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MAKING A HERBARIUM – MONOGRAPH EXAMPLE

ABSTRACT

The renewed interest in Herbal Medicine shown in the Western World has demonstrated a growing need for detailed information on **all** medicinal plants that conforms to scientific protocol. In this respect, herbal monographs that are specifically constructed for the purpose of recording and archiving provide essential information on all aspects of herbs that are used primarily for therapeutic benefits, whilst encompassing diverse subject areas such as botany, phytochemistry and pharmacology. Monographs have been a long established method for presenting collated information that is comprehensive for a specific subject. With regard to herbal remedies, this serves to highlight important areas of research that may be conducted in order to elucidate not only the actions of individual active constituents in any one herb, but also the medical potential of the whole herb. This seems particularly pertinent now especially in the Western World, as it gradually embraces a holistic approach to diagnosis and treatment that has firmly established traditions in many other parts of the world.

INTRODUCTION

Owing directly to the enormous resurgence in the Western World in to the study and use of herbs and herbal preparations, the availability of medicinal plants or herbs is rapidly increasing. Scientific information on herbs seems to originate from two related disciplines: **ethnobotany** and **pharmacognosy**; medicinal plants being of principal interest here. A significant proportion of orthodox medications that are currently prescribed are essentially plant derivatives. Traditional or folkloric knowledge of medicinal plants is an integral part of a culture's understanding of health and disease. Current uses of herbs that reflect traditional practices of European Herbalism, Traditional Chinese Medicine, North American Indian Traditional Medicine and Ayurvedic Medicine of India all continue to be explored as new sources of botanical healing.

Good scientific herbal texts and monographs; formal summaries of knowledge, offer referenced information on what is already known about a plant's use as a medicine. (Bisset, 1994). Though there are many texts on the botany, chemistry and pharmacology of medicinal plants, no one text is fully comprehensive. The important work of pharmacognocists illustrates the relevance of tradition and practice in the context of some of the most invasive, infiltrative and chronic medical conditions witnessed today. Information on the safety of a herb is generally discussed providing guidelines as well as cautions, where necessary; a crucial part of a herb description. The current climate of study

in to herbal medicine, in particular, research and practice owes much to traditional knowledge and historical data especially the careful cataloguing of herbal monographs.

The following monograph on the common garden sage (*Salvia officinalis*) discusses the morphological/ anatomical features that are redolent of the species, in addition to its pharmacological actions in context with future studies/ research.

MONOGRAPH : SALVIA OFFICINALIS **Common or Garden Sage**

Taxonomy

Order :	Tubiflorae
Family :	Lamiaceae (Mint Family) formerly Labiatae
Genus :	Salvia
Species :	<i>Salvia officinalis</i>
Common Name :	Common or Garden Sage [Synonyms : Red Sage, Broad-leaved White Sage, Narrow-leaved White Sage, <i>Salvia salvatrix</i> (old English), Sawge]

Gross Morphological Description

Salvia officinalis (sage) belongs to a genus with approx. 700 species of which the common garden sage is one. Sage generally grows about a foot or more in height and has wiry stems. The leaves are set in pairs on the stem and are 1.5 to 2 inches long, stalked, oblong, rounded at the ends, finely wrinkled by a strongly-marked network of veins on both sides. They are greyish-green in colour, softly hairy and beneath glandular. The flowers are arranged in whorls, purple in colour and the corollas are lipped. They blossom in August. All parts of the plant have a strong scented odour and a warm, bitter, somewhat astringent taste due to the volatile oil contained in the tissues. (Leyel, 1976).

Detailed Morphological Characteristics; Flower & Fruit

The medium-sized, pale violet, white or pink labiate flowers are 6 – 12 blossomed false whorls, arranged above each other in 4 – 8 rows. The calyx is 10 – 14 mm long, funnel-shaped campanulate, downy, glandular punctate and bilabiate. The upper lip has 3 awned teeth, the lower lip 2. The corolla tube has a ring of hair inside. The upper lip is almost straight and the lower lip has 3 segments. There are 2 stamens with almost semi-circular bent filaments. (PDR for Herbal Medicines, 1998).

Leaves, Stem and Root

The plant is a bush up to 60cm high. The stem is erect and woody at the base with leafy, quadrangular, white-grey tomentose branches. The leaves are simple, oblong or oblong-lanceolate

and narrowed at the base. They are petiolate, densely and finely crenate, ribbed-wrinkled, white-grey tomentose initially, tough and evergreen. (PDR for Herbal Medicines, 1998).

Brief History and Folk Use

Salvia officinalis contains powerful medicinal ingredients and has been credited throughout history with promoting a long life and restoring memory in the elderly. The Romans gathered it with great ceremony treating it as sacred. Infusions of the leaves were used to treat fevers and to stimulate the nervous system. It was supposed to stem bleeding, and the juice was used to treat snake bites.

The legend of the sage plant dates back to biblical times when the plant provided shelter for Mary and baby Jesus who were fleeing from King Herod and his soldiers. Since then, Christians and alike believe sage to possess many curative powers. In this respect, sage is considered to be an all-round, general purpose herb.

Unique Characteristics of Salvia sp.

Salvia comprises a genus of some 700 to 900 species (as quoted in some literature) of mostly aromatic annuals, biennials, perennials and mainly evergreen shrubs and subshrubs, which with the exception of *S.officinalis* are mostly tender or half-hardy. The flowers secrete abundant nectar, making them locally important as bee plants. Amongst the unique characteristics of *Salvia* are their interesting aromas, textures and colours. About 80 species and many variants are available as ornamentals, some of which have medicinal and culinary uses. *Salvia* is from the Latin *salvere* 'to be well' or 'to save' in reference to the health-giving properties of the plant. (Brown, 1995).

Habitat and Cultivation

Sage is found in its natural wild condition from Spain along the Mediterranean coast up to and including the east side of the Adriatic. It grows in profusion on the mountains and hills in Croatia and Dalmatia, as well on the islands of Veglia and Cherso in Quarnero Gulf, being found mostly where there is a limestone formation with very little soil. (Leyel,1976). When wild, it is much like the common garden sage, though more shrubby in appearance and has a more penetrating odour, being more spicy and astringent than the cultivated plant.

Sage is cultivated all round the world, thriving in sunny conditions. It is grown from seed in spring and the plants are replaced after 3 – 4 years. (Chevallier, 1997). It is recommended that harvesting of the leaves take place from the second vegetation year at the beginning of the flowering period in the afternoon. (PDR for Herbal Medicines, 1998).

In cultivation, sage is a very variable species and in garden varieties it may be found with narrower leaves, crisped, red or variegated leaves and smaller or white flowers. The form of the calyx teeth also varies and the tube of the corolla is sometimes much longer. The two usually absent upper stamens are sometimes present in very small sterile hooks. The Red Sage and the Broad-Leaved variety of the White (or Green) sage, both of which are used and have been proved to be the best for medicinal purposes, as well as the Narrow-Leaved White sage, which is best for culinary purposes as a seasoning, are classed merely as varieties of *Salvia officinalis* and not as a separate species.

Constituents

Fresh or dried leaves of *Salvia officinalis*, and preparations thereof in effective dosage forms constitute key compounds as indicated in Table 1. (Adapted from Bisset, 1994 and the American Botanical Council, 1998).

TABLE 1 : MAIN CHEMICAL CONSTITUENTS OF SALVIA OFFICINALIS

(Adapted from Bisset, 1994 & American Botanical Council, 1998)

CHEMICAL GROUP	COMPOUND
Monoterpenes	<ul style="list-style-type: none">• 1 – 2.5% essential oil (consisting of α-thujone & β-thujone; up to 35 –60%)• 1,8-cineole (6 – 10%)• camphor (14 – 37%)• borneol• isobutyl acetate• camphene• linalool• α and β-pinene• viridiflorol• α and β-caryophyllene (humulene)
Caffeic Acid derivatives (Tannins) 3 – 6%	<ul style="list-style-type: none">• rosmarinic acid• chlorogenic acid
Diterpenes (Bitters)	<ul style="list-style-type: none">• carnosolic acid (chief component; 0.2 – 0.4% picrosalvin)• rosmanol & its 7-methylether• safficinolide• carnosic acid 12-methyl ether γ-lactone• manool
Flavonoids	<ul style="list-style-type: none">• apigenin & luteolin 7-glucosides• methoxylated aglycones (genkwarin & genkwarin-6-methylether)
Triterpenes	<ul style="list-style-type: none">• ursolic acid (chief component; 5%)• oleanolic acid and derivatives
Other components	<ul style="list-style-type: none">• small amounts of sesquiterpenes

Thujone, the principle volatile oil has been shown to be derived from mevalonate or acetate (Willard, 1992).

The mevalonate pathway is a highly complex series of reactions but produce some biologically important compounds that are specific to the *Salvia officinalis* (as indicated in Table 1).

Medicinal Parts and Preparations

The medicinal parts that are used are the dried leaves, the flowers and stems from which the volatile oils are extracted, the fresh leaves and the fresh, flowering aerial parts.

Preparations of sage can be in the form of **infusions** (dried or fresh leaves are left to infuse in boiling water, strained and standard doses are drunk 3 times a day). Alternatively, a **tincture** can be prepared by soaking the fresh or dried herb in alcohol (non-alcoholic equivalents can be made with vinegar or glycerol). The resultant solution is strained and taken in standard doses of 2 – 4 ml three times a day. A gargle may also be prepared by bringing to boil fresh sage leaves in water and deeply gargling the hot tea several times a day. (Hoffman, 1997). Additionally, fresh sage leaves are a useful first aid remedy when rubbed directly onto insect stings and bites. (Chevallier, 1997).

Pharmacological Actions and Medicinal Uses

The indications of *Salvia officinalis* are diverse hence its reputation as an all-round, general purpose herb. It can be used as a antiphlogistic for inflammation of the mouth and throat, for gingivitis and stomatitis, mainly in the form of a gargle (auxillary treatment for sore throat) but also as a tea for digestive complaints, flatulence, inflammation of the intestinal mucosa and in diarrhoea. It also has antisudorific (anti-hydrotic) properties and hence reduces sweating. In this action, it is particularly useful for reducing night sweats as experienced in TB and in cases of excessive sweat formation due to causes of psychosomatic origin. (Bisset, 1994). Table 2 summarises the pharmacological effects attributed to and proved in *Salvia officinalis*. (Adapted from Stary, 1998).

TABLE 2 : SUMMARY OF INDICATIONS FOR SALVIA OFFICINALIS
(Adapted from Stary, 1998)

MEDICINAL ACTION	COMMENT
Anti-inflammatory	<ul style="list-style-type: none"> • applied as a compress for insect stings/bites • all other external applications as indicated • good for URT inflammations • various digestive disorders
Antiseptic and Astringent properties	<ul style="list-style-type: none"> • Eg. Mouthwash following dental surgery • Eg. Gargle for sore throat (auxillary treatment)
Antisudorific (or anti-hydrotic)	<ul style="list-style-type: none"> • ↓ sweat gland secretion
Hormonal Stimulant	<ul style="list-style-type: none"> • good for menopause & thyroid conditions
Nerve & Digestive Tonic	<ul style="list-style-type: none"> • treatment of neuroses • treatment of various digestive disorders

Empirical data has provided evidence of pharmacological actions of the whole herb but similar findings on isolated constituents are still largely lacking. Despite this however, the antisudorific action has been adequately demonstrated in animal experiments and clinically in man, eg. Pilocarpine-induced sweating is rapidly curtailed (Bisset, 1994). Other external applications include the use of the herb in bathing the skin in the treatment of various skin diseases, chiefly mycosis, a disease caused by parasitic fungi. (Stary, 1998).

In folk medicine, sage has had a reputation for **lowering** milk supply. (Riordan & Auerbach, 1993). However, the exact amount of herb that could adversely affect lactation is not established. Although sage has been attributed to have mild hypotensive and emmenagogic effects, there is a paucity of empirical data and scientific proof to substantiate this claim.

Cautions

Side effects of sage are uncommon unless taken in overdoses (more than 15g sage leaves/dose) or on prolonged use. (Bisset, 1994). Due to the essential oil content of sage preparations there are several aspects of toxicity that must be reviewed. Issues pertaining to thujone in particular, are well-documented. A number of studies on other essential oils extracted from sage (and other herbs) demonstrate potential toxic effects when administered inappropriately without prior adequate consultation, case-history taking and an oversight of major contraindications. (Tisserand & Balacs, 1996). However, despite the alarming evidence supporting the significant toxic effects of essential oil extracts, it is imperative to bear in mind that *in vitro* studies on isolated ingredients do not always correlate readily to the use of the whole herb in clinical applications. Nevertheless, supporting evidence on toxicity should always be regarded seriously and in respect of that, Table 3 highlights the potential risks of using *Salvia officinalis* in Herbal Medicine.

TABLE 3: POTENTIAL RISKS AND SIDE EFFECTS OF SALVIA OFFICINALIS CONSTITUENTS.

CONSTITUENT	COMMENT
Thujone (α -Thujone isomer is more toxic than β -Thujone)	<ul style="list-style-type: none"> • symptoms of overdose or side effects include tachycardia, hot flushes, convulsions and dizziness • the drug is narcotic at higher doses (\therefore can be habit forming) • convulsive and psychotropic in mice at 0.25g/kg (LeBourhis & Soenen, 1973) • it has been postulated that the psychotropic effects conferred to thujone is due to its mode of action involving its interaction with a common receptor in the CNS • thujone affects nervous tissue at low doses (Sampson & Hernandez, 1939) This study strongly suggests that it has the ability to cross the blood-brain barrier and to enter the CNS after absorption into the bloodstream. • Should be avoided in pregnancy • A 24 hour patch test using undiluted sage oil produced one irritation reaction in 20 human subjects (Opdyke, 1974)
Camphor	<ul style="list-style-type: none"> • Potential risk of neurotoxicity • Cause epileptiform convulsions when taken in sufficient quantity (Craig, 1953)
1,8-Cineole	<ul style="list-style-type: none"> • Occasionally reported as causing serious poisoning when accidentally instilled into the nose Melisk et al., 1990)

	<ul style="list-style-type: none"> • Effects of poisoning incl. Irritated mucous membranes, tachycardia, dyspnoea, nausea, vomiting, vertigo muscular weakness, drowsiness & coma (Reynolds, 1993)
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Research

Pharmacological investigation of herbs is a rapidly expanding field, though much remains to be carried out and not all of the traditional uses of herbs have held up under scientific scrutiny. Indeed, some have turned out to be at best ineffective and on occasion even toxic. Most of the herbal literature generally addresses single herbs rather than multiple herbal preparations. Scientific information on the pharmacological actions of combination herbal preparations is relatively limited at present. (Humphrey, 1998).

Much of the current scientific literature focuses on the principle constituents of *Salvia officinalis* as opposed to extensive clinical studies on the whole herb. The inflammatory oedema induced by 1,8-cineole was used as a model for screening anti-allergic and anti-inflammatory compounds [see paper enclosed; Ref; Santos & Rao, 1998]. This is another example of the paradoxical influences of the individual constituents over the actions of the whole herb; sage has been shown to exert anti-inflammatory effects (see pharmacological actions attributed to sage).

Variants of Salvia officinalis

Botanical details of the following variants of *Salvia officinalis* in addition to the common garden sage as described in this monograph is summarised in Table 4 (Adapted from Brown, 1995).

TABLE 4 : BOTANICAL INFORMATION ON SAGE VARIANTS

(Adapted from Brown, 1995)

SAGE VARIANT	BOTANICAL DETAILS
<i>S.officinalis</i> 'Albiflora'	This cultivar has white flowers and is a most elegant plant for white and silver gardens. H 60-80cm, S 1m
<i>S.officinalis</i> 'Berggarten'	This distinctive German cultivar has a dense, compact habit, broad, almost rounded leaves in a pale, grey-green and purple-blue flowers. H 45cm S 1m
<i>S.officinalis</i> 'Kew Gold'	This choice cultivar has yellow leaves and a compact, dwarf habit. H 30cm S 45cm
<i>S.officinalis</i> 'Icterina'	A popular cultivar with yellow variegated leaves that provide interest among plain green herbs. H 60-80cm S 1m
<i>S.officinalis</i> 'Purpurascens Group'	Purple sage, Red Sage. This evergreen shrub has purple-grey foliage. H 60-80cm S 1m

H = Height S = Spread

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