

VELVET ANTLER: THE TISSUE, THE PRODUCT AND PHARMACOLOGY

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For hundreds of years velvet antler has been used as a medicine in the Eastern countries of China, Korea, Tibet and Japan. Recently research, particularly in South Korea and the Soviet Union, has provided experimental evidence for some of the effects claimed for antler preparations.

The tissue

Mature hard antler is bone. However, the antler tissue, as first synthesised, consists mainly of the protein, collagen. This matures into cartilage and eventually is converted into bone, mainly under the influence of the stag's sex hormones. Consequently, the "velvet antler" when cut at the appropriate stage for use as a high quality product for traditional medicines is an actively growing cartilage type-tissue and is not of uniform composition.

The product

The composition changes from the tip to the base of the antler are reflected in a Chinese system of classifying the parts of velvet antler(7). For 'A' grade antler, the upper main beam and trez tine are classified as parts I and II while the antler base is classified as part IV. The calcium (Ca) and phosphorus (P) contents of the antler reflect the

degree of calcification and conversion into bone. The few samples of New Zealand 'A' grade antler analysed at Invermay had the following composition:

Parts I and II:	4- 5% Ca and 2-3% P in the dry matter (DM).
Part III	6-10% Ca and 3.5-5.5% P in the DM.
Part IV	10-12% Ca and 6.7% P in the DM.

Overall the whole of such an antler would contain about 7-9% Ca and 4-5% P with an actual dry weight of about 30% of the fresh or green weight.

As a medicinal product velvet antler may be prepared in a variety of different ways. For example, the blood may be extracted or the skin removed prior to drying; it may be immersed in boiling water and then kiln-dried, hot air-dried or just hung to dry. After drying it may be used as the crude antler preparation, having been sliced or powdered and then boiled in water or treated with alcohol or it may be specially prepared into a product such as Pantocrin (6, 7, 8, 9).

Pantocrin a Russian product, derived from spotted or Sika deer antler is an alcohol extract consisting mainly of lipid or fatty substances. The yield of pantocrin from dried antler is in the order of 3% (i.e. 3 g pantocrin from 100 g antler). The comparative compositions of antler^{ant} and pantocrin are (8):

	Antler	Pantocrin
	<u>(g/100 g dry)</u>	
Organic matter	61	98
Protein	49	6
Lipid	2.3	65
Amino acids, etc.	9	20
Ash	39	2

Pharmacology

The pharmacological activity of the antler products are affected by the method of preparation. For example, extraction of antler in alcohol at 112-120°C followed by evaporation of the alcohol in a boiling water bath was superior to extraction at 38-40°C. A test of the efficacy of an antler preparation is the drop in blood pressure (hypotensive effect) in cats following treatment with it. The following table indicates the decline in blood pressure and the length of time for the blood pressure to return to normal after treatment with two preparations(9).

	<u>Decline in blood pressure (mm Hg)</u>	<u>Time (secs) to return to normal</u>
Hot alcohol (112-120°C) plus boiling water evaporation	20	126
Alcohol (38-40°C) plus vacuum evaporation at 38°C.	18	37

Some of the pharmacological properties of pantocrin have been shown to be due to its lipid content including the gonadot-

rophic, stimulatory, anti-inflammatory, anti-stress and hypotensive.

Korean scientists have used a variety of antler preparations; in some experiments dried antler was used as a feed additive while in others the antler was subjected to extraction in hot water. When used as a feed additive in broiler diets (1g of antler in 4 kg feed over 60 days), growth rate was increased slightly, while a gonadotrophic effect was indicated by an increase in testes size. Blood characteristics were also affected with rises in red blood cell numbers and blood haemoglobin content (1, 2). Studies with roosters kept for semen collection for artificial insemination provide further evidence of the gonadotrophic effect of antler; in this work high doses of antler increased semen volume, sperm numbers and sperm viability and also results in a higher fertilisation rate (3).

Several studies have shown that antler given to rats prior to starvation, heat stress, cold stress or electric shock can partly protect the animal against these stresses and shocks (4, 5). A frequently reported effect of antler is its effect on synthesis of red blood cells in rabbits and rats (6, 10). For example, Kim and others(6) compared extracts of the upper portion of antler from four sources, namely elk, reindeer, New Zealand red deer and Formosan sika. The rate of recovery of blood cell numbers was faster in anaemic rabbits treated with elk or New Zealand red deer antler than in untreated anaemic controls.

Frequently claims are made in the popular press that velvet antler is used as an aphrodisiac; this is not the case but this idea probably arose through misunderstandings regarding the gonadotrophic effect of antler as described for roosters and the tonic effect of antler preparations.

Conclusion

There is an increasing amount of research providing evidence for the pharmacological effects of velvet antler and its various preparations. Further studies with laboratory animals using different antler preparations followed by isolation of the active components together with studies of the effects of processing methods are necessary to place our knowledge of the pharmacology of antler on a firmer footing.

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