



Analytical and Statistical Investigation of Some Medicinal Plants

Syed. U. K Asema, Sayyad Sultan, , Mohd. Asif, Pathan Mohd. Arif

Department of Chemistry, Maulana Azad College, Aurangabad.

ABSTRACT

The determination of analytical parameters of nine medicinal plant extracts namely Black Night, Black Wood, Cyndon Daclyton, Caesal Piniaceae, Enicostema Axiuae, Five Leaved Cheast, Milk Hedge, Prickly Poppy and Wood Apple. Total ash, Alcohol soluble extractive, Acid Insoluble Ash, ether soluble extractives and sodium were analysed as analytical parameters. The values obtained were subjected to the statistical analysis by evaluating the correlation coefficient and the regression equations were obtained.

INTRODUCTION

India has one of the richest herbal medical traditions in the world. Ayurveda is the system of traditional medicine prevalent in India since 2000 B.C. Ayurveda meaning the "science of life", is the oldest existing medical system recognized by WHO which is widely practiced. India is a land of immense biodiversity. The World Health Organization (WHO) estimates that about 80% of the population living in the developing countries relies on traditional medicine for their primary health care needs. In almost all the traditional systems of medicine, the medicinal plants play a major role and constitute their backbone. Indian Materia Medica includes about 2000 drugs of natural origin almost all of which are derived from different traditional systems and folklore practices¹. Many plant extracts have been shown to inhibit the growth of microorganisms. These extracts consist of chemicals and are usually considered to play a role in defense reactions of plants, towards infections by pathogenic microorganisms².

The human body requires a number of minerals in order to maintain good health. A number of minerals essential to human nutrition are accumulated in different parts of plants as it accumulates minerals essential for growth from the environment³. In the present analysis we have included sodium as a mineral under study.



The analytical parameters of the plants have not been studied yet and hence in this work an attempt is made to study the analytical parameters of the nine medicinal plants and its correlation coefficient is calculated to establish whether there is linear relationship between two variables and regression equations are obtained.

METHODOLOGY

The collection of the samples was done from the local field of Aurangabad (Maharashtra) since the area is rich in vegetation. The fresh plant material used in this study consisted of leaves of Black Night, Black Wood, Cyndon Daclyton, Caesal Piniaceae, Enicostema Axiuae, Five Leaved Cheast, Milk Hedge, Prickly Poppy and Wood Apple. The air dried plant materials were ground into fine powder and were used for the analysis of different parameters like total ash, acid insoluble ash, alcohol soluble extractive, ether soluble extractive and sodium. All these parameters for the plant material were estimated by using the standard procedure⁴.

RESULT & DISCUSSION

Table 1 contains all the values of total ash and acid insoluble ash and the extractives of ether, alcohol soluble of all the plants under study and sodium. Total ash is represented towards to inorganic material that is present in plants. The highest amount of ash i.e. 1.087% was present in Black Night sample and the lowest in Wood Apple i.e. 0.420%. Acid Insoluble ash was 0.248% which was highest in Cyndon Daclyton and 0.004% in Wood Apple. Extractives of ether, alcohol and water soluble were also studied and it was found that the high level of ether extractives were found in Five Leaved Cheast and it was 1.53%. Alcohol Soluble Extractives was found to be maximum 0.447% in Caesal Piniaceae. Maximum amount of sodium was found in Enicostema Axiuae (35.3 ppm) and minimum amount was found in Milk Hedge (2.8 ppm). Physicochemical Analysis of the Aqueous Extracts of Six Nigerian Medicinal Plants was studied by Sunday J Ameh et al⁵ and they concluded that the extracts possess characteristics that predispose them to possible development into solid dosage forms.

The literary survey reveals that some plants contain different metals. Determination of different trace elements was done by G.D. Kaniyas and S.M. Philianos⁶ by neutron activation analysis and



they reported that antimony has aselective accumulation in the rhizome of plant and chlorinewas found in leaves. The study of the concentration of mineral elements in medicinal plants is important becauseknowledge of their composition and of the factors affectingit will probably lead to conclusion of economically value.Analysis of mineral and heavy metals in some medicinal plants collected from local market was studied by R. Subramanian et al by using AAS⁷. Some metals, e.g., sodium, potassium, magnesium and calcium, that are required in relatively large amounts in the body are called macro-elements⁸. In the ash of plant the sodiumpresent were determined using flame photometer.Maximum amount of sodium was found in EnicostemaAxiuae (35.3 ppm) and minimum amount was found in Milk Hedge (2.8 ppm).

To establish whether there is linear relationship between two variables, Pearson's correlation coefficient 'r' is used. The value of r must lie between +1 and -1; the nearer it is to ± 1 , the greater the probability that a definite relationship exist between the variables x & y; values close to -1 indicates negative correlation. Values of r that tend towards zero indicates that x & y are not linearly related they may be related in a non linear fashion⁹. Correlation can acquaint us with something about the relationship between variables. It is used to understand whether the relationship is positive or negative and the strength of relationship.Correlation is a powerful tool that provides these vital pieces of information

Table 2 displays the statistical data of the correlation coefficient between the different parameters of medicinal plants. In the present analysis there exist positive correlation between most of the parameters and negative correlation between ether soluble extractives and total ash Sodium and total ash, Alcohol soluble extractives and Acid insoluble ash, sodium and Acid insoluble ash.

Linear regression analysis is a powerful technique used for predicting the unknown value of a variable from the known value of another variable.Different regression equations are developed using the data obtained for five parameters and different samples of medicinal plants having correlation with Total Ash. The equations are shown in table no 3.



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Table 1

Parameters	<i>Black Night</i>	<i>Black Wood</i>	<i>Cyndon Daclyton</i>	<i>Caesal Piniaceae</i>	<i>Eniscotema Axiuae</i>	Five Leaved Chest	Milk Hedge	Prickly Poppy	Wood Apple
Total Ash	1.087	0.627	0.603	0.711	0.489	0.604	0.554	0.56	0.420
Acid Insoluble Ash	0.061	0.034	0.248	0.12	0.037	0.017	0.037	0.009	0.004
Ether Soluble Extractive	0.123	0.197	0.81	0.71	0.68	1.53	0.55	0.56	0.113
Alcohol Soluble Extractive	0.296	0.257	0.136	0.447	0.365	0.374	0.278	0.315	0.241
Sodium (ppm)	6.5	12.7	9.1	22.7	35.3	10.3	2.8	2.8	19.00

Table 2: Correlation Matrix among Different Parameters of Medicinal Plants

	Total Ash	AIA	ESE	ASE	Sodium
Total Ash	1				
AIA	0.1839	1			
ESE	-0.2083	0.16464	1		
ASE	0.121	-0.4054	0.329917	1	
Sodium	-0.3038	-0.02136	0.021329	0.403731	1

Table 3 Regression equations for different parameters of medicinal plants

$AIA = 0.0747 \text{ total ash} + 0.0161$
$ESE = -0.4816 \text{ Total ash} + 0.6160$
$ASE = 0.0569 \text{ Total ash} + 0.2653$
$Sodium = -16.8686 \text{ Total ash} + 24.0651$