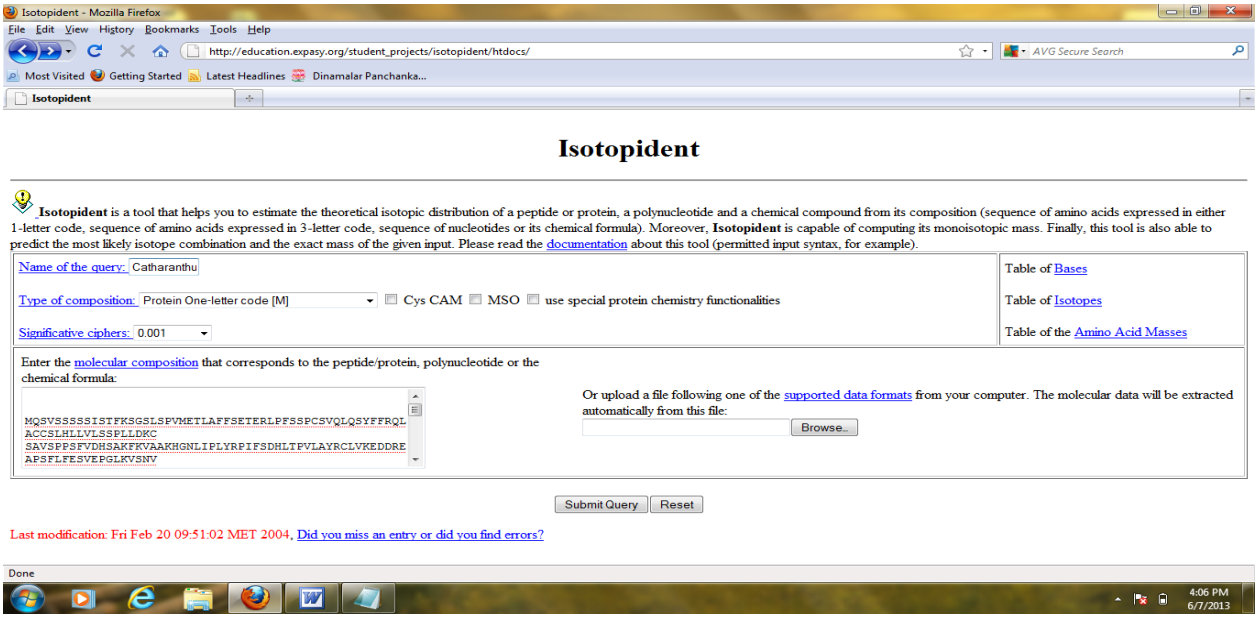


Fig 4: Submission of plant sequence to Isotopident tool

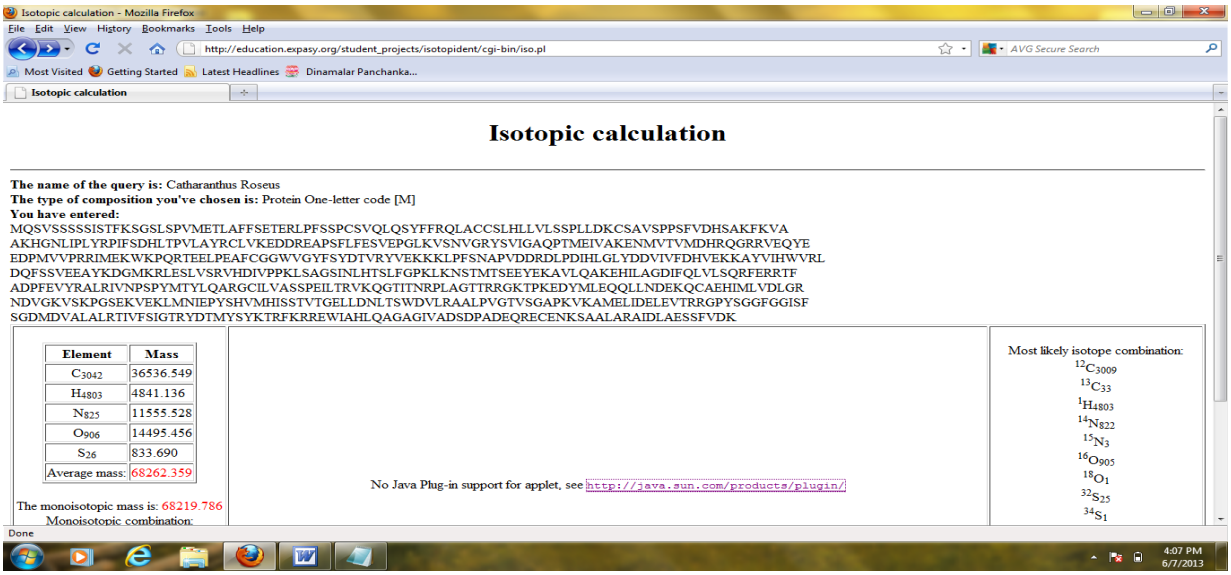
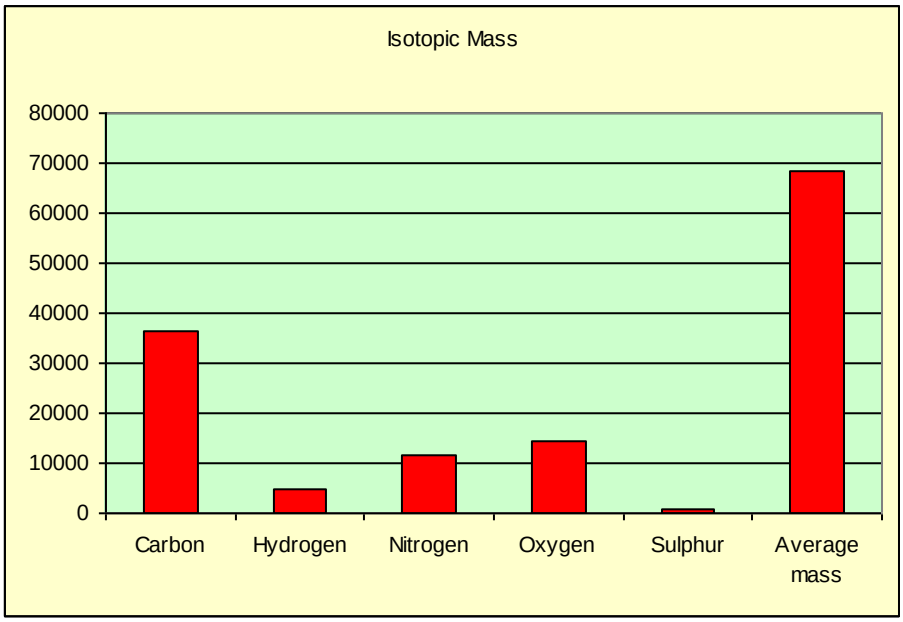


Fig 5: Calculation of Isotopic mass for the sequence

Table 2: Composition of Isotopic mass for the elements

Element	Mass
C_{3042}	36536.549
H_{4803}	4841.136
N_{825}	11555.528
O_{906}	14495.456
S_{26}	833.690
Average mass	68262.359

ISSN: 0975-8585



Graph 1: Composition of Isotopic masses

DISCUSSION

The *Catharanthus Roseus* sequence was collected from the database and submitted to PSORT tool for the analysis of Sub Cellular Localization Sites. (Fig 1) The sub cellular localization regions were predicted and displayed in Fig 2. In Fig 3, the composition of regions in the sites was derived from the tool. The Regions were Chloroplasts Thylakoid Membrane, Mitochondrial inner Membrane, Chloroplasts Stroma and Chloroplasts Thylakoid space. The Composition values for these regions showed as 0.780 and 0.749 for Chloroplasts Thylakoid Membrane and Mitochondrial inner Membrane respectively. The values 0.666 and 0.666 for Chloroplasts Stroma and Chloroplasts Thylakoid space. The Sequence was also submitted to Isotopident tool for the Calculation of mass value. (Fig 4) The atom Carbon, Hydrogen, Oxygen, Nitrogen and Sulphur plays a major role in the functioning of biomolecules. Fig 5 shows that the isotopic calculation of mass for these atoms. It shows the value for Carbon is 36536.549 and 4841.136 for Hydrogen. The values 11555.528, 14495.456 and 833.690 for Oxygen, Nitrogen and Sulphur respectively. The element Carbon has the highest mass value while Sulphur is very less. The element Oxygen and Nitrogen has a moderate value while hydrogen is less when compared with these elements. The average mass value for the above elements is that 68262.359 is showed in Table 2. Graph 1 show that the comparison of mass value and graphical representation of elements based on the values.

CONCLUSION

The *Catharanthus Roseus* sequence was retrieved from database and the sub cellular localization sites were identified. The Plant sequence which shows Chloroplast thylakoid membrane has the highest value of 0.780. It plays a significant role in all the biological

functions. The sequence was also subjected to isotopic mass calculation and the mass value for the elements was calculated. From these observations, we found that the atom carbon has the highest mass value which is present in the *Catharanthus Roseus* sample.

REFERENCES

[1] Pandey SK Gupta and AK Mukherjee. J Environ Biol 2007; 28(3): 655-662.
[2] Prerona Saha UK Mazumder, PK Haldar, Sagar Naskar, Sriparna Kundu, Asis Bala, Biswakanth Kar. Int J Res Pharm Sci 2011; 2(1): 52-59.
[3] Sathiya SB, Karthikeyan, Cheruth Abdul Jaleel, MM Azooz and Muhammad Iqbal. Global Journal of Molecular Sciences 2008; 3(1): 01-07 ISSN 1990-9241.
[4] James S, Bilbiss and Muhammad BY. World J 2007; 2(1): 5 -9.
[5] Bagalkotkar G, Sagineedu SR, Saadms and Stanslas J. J Pharm Pharmacol 2006; 58(2): 1570
[6] Ashutosh K Shukla, Ajit K Shasany, Madan M Gupta and Suman PS Khanuja. J Exp Bot 2006; 57(14): 3921–3932.
[7] Azra Ataei-Azimi, Babak Delnavaz Hashemloian, Hassan Ebrahimzadeh and Ahmad Majd. African J Biotechnol 2008; 7(16): 2834-2839.
[8] Siddiqui MJ, Z Ismail, AFA Ashia, AMS Abdul majid. Int J Pharmacol 2010; 6(1):43 -47.
[9] Mohammed Ibrahim, Syeda Sughra Mehjabeen and Mangamoori Lakshmi Narsu. International Journal of Pharmaceutical Applications 2011; 2(3): 165-173.
[10] Wahyu Widowati Tjandrawati Mozef, Chandra Risdian, Hana Ratnawati, Susy Tjahjani, Ferry Sandra. International Research Journal of Biochemistry and Bioinformatics 2011; 1(2): 022-028.