INNOVARE JOURNAL OF AYURVEDIC SCIENCES

Vol 6, Issue 1, 2018

ISSN- 2321-6832

Research Article

LIPOPHILICITY PROFILING ON THE BASIC OF OECD GUIDELINE OF *HARIDRA* HYDROALCOHOLIC EXTRACT ON THE BASIS OF ITS MARKER COMPOUND CURCUMIN

AZAD SINGH*

Department of Pharmaceutical Laboratory, IPGT and RA, Jamnagar, Gujarat Ayurved University, Gujarat, India.
Email: azadaswal@gmail.com

Received: 12 May 2018, Revised and Accepted: 01 June 2018

ABSTRACT

Objective: The objective of this study was to calculate the lipophilicity (LOG P) of *Haridra* extracts on the basis of their main chemical compound curcumin.

Methods: As per the OECD guidelines for the testing of chemical adopted by the council on July 27, 1995, partition, and partition coefficient (n-octanol/water): Shake flask method, this experiment is performed in this first extracts are prepared by raw herbal drugs (*Haridra*, coarse powder). Snyder classified solvents based on their interactions with three solutes determined by their gas–liquid partition coefficients corrected for differences in solvent size, polarizability, and dispersion interactions**.**

Results: *Haridra* shows hydrophilicity and its marker compound shows LOG P.

Conclusion: *Haridra* is highly useful drugs its pharmacological activity is anti-inflammation, useful in the skin. However, where curcumin is more potent due to its lipophilic property. It is highly useful in various alignments.

Keywords: OECD, Ayurveda, Solvent, Polarizability.

INTRODUCTION

Haridra is well-known plant used in Ayurveda from ancient time. It is also well-known spice which is found in India and Sri Lanka. The Latin name of this plant is *Curcuma longa* and belonging to *Zingiberaceae* family. It is shrub and rhizomes are used as a drug. It acts as a Rasayana Dravya according to ancient texts [1]. It is a dazzling yellow color component. *Haridra* is Lekhaneeya, Kushthaghna, and Vishaghna. It is Ushna in quality. It is used in many forms and through many routes of administration such as nasal, oral, and over the skin. Curcumin is a polyphenolic component of the *Haridra*. It is high therapeutic value because it will affect most of adjusts multiple cell signaling pathways. The pharmacokinetics is proved that its effects against several chronic diseases in human. Curcumin is used because of its multifunctional properties [2,3]. One of its roles is played in medicinal sciences as it is used to treat the bacterial infection, inflammation, any digestive disorders, and burns, and it has also been used in many traditional spices in several countries, especially in Asia. It also the effects on the cardiovascular system and atherosclerosis as diet has many roles in modulating the risk of development of several diseases [4-8]. It will also demonstrate its anti-inflammatory, antioxidant, anticarcinogenic, antithrombotic, and cardiovascular protective effects. Modern scientific research has demonstrated of curcumin in haemostasis, anticoagulation, and fibrinolysis [18]. It also presented molecular mechanisms associated with the antiplatelet and anticoagulant activities of curcumin and potential implications for the treatment of cardiovascular disease. Then, Snyder's solvent selectivity triangle generated more interest and critical examination [9-14]. Snyder based his solvent characterization scheme on Rohrschneider gas–liquid partition coefficients for three test solutes, ethanol, dioxane, and methane and in 82 common solvents. In which three solutes were taken to probe the ability of each solvent to participate in proton acceptor, a proton donor, and dipolar interactions. However, as Cooper and Smith point out, in the Snyder system, "proton donor characteristics" actually refer to a solvent's ability to interact with a proton acceptor (dioxane). It is not an actual measure of proton donating capability, and thus a solvent (or solute) can be classified as a proton donor even though it contains no protons. The same qualification applies to proton acceptors, which are classified as such based on an ability to interact with a proton donor (ethanol). On the basis of curcumin quantitative value, we will enrich the protocol for the manufacturing of the curcumin [15-17].

Materials

The drugs collected from the Pharmacy of Gujarat Ayurved University, Jamnagar, India. The authentification is done in the Pharmacognostic laboratory, Gujarat Ayurved University, Jamnagar, India, with authentication number 6251.

METHODS

1. Drugs are cursed in coarse powder with the help of mixie (Fig. 1).
2. Weighed accurately 100 g of drugs in butter paper.
3. Take six conical flasks and put the weighed drugs sample in it.
4. Then, pour the chemicals solvents using graduated cylinders in it as per calculation.
5. Cover it and kept it for 24 h and shake it gently when the solvent added to it (Fig. 2).
6. After 24 h, filter it with the help of cotton and simple filter paper (Fig. 3).
7. Then, take glass evaporated disks weighed it and kept the filtrated solvent in it. Heat it until all solvent is evaporated (Fig. 4).
8. Kept this dry evaporated in the oven in 15 min, then cooled it (Fig. 5).
9. Collect the extract and weight it 1 mg and dissolve in the solvent present in separating funnel. Kept it for 24 h (Fig. 6).
10. After 24 h separate the octanol solvent and water contains solvent (Fig. 7).
11. Make the dilution from water solvent and fill it in a test tube (Fig. 8).
12. Measure the absorbance using with spectrophotometer standard compound and calculate the lipophilicity (LOG P) as prescribed below (Fig. 9).

RESULTS AND OBSERVATIONS

Formula used:

1. STDOD/STDCON=SAMPLEOD/SAMPLECON.
2. LOGP = LOG (CON OF OCTANOL)/CON OF DISTILL WATER.

Fig. 1: Authentication number of *Haridra*

Fig. 2: Prepation of *Haridra* hydroalcholic extract by (50:50)

Fig. 3: Filtration of Extract Solvent

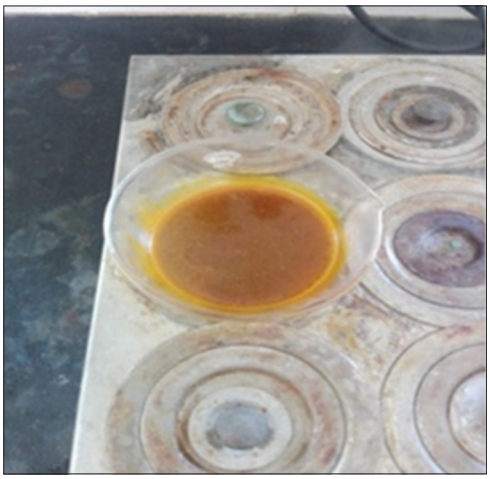

Fig. 4: Boiling of *Haridra* Extract in Boiling Apparatus

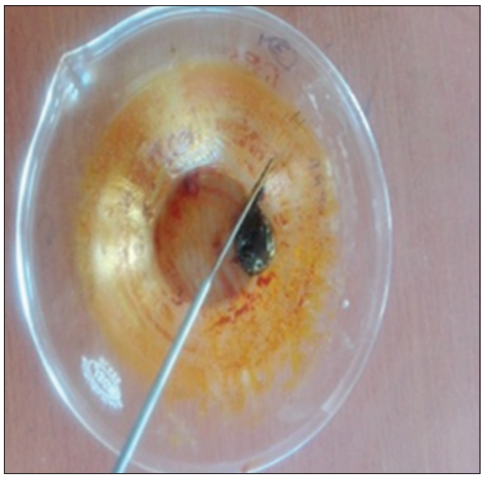

Fig. 5: Scraping of Extract

Fig. 6: Partition coefficient of *Haridra* extract by n-octanol and water media. (50:50)

Where,

Standard (STD), OD (optical density), Concentration (CON), and Lipophilicity (LOG P).

All the solvents have a different LOG P (Table 1) it indicates that with the help of solvents we will affect the LOG P of the raw drugs. Hence, this is essential information that if we change the solvents system the raw drugs will also behave a different way. This is a vast field. There is still a lot of work done in this field.

Fig. 7: Small conical flask contains for the measurement of lipophilicity

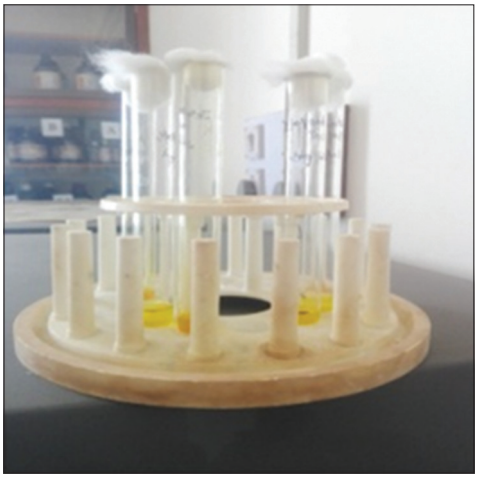

Fig. 8: Different concentration for Curcumin to measure *Haridra* log p values

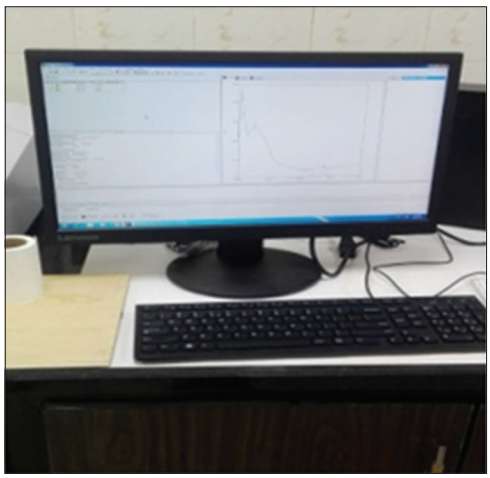

Fig. 9: Desktop of UV spectrophotometer for readings of lipophilicity

CONCLUSION

The natural product is always having a specific property and behavior in this research I have found that the behavior is totally changed with the solvents system. Curcumin shows LOG P. Where *Haridra* extract is hydrophilic in nature, but while in the presence of solvents he extremely changes its behaviors toward LOG P. This result shows that in extreme environment the curcumin present in getting changes its behavior to LOG P.behavior to LOG P (Table 1).

Table 10: LOG P on different solvents in *Haridra* extracts as per Snyder triangle

S. No	Solvents used in *Amalaki* for extraction	LOG P
1.	Methanol: water	−4
2.	Methanol: acetone	−3.74
3.	Diethyl ether: toluene	−3.88
4.	Propane-1-Ol: toluene	−4.32
5.	Curcumin	3.26

LOG P: Lipophilicity

ACKNOWLEDGMENT

The author is very thankful to Dr. Vinay Kumar Shukla, Head of the Department, Department of Pharmaceutical Chemistry laboratory, IPGT and RA Jamnagar, Gujarat, India, for providing the research facilities.

REFERENCES

1. N SJL. Dravyaguna Vigyan. In. Varanasi: Chaukhamba Orientalia; 2005. p. 513-514.
2. Mand JK, Soni GL, Gupta PP, Singh R. J Res Educ Ind Med 1991;10:1-7.
3. Ghosh A, Li P, Ghosh A, Wagner RF, Krill S, Joshi YM, Serajuddin AT. Effect of combined use of non-ionic surfactant on formation of oil-in-water micro emulsions. Int J Pharm 1993;31:116-20.
4. Mathur R, Sharma A, Dixit VP, Varma M.J Ethnopharmacol 1996;50:61-8.
5. Singh BN, Sharma PV. Herbalism, photochemistry and ethno pharmacology. J Res Ind Med 1971;5:223.
6. Wang NP, Wang ZF, Tootle S, Philip T, Zhao ZQ. Curcumin promotes cardiac repair and ameliorates cardiac dysfunction following myocardial infarction. Br J Pharmacol 2012;167(7):1550-62.
7. Al-gubury HY, Almaamory ES, Alsaady HH, Almurshidy GS. Photocatalytic degradation of aquatic rhodamine B solution using ultraviolet light and zinc oxide. Res J Pharm Biol Chem Sci 2015;6:929.
8. Ruwaida AR, Al-gubury HY, Aseel MA, Ayad FA. Photocatalytic degradation of reactive green dye by using zinc oxide. J Chem Pharm Sci 2016;9:1134-8.
9. Al-gubury HY. The effect of coupled titanium dioxide and cobalt oxide on photocatalytic degradation of malachite green. Int J Chem Tech Res 2016;9:227-35.
10. Stahl E, editor. Thin-Layer Chromatography. A Laboratory Handbook. 2nd ed. Berlin, Heidelberg: Springer; 1969.
11. Gasparic J, Kralove H. Chromatography on thin layers impregnated with organic stationary phases. Adv Chromatogr 1992;31:153-252.
12. OECD. Test Guideline 107, Decision of the Council C (81) 30 Final. Paris: OECD; 1981.
13. Hansch C, Leo AJ. Substituent Constants for Correlation Analysis in Chemistry and Biology. New York: John Wiley; 1979.
14. Renberg L, Sundstrom G, Sundh-Nygard K. Application of reverse-phase h.p.l.c. for the determination of partition coefficients. Chemosphere 1980;80:683.
15. Ellgehausen H, D'Hondt C, Fuerer R. Reversed-phase chromatography as a general method for determining octan-1-ol/water partition coefficients. Pestic Sci 1981;12:219.
16. McDuffie B. Chemosphere 1981, 10, 73-82. 2. Howard, PH, editor. Handbook of Fate and Exposure Data for Organic Chemicals II. Chelsea: Lewis Publishers; 1990.
17. Hammers WE, Meurs G J, De Ligny CL. Activity coefficients.interfacial tensions and retentionin reversed-phaseliquid chromatographyon lichrosorbrp-is with methanol-watermixtures. J Chromatographia 1982;247: 1-13.
18. Keihanian F, Saeidinia A, Bagheri RK, Johnston TP, Sahebkar A. Curcumin, haemostasis, thrombosis and coagulation; J Cell Physiol. DOI: 10.1002/jcp.26249.