

THE ANALYTICAL PROBLEMS INVOLVED IN THE GINSENG PRODUCTS ON THE EUROPEAN MARKET

Finn Sandberg

*Uppsala Univ. Biomedicinska Centrum Institutionen for Formakognosi
SWEDEN*

When I was invited here four years ago to the first International Ginseng Symposium, I had the pleasure to present the result of an investigation of the Pharmaton preparation Gerikomplex and its near "relative" Geriatric. It was found that these preparations produced an improved psychomotor activity and improved simultaneous capacity of young healthy students in Sweden.

Since that time I have been asked many times for the validity of the results. From a strictly scientific point of view it is valid only for the preparation used and the group of volunteers involved. However, I am quite convinced that results also apply to all young and grown-up people in Europe and North America.

Does it apply to other ginseng preparations? Again, from a strictly scientific point of view it is valid only for that particular batch of capsules that was used; but it will certainly be valid for other batches of capsules, provided they have an identical composition. Here comes the problem!

The need for quantitative and qualitative assay of ginseng root has become very acute in West European countries. One reason for this is the new laws and requirements that now have been introduced in various countries, among others, in my own country. In Sweden a registration is required for a natural product remedy.

Thus, in Sweden it is now required for such

a natural product remedy an exact declaration of the content, *i.e.* the exact amount of each ingredient. And how to indicate the amount of ginseng?

Well, you can indicate the amount of powdered root *without any further details*. But, against such a statement you can raise the entitled criticism that this is very inaccurate, because, as everybody in the audience knows, the amount of active ingredients might vary considerably.

The classification of ginseng root according to size and external appearance, that was demonstrated for us here in Korea four years ago, is totally misleading, since it does not give any information as regards the qualitative and quantitative contents of ginsenosides, now considered to be the most important active ingredients of the ginseng root.

An ideal analysis should of course show both the qualitative and quantitative composition of the ginsenoside mixture, that occurs in the ginseng root.

According to our experience the best method available for this purpose is the gas chromatography—mass spectrometry method described by Bombardelli *et al.* (*Fitoterapia*, **47**, 99, 1976). However, it has its limitations: it requires a very expensive apparatus and it can only be used for purified extracts—not for tablets and capsules

on the present European market. As far as my knowledge reaches, only Inverni della Beffa has used it for control of their extract.

It is therefore a great need for another less expensive method that can give the quantitative amount of *total ginsenosides*. However such a method should then be combined with a TLC with at least two references.

Before a quantitative determination both extract and powdered tablets must be purified. For this purpose we have used absorption on an Amberlite XAD₄ —column proposed by R. Bombardelli.

As a colorimetric determination two methods have been tried:

A. The reaction between ginsenosides and antimony trichloride in perchloric acid at 60°C, giving an absorption maximum at 525 nm.

B. The reaction between ginsenosides and vanillin and sulfuric acid at 60°C, giving an absorption maximum at 545–550 nm. Our experience shows that these methods are not exact quantitative, they are semiquantitative, method B being somewhat more accurate than method A.

With HPLC we reinvestigated a Swiss proposal for determination of ginsenoside Rg₁. Using the RP 18-column in methanol-water (reversed phases) it was found that the proposed Rg₁-peak in reality is the peak of Rg₁ and Re, whereas Rb₁ does not appear at all.

As regards TLC, I consider it important to have at least two references of pure ginsenosides to be sure that you really have a *Panax ginseng* extract. I have had an argument with the German company Finselberg, which produces the ginseng extract for many products under various names on the European market.

Leaving the details it was found after a reinvestigation that the Finselberg extract was used in far too low amount in two Swedish prepara-

tions: "Gerogin" AB Carls-Bergh and "Korean Ginseng", Svenska Örtmedicinska Institutet.

To be correct, the other preparations investigated contained acceptable amounts of ginsenosides.

The worst analytical problems are the preparations (tablets, capsules) containing—besides ginseng extract—vitamins, metals and liquorice. It must be admitted that up to now there is no acceptable method for analysis of such preparation.

It is strongly recommended that the chemists who are present here, should get together for a detailed and constructive discussion of this difficult problem.

I have stressed the inaccuracy of the potency of the ginseng drug - the difficulty of expressing its potency in exact terms. This also reveals the striking inaccuracy of the dosage. It is in fact very difficult to compare the effective dosage between various preparations. Furthermore the basis of a rational dosage of ginseng, according to my knowledge, is almost non-existing.

One constant problem—analytical and also clinical in nature—is the difference between red and white ginseng. One of the most irresponsible marketing organisations in Sweden by the name of Korean Ginseng Center in Helsingborg makes the flat statement: "Red ginseng is best and most effective." Before leaving this symposium I want to have proofs for this statement, in which I do not believe at all. Their further statement: "Buy Korean ginseng, then you know that you get a pure product of effective *Panax ginseng* without addition of synthetic vitamins" will certainly upset some of the participants of this symposium. Such statements will certainly not increase the reputation of the famous ginseng root—we have still "a long march" to do.