

Anticancer Effects of and Direction of Research on Hippophae

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Seabuckthorn, *Hippophae rhamnoides* L., belongs to genus Hippophae in family Elaeagnaceae. Hippophae berry was the common medicine used in ancient China by Tibet and Mongolia doctors, it had pharmacological functions like making expectoration easy, good for lungs and stomach, invigorating the function of the spleen, removing blood stasis and promote blood circulation etc., it was already recorded in <<The rare medicine book of the king of Moon>>, <<The four medical dictionaries>> in Tang dynasty, and <<A book on Chinese herbal medicine>> in Qing dynasty. In 1977, the Chinese Department of Public Health officially listed Hippophae in the <<The dictionary of Chinese Medicines>>. After the directive "Taking Seabuckthorn as a springboard to the accelerated conservation work of the loess plateau" issued by Mr. Qian Zhengying in November, 1985, the medical researches on Seabuckthorn had caused more attention in the medical research areas all over the country, as an important project in water and soil conservation, bringing the land under control, and helping those poor to be rich, and using in accelerating the medical research on Hippophae, the achievement is obvious and huge in the "seventh five-year period". It was demonstrated that Hippophae had very precious medical value, and is a very promising Chinese medicine. However, as an anti-cancer medicine, we need more works according to the <<The Methods in Examining and Approving New Medicines> by the Department of Public health, and need strict, standardized and scientific researches. If one want share Hippophae as an anti-cancer medicine with the public, first one need the full information of the scientific researches, and then apply to the Public Health bureau in different areas, and then send to the Office of the New Medicine Examination and Approve at Department of Health Public, and examine by the Medicine Examination Committee, approve by the Department of Public Health until the Certificate of the Medicine is obtained. In this paper, the evaluation of the anticancer effects of and direction of research on Hippophae were discussed.

1. Studies on the part of Hippophae for medicine

According the <<The Methods in Examining and Approving of the New Medicines>>, the studies of the new medicines divided into five categories, each category had its own requirement, which category does Hippophae belong to?

The berry of Hippophae was used as medicine according to the Hippophae listed in <<Chinese dictionary of medicines>>, which was made into the Chinese medicine mixture without any chemical extraction, and this belongs to the third category of new medicines. It will belong to the second category of new medicine if it was extracted by any chemicals, or using its root, leaf or bark in making into new medicines, in the different category of new medicines, the items and depth of researches will be different, and the requirement for examination and approve will also be different. Thus, it is necessary that one select a certain part of Hippophae in making new medicine, and then put into effects according to its requirements.

At present, for the research on the anticancer effect by Hippophae, because there were no united leadership and organization, researcher in different areas started the first step by selecting the anti-cancer compounds according to their own condition, and there were various reports, the anti-cancer experiments were conducted by extracting compounds from seven parts of the plant, root, leaf, bark, fruit juice, fruit oil, residue oil and seed oil, and promising results were achieved which lay a very good foundation for Hippophae research. However, there were no definite answers to the questions: which part of Hippophae, which ingredients, and which cancer in human body it could resist to? Because there were no in depth studies, no comparable analysis, and no compounds had been identified in anti-cancer function, and could not conduct the stage II clinical research, those questions were unanswerable.

Thus, for selection anti-cancer medicines, one should make a full selection from the different medical using part of Hippophae. This will need long time and is very expensive, and need the full financial and resource support in order to conduct the in depth study for an clear answer. If studied from Hippophae oil, it will be possible to put the anti-cancer researchers together, and organized an combined an anti-cancer study group, and united leaded according to << the Methods in Examining and Approving New Medicine>>, and conduct more experiments, and that will made it possible to have a break through in the short period.

2. Studies on the anticancer effectiveness of Hippophae

It was clearly listed in <<the Methods in Examining and Approving New Medicines>> that: (1) The pharmacological effectiveness of the new medicine methods need to be demonstrated in at least two methods: *in vivo* and *in vitro*, among them, one has to be the normal intact animal or the animal pathological model, each experiment need the negative control and the positive control by known medicine, and all data need statistic treatment. (2). The experiment need at least two dosage and different treatment methods.

Analysis the known experimental research information on anticancer by Hippophae available at present, most of them were not coincided with the above two rules. In some studies, there were only negative control without any positive control by known medicine; in some experiments, even there were positive control, the inhibition of Hippophae oil on the cancer cells was not as effective as the positive medicine, for example, the cancer inhibition rate of phosphamide was twice as much as Hippophae. In some experiments, there were only study on one cancer cells, with only one treatment method etc.. In all those experiments, it was the first step in selection with some preliminary anticancer information, no definite conclusion could be obtained.

Beside, even there were effectiveness in anticancer experiments in animals, one cannot say that it will also effective in human body. Because in the animal cell , there were

high malignant, and the growth was very rapid, and was more sensitive to medicines than the natural occurred cancer in human body. Thus, the medicines which were effective in inhibiting animal cancer could be not effective in human body. This was decided by the difference in biological characters between animal cancers and human cancer. In the National Cancer Institute of the United State, for seeking the effective medicine for human cancer, they used the human cancer cell lines and *in vitro* selected the effective medicines preliminarily, and then transferred the human cancer cells into the mouse or immunized mouse to test its effectiveness on human cancer. Recently, they also transferred the cancer cell into the normal mouse kidney cystocytes to observe the inhibition of the cancer cells growth by the medicine.

To promote the researches on the anticancer effectiveness of Hippophae, it is urgent to form the key task group, and then according to the above requirements, and worked by referring to the <<Selection process of the anticancer medicines in vivo>> made in 1983. Three cancer cell lines is needed: sarcoma, ascites type cancer and leukemia, it was proposed that S₁₈₀, A's ascites type cancer, L₆₁₅ leukemia should be used. NCI in the United State recommended to use P₃₅₈ (leukemia), W256 (mouse Wake sarcoma), B₁₆(melanin cancer), Co₃₈ (colon cancer), 3LL (Lewis lung cancer). If possible, other three human cancer cell lines: MXI, LXI, CXI (breast cancer, lung cancer, colon cancer respectively) should be added. After the effectiveness was confirmed, there were further steps to go, mainly (1). Testing more cancers; (2) select the most sensitive cancer and compared with the known effectiveness medicines; (3) studies on the rational treatment methods; (4) rational time period in giving the medicine; (5) the anticancer mechanism studies. After all those above information were obtained, one will then apply to the Office of the new medicine examination and approved by Department of Public Health for the clinical studies.

3. The clinical studies of the anticancer by Hippophae

Only when experiments of the effectiveness, toxicology, processing technology, quality control of the products, and the stability of the medicine were finished, the clinical studies should then be applied to conduct.

The clinical studies were divided into stage I, II, III, and should be conducted in the hospital which had all the scientific research equipment and was approved more than three months, and should strictly conducted according to rules of control, random and blind methods, and need the positive anti-cancer medicine which was known and listed in the medical dictionary medicine. In the stage I clinical studies, the main study items were the reaction and endurance of human body to the new medicine, and search for the safe dosage, and propose the ration method in treatment and the items need to noticed. In the stage II clinical studies, the main study items were evaluate the effectiveness and safety of the new medicine, and then compared with the known effective medicine, and pointed out its advantages and disadvantages, all the new medicines belong to category 1-3 need the stage I, II clinical test. Only when the strict scientific stage II clinical studies had been conducted, the effective of the medicine could be concluded.

4. The future of medical application of Hippophae

From ancient to present, in and outside the country, the practice and studies had demonstrated that the pharmacological functions of Hippophae is regarded as positive.

Hippophae contains vitamin A source (β -carotenoid), vitamin C, K₁, B₁, B₂, corn flavin, tomatine, flavonoids, folic acid, trace elements, steroids, terpenes, fatty acids, tannin, 5-hydroxytryptophan etc. active ingredients. According to reports outside the country, the active ingredients in the Hippophae berry had already reached more than 190 compounds, and in the oil there were 106 active compounds (among them, there were six fat soluble vitamins, 22 fatty acids, 42 lipids, and 3 flavonoids and phenols). All those active ingredients make the Hippophae into a very precious medical plant, and is very promising in pharmacological application.

At present, studies that is in depth were the effect of Hippophae fruit oil on anti-ulcer, increase the tissue regenerate, improve the ulcer recovery, could used in treating cervix erosion and bedsores. Total flavonoids had very good effects on the coronary heart disease, angina pectoris. The Hippophae flavonoid tablet had already been used in clinics. The health beverage and health food also could adjust the human immunological function, and could improve the resistance to diseases in human body.

About the anti-cancer function, it need more extensive studies to draw the final conclusion. However, analyzing from its rich nutrient ingredients and biological active compounds, combined with the individual report from folks, it is very promising to make Hippophae into a synergetic anti-cancer medicine by improving the immunological function in the body, or a assistant anti-cancer medicine in relieving the side-effect of some chemical therapies.

References

1. Xu Mingyu et al., The general situation of the medical application of Hippophae. Proceeding of the international conference of Hippophae, Xian: 1989: 237-239.
2. Xu Mingyu et al., The present and the future of the medical application of Hippophae. The water and soil conservation in China, 1991; (5):38.
3. Zhang Peizhen et al., The anti-cancer effect of Hippophae fruit juice oil, seed oil and its effect on the immunological function. Proceeding of the international conference of Hippophae, Xian: 1989:271.
4. Yang Jianping et al, The preliminary study on the anti-cancer function of Hippophae residue oil. Proceeding of the international conference of Hippophae, Xian: 1989: 279.
5. Tang Jin et al., The preliminary study of the effect of Hippophae leaf on liver cancer caused by flavacol toxin B₁. Proceeding of the international conference of Hippophae, Xian: 1989: 281.

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6. Zhang Peizheng, The anti-cancer activity of Hippophae seed oil and its effect on the weight of the immunological organs. Hippophae, 1989; (3):31.
7. Xu Shuyun et al., The methodology of the pharmacology experiments: Methods of the experiments of the anti-cancer medicines, the second edition, Beijing: The people's health press, 1991:1423.

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