Journal of Cell and Tissue Research Vol. 23(2): 7371-7374 (2023)
(Available online at www.tcrjournals.com)
ISSN: 0973-0028; E-ISSN: 0974-0910

Review Article

HERBS AND HERBAL EXTRACTS, THE FUTURE MEDICINES (PROBLEMS AND SOLUTIONS): A REVIEW

BADAMI, S.

SDM College of Pharmaceutical Sciences, SDM University, Dharwad-580009, Karnataka, India. Email: shribadami@rediffmail.com

Received: July 30, 2023

Abstract: Herbal drug and Phyto chemists were so far involved in research unknowingly utilizing not so perfect methodologies, means not considering the effects of temperature during powdering and extraction, selecting solvents other than those used in traditional medicine and testing the plants for their pharmacological activities in a manner different from traditional use. Only on experience, one will accumulate knowledge and solve such errors. In this article, some such ideal suggestions for medicinal plant researchers is given in order to protect the traditional knowledge in the hands of untrained wrong testing methodology followers.

Keywords: Herbal medicine

INTRODUCTION

As alternative therapies becoming famous, medicinal plant derived products are gaining momentum in our daily life including cosmetics, nutraceuticals, drugs, paints, perfumery, etc. The resurgence in the use of medicinal plants resulted from the increasing awareness in the general public about the toxic effects of chemicals on the human body, as allopathic drugs are also of same origin. Increasing incidences of cancer, heart problems, diabetes, and other life style diseases further increased the demand for these products. The public perception is changing. They don't want to take a risk by using chemical based products and anything sold under the name of natural, herbal is accepted widely. Though synthetic caffeine, curcumin, etc., are available in the market chiefly, based on the demand by the general public, industries are eager to purchase such materials of plant origin by paying higher prices.

Scientists are also in search of eco-friendly techniques for the extraction and isolation of plant-based products. For example, chlorogenic acid made

Dr Shrishailappa Badami has worked in the field of medicinal plants research for more than four decades and considered as an expert. He has worked in academics in various capacities for more than 30 years and a receiver of STARS, best pharmacy teacher and researcher award in 2009, given by American Alumni Association of Govt College of Pharmacy, Bengaluru. He is a strong supporter of traditional medicine and argue that its protection is very important and the research should aim in establishing it rather than destroying it by using wrong testing methodologies.

Dedication: I would like to express my heartfelt gratitude for Dr. P.D. Gupta's on celebrate of his 85th birthday, it brings me tremendous pleasure to dedicate my research endeavors to him

caffeine free without the use of chloroform, but by natural solvents is the need of industries today. Herbal formulations for food, cosmetics and drug usage are in great value in the market today. Herbal excipients like emulsifiers, frothing agents, diluents, colours and flavours are also in demand. There is a need to train our younger generation in phyto-techniques to supply the demand created in recent years and to sustain the competition of other developing countries. Issues related to resurgence of herbal medicines, the industrial needs, the present direction of herbal research, whether the scope continues in future, etc., is discussed here.

Herbal sale, cancer and lifestyle diseases: There is no second opinion about this. World is fast moving towards cancer now a days. Its prevention along with other life style diseases is essential for the survival of all life on earth. Modern lifestyle is the major causative factor for all the health catastrophes seen around the world. A healthy and sustainable future for our children depends on us. Back to nature - looks strange for some, impossible for a majority, but inevitable especially when one look at the health impact of man-made chemicals on humans and even the wild. Natural medicines in future are the only alternatives left and essential for our generations to live, as modern drugs are also considered as chemicals. The trend of rapid increase in herbal drugs sale is already seen in world market [1].

Synthetic vs natural: Since ancient times, edible plants and their fruits have been the basis of many traditional medicines and continuing to provide humankind with new remedies. For more than a century now, people treated most diseases with synthetic drugs, which have defeated many illnesses and thereby allowed to increase the overall quality of life and its extension. In addition, the advent of biotechnological drugs has further improved the treatment of many chronic diseases.

However, over the recent decades, the world has witnessed a return to natural remedies to prevent or treat a large number of degenerative diseases [2]. Frequently, they are employed when minor health problems occur, however they can even be used as co-adjuvants for synthetic drugs in major health problems. Indeed, natural drugs, supplements and functional foods raised interest in the general population, which more often prefers to use these remedies rather than synthetic ones. This choice is preferred because they are easier to use and exert fewer side effects, thus contributing to increased patients' compliance. Hence, up to 80% of people are using natural remedies worldwide and their effectiveness is evaluated and proven by clinical studies.

Several other reports also suggest that bio-active compounds in natural ingredients reduce proliferationand transformation of cells, tumor angiogenesis and metastasis [3]. If the natural extracts prove to possess cancer and other degenerative disease prevention potential, preventive strategies based on the commonly used dietary sources will be ideal as they are likely to be free of side effects and could be implemented with ease. Moreover, the human system is adapted to these dietary ingredients. Additionally, these extracts may be taken along-side with the conventional chemotherapy and radiotherapy treatment regimens to augment their therapeutic potency.

Prevention – better option: Another approach to prevent degenerative diseases is following a combination of a healthy life style and diet habits, employing "food as medicines". In particular, cancer prevention comes from healthy habits, as nearly 30–40% of cancer incidence might be prevented by a proper diet and physical activity in order to maintain appropriate body weight [4]. It has also been suggested that high dietary intake of vegetables and fruits could prevent at least 20% of all cancer cases. Nutraceuticals, food supplements and natural remedies are known to improve one's natural defence's or to rebalance some loss of nutritional factors important to maintain the health status. On the contrary, employment of synthetic drugs for preventive purpose is not advisable, mainly because of the side effects that may arise. Indeed, even if natural products are not without risk, generally they are safer than synthetic drugs, have a reasonably effectiveness as well as meet patient's compliance.

Single drugs vs natural extracts: Herbs, plant extracts, botanicals, spices, and supplements are increasingly popular with all kinds of patients throughout the world, including those struggling with serious illnesses like mesothelioma and other types of cancer.Many natural drugs are single compounds, some of these are implemented in clinical practice to

prevent or treat several diseases, including cancer. Taxanes such as paclitaxel and Vinca alkaloids such as vinblastine are examples of active principles derived from plants that are prescribed in cancer therapy. However, it was hypothesized [5] that a single biologically active molecule, even if used at high concentrations, could not be sufficient in preventing or treating cancer because several different pathways are involved in malignant progression or sometimes toxic. Therefore, employment of complex mixtures of biologically active substances, such as those present in whole fruits and vegetables, juices or their extracts, increases the chances of success against cancer. The logic behind this hypothesis is: (i) the additive and synergistic actions of their individual components and (ii) their simultaneous modulation of different intracellular targets involved in oncogenesis. Thus, a cocktail of pharmacological actions is playing to induce the anticancer effect.

Non polar vs polar extracts: The imbalance of redox and inflammatory pathways between the inside of tumor cells and their surrounding stroma is important in tumorigenesis, invasion and consequent systemic diffusion. Therefore, the use of antioxidant and anti-inflammatory substances mainly derived from natural origins is highly desirable in the treatment of malignant tumors and are generally safer than synthetic drugs. Polar extracts show excellent antioxidant properties when compared to the non-polar extracts and hence, are better for use in commercial formulations.

Usually aqueous, alcoholic, hydro-alcoholic and ethyl acetate extracts are considered as polar extracts and solvents like hexane, petroleum ether, chloroform, benzene, etc are non-polar. The non-polar extract use in industry has seen drastic decline with studies proving cancer causing properties of some of these solvents even in small quantities. There is a need for the industries to switch over to polar extraction if not preferred so far. Since ethyl acetate is found naturally in some plants, it is considered as natural.

Some studies found that commonly used aqueous natural extracts can induce cell death in cancer cells and lower the number of dividing cells and increased effects of tamoxifen when combined with the natural extracts. E.g. Enhancement of Tamoxifen-induced cell death of MCF-7 cells with equol, a soya phytochemical [6].

Temperature effects: Exposure to high temperatures during processing of plants leads to decomposition of phytoconstituents, especially glycosides releasing free sugars. For the same reason, too much fine powdering of herbs shall be avoided. Herbs and their extracts with low glycemic index are better and preferred. Hence, it is of utmost importance to take care, avoiding high temperatures especially during powdering of herbs, extraction and concentration of the extracts. The Herbal and Ayurvedic industries should adopt processes which involve less decomposition of the original constituents.

Additive or synergistic effects of natural compounds combined with chemo-preventive agents has also been suggested and it is also helping in mitigating drug-associated toxicities.For example, genistein which is used for its chemopreventive effects in human breast cancers has also shown anti-proliferatory effect in breast cancer cells. Genistein was sensitizing the prostate cancer to radiation, and similarly *iso*-flavones from soya were able to reduce the adverse effects of radiation in men[7].

Lack of clinical studies: Though a large body of evidence of pre-clinical studies on the effects of herbs and their extracts is available, a current limitation for their employment is that clinical studies are only a few and their results were obtained through self-assessed tests on patients. Both short, long-term and multi hospital studies involving more number of patients are necessary.The governments should support such studies by funding. If this aspect is taken care of, then a vast scope for the international sale of herbs and their extracts open up without any doubt.

Herbs and their extracts which are already in use as food components have high potential in preventive medicine, can be consumed routinely, put into use with little effort and widely acceptable as they have been a part of Ayurveda, an ancient system of Indian medicine.

Screening a formulation or plant: Without any prejudice, they should involve in such research and test the phyto-samples as it is, means in the same formulation in the beginning, instead of testing each plant/plant extract separately. Once the formulation is effective, then search should continue in identifying the most beneficial plant among the plants involved in the formulation.

CONCLUSION

Phytochemists and phytopharmacologists worked mostly so far were not considering the effects of polarity, temperature, method of use in traditional medicine, short- and long-term benefits or toxicities, while screening the medicinal plants for biological properties. Researchers must be trained in such aspects before starting their research on phytomedicines. Screening a phytomedicine in the same formulation or combination of herbs is utmost important in the beginning, which can be further continued to identify the active ingredients. The plant constituents are vulnerable to high temperatures, which usually the researchers won't think. The plant constituents shall be extracted in a manner such that their structures and composition should be similar to those present in the plant. Such measures, though look silly are utmost important and not considering the same might have contributed to most of the negative results, reported so far. This paper discussed and provided suitable remedies to medicinal plant researchers to farther their research.

REFERENCES

[1] Bareetseng S.: J Biomed Res Environ Sci. 2022; 3(5): 575-584.

[2] Di Paolo M, Papi L, Gori F, Turillazzi E. Int J Mol Sci. 2019;20:5170.

[3] Yuan M, Zhang G, Bai W, Han X, Li C, Bian S. Oxid Med Cell Longev. 2022; 2022:1429869.

[4] Tomasetti C, Vogelstein B.Science. 2015;347:78.

[5] Cirmi S, Maugeri A, Ferlazzo N, Gangemi S, Calapai G, Schumacher U, Navarra M. Front Pharmacol. 2017;8:420.

[6] Charalambous C, Pitta CA. BMC Cancer. 2013;13:238.

[7] Landauer MR, Harvey AJ, Kaytor MD, Day RM. J Radiat Res. 2019;60:308.