

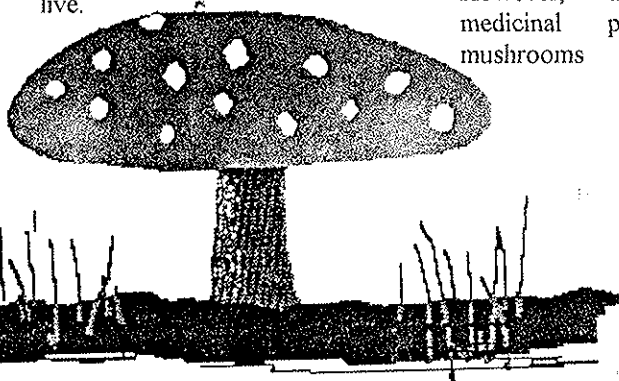
# MUSHROOMS - A SOURCE OF COSMETIC MAGIC

THE MUSHROOMS APART FROM BEING A DELICACY TO SERVE AT THE DINNER TABLE, HAS MANY UNUSUAL PHARMACEUTICAL AND COSMETIC PROPERTIES. DR ALLAN ONIONS OF HONEYWILL & STEIN REVEALS SOME WELL KEPT SECRETS OF THE FABULOUS FUNGI

Apart from being served in restaurants, sauted in garlic butter, most people know little about mushrooms. The exception perhaps being the minority who have a fringe interest in those varieties with hallucinogenic properties - the "magic mushrooms" of the 1960's generation.

There are over 1,500 varieties of fungi growing in the UK today. These range from the edible field mushroom (*Agaricus campestris*), the hallucinogenic Fly Agaric (*Amanita muscaria*) and Liberty Cap (*Psilocybe neolanceolata*) a resident of Hampstead Heath, to the deadly poisonous Destroying Angel (*Amanita virasa*) and the aptly named Death Cap (*Amanita phalloides*).

Worldwide, over 64,000 have been identified. Fungi are unique amongst the plant kingdom, in that they possess no chlorophyll. Thus they cannot take part in photosynthesis for their metabolism and have to resort to other means in order to live.



Many enjoy symbiotic or parasitic relationships with other plants whilst others are free growing, generally on decaying matter, from which they derive their nutrients. As they contain no chlorophyll, they do not take in CO<sub>2</sub>, and give off O<sub>2</sub>, as do green plants, but respire in the opposite way, similar to animals, as net consumers of oxygen.

## HISTORICAL PERSPECTIVES

As with most plants, different peoples from around the Globe have over the ages investigated not only the culinary attributes of fungi, but also their medicinal and cosmetics properties.

There is some debate as to when we first started eating mushrooms, no one seems to know for sure. Indications are that nomadic hunters as long ago as the last Ice age feasted on various local fungi but it was during classic times that mushrooms came to the fore and their use was initially recorded.

In the first century, the physician Nicander eloquently spelled out the dangers of eating the wrong varieties, Dioscorides making similar reference some hundred years later, Greeks and Romans were very partial to mushrooms, and at least one Roman Emperor, the infamous Gnaeus Pompeius, succumbed to the toxins of *Amanita caesarea*, albeit with the helping hands of his scheming third wife Agrippina and a local witch Locuste.

However, the beneficial medicinal properties of mushrooms were also

recognised and recorded by Dioscorides who described *Agaricus*, actually a *Fomes* spp, as being effective against colds, sores, fractures, asthma etc.

In more modern times, the first serious attempt to classify mushrooms was made by French botanist Clusius. The famous herbals written by Gerard and Culpeper hardly give mushrooms a mention. Grieve, on the other hand, in 'A Modern Herbal' (1), gives fungi a good airing, referring to medicinal and even pharmaceutical status for several species including the Giant Puff Ball (*Lycoperdon gigantea*) which apart from forming part of the diet for some native American tribes has been used in the UK to arrest haemorrhage.

The hallucinogenic properties of mushrooms have been associated with Shamanism in many parts of the world. Nomadic hunters of Northern Europe and Asia have been reported as using Fly Agaric (*Amanita muscaria*) to induce shamanistic trances.

The Koryak people of Eastern Siberia believed the plants were inhabited by spirits known to them as Wapag man. These spirits of the woods were believed to have left the fungi for the benefit of mankind to enable them to learn something of the temporal world.

One well reported story relates to times of short supply of the fungus and to a strange kind of pecking order in which the most senior shaman takes the potion,

enters into his trance and then urinates into a cup which is then drunk by the next senior shaman. Apparently, the hallucinogen, is quickly absorbed into the bloodstream and into the urine via the kidneys. It continues to be passed around the group in this fashion.

In Central and South America also, this local magic mushroom is utilised for shamanistic purposes. Elderly women of the tribes employ *Psilocybe mexicana*, a relative of the afore mentioned Hampstead Health variety, to aid in the prescription of magic and cures. The *Psilocybe* species contain two psilocin. Although chemically related to LSD they possess only approximately 1% of its psychotropic activity (2).

Nearer to home, it is believed that witches of the Middle Ages were well aware of the psychotropic effects of certain mushrooms. It is believed the act of riding on broomsticks is actually a representation of their use of sticks to administer mushroom potions and already, a well documented route for drugs to enter the bloodstream quickly.

But as with many things botanical, it is the inhabitants of the Pacific Rim that seem to have studied more deeply the beneficial properties of mushrooms.

Perhaps the best known Japanese mushroom is the Shiitake (*Lentinus edodes*). It is cultivated on oak logs with which it enjoys a parasitic relationship. In the

Far East it is revered. Foodwise, it is stir fried, cooked in soups, canned or pickled. It is nutritious and rich in essential amino acids.

In both China and Japan, it is considered a revitalising tonic whilst some consider it to enhance sexual performance. It is prescribed to reduce blood pressure and cholesterol, to treat anaemia, diabetes and cancer possibly via a stimulation of the immune system. The chemical lentinan resists carcinogen, an attribute shared by many fungal carbohydrates.

#### ENERGISING PROPERTIES

In the Far East a holistic approach prevails for both health and beauty and a Shiitake mushroom tea is one means used to strengthen, vitalise, energise and tone the body. (3)

*Coriolus versicolor*, Kawaratake, is known in the UK as the turkey-tail mushroom. In Japan, it is drunk in the form of a tea for the treatment of flu, colds, asthma, bronchitis and is much sought after as a tonic for general debility. It is also used in many food delicacies.

Chemical analysis shows it to be rich in corfolin which has been known to exhibit antibiotic and tumor inhibitory actions and a protein bound polysaccharide, klein, which has been shown to have a cytotoxic effect on skin and other cancer cells.

Cosmetically, Kawaratake is used in the Far East for treating areas with weak

connective tissue, in massage formulations, the treatment of acne and on irritated erythema due to the effects of excess UV rays. Suggested cosmetics applications include after-sun, anti-acne products, massage formulations and anti-cellulite products.

Matsutake (*Tricholoma matsutake*) is the Korean Pine Mushroom, known locally in Korea as Song-Yi. This edible fungus is much sought after in Japan due to its unique fragrance, a sweet pine like odour with earthy mushroom undertones. As such it provides a natural flavouring and fragrance to festive season delicacies where it is used as the main ingredient. It grows in a symbiotic relationship with pine trees.

Chemically, the pine-like fragrance is provided by concentrations of alpha and beta-pinene, cembrene and S-matsutake alcohol. It has also been shown to contain amino acids and methyl cis-a-methyl cinnamate which aid moisture retention and 2-octen-1-ol which stimulates peripheral circulation.

Cosmetically, it has traditionally been used as a decoction, normally steeped overnight in water, the solution then being used as a facial wash, generally in Autumn, to remove Summer sun darkened facial spots and for the tightening of facial wrinkles in a new development, which mirrors this traditional use, an alcoholic extract, rich in songyic acid, is generating great interest in Korea as a

skin whitening agent as an alternative to kojic acid.

Matsutake is recommended for the corporation in sensitive facial lotions, moisturising products, sensitive skin products, haircare, bath and shower products where the stimulating effects of the pine fragrance can be utilised.

Ralgankin (Polyporus mylitoe) has been shown to contain an interesting variety of chemicals that make it an ideal candidate for haircare products. A study of its ethnobotany shows that in addition to culinary applications, it has been used for haircare preparations and the treatment of dandruff.

This can be rationalised by investigation of its chemical constituents which include bio-sulphur and salicylic acid, the first is an effective anti-mycotic whilst the salicylic acid exhibits keralytic effects. Also present are volatile oils which act as a stimulant for the scalp and organic acids which are astringent.

Mirroring the traditional use and making use of the identified active ingredients, Raigankin may be recommended for incorporation into all hair care products, particularly those designed for the treatment of dandruff.

#### EASTERN TONIC

Known as the Deer Mushroom in the USA, Cordyceps sabolitera, is known in Japan as Semitake. It is traditionally used in Japan as a food and medicinal mushroom, used for the

treatment of general debility, post-partum debility and as a natural antibiotic. As a food, it is incorporated into a rich spicy mushroom cream stock for soups and broths and also as a mushroom spice. It exhibits a faint spicy cinnamon fragrance.

Chemical analysis reveals amino acids which regulate moisture on the surface of the skin, ophiocordin, which show bacteriostatic and anti-phlogistic properties, and polysaccharide co-1 which stimulates peripheral blood flow.

These properties suggest application in cooling preparations, refreshing facial lotions, moisturising preparations and after-bath skincare products.

Magojakushi (Ganoderma neo-japonicum) is a much sought after delicacy and is known as panaceapolypore. This mystical panacea is used in the highest class on tonics in the Far East and because of its scarcity is now often substituted by the more common Reishi mushroom (Ganoderma lucidum). It has been shown to contain a variety of ganodermapolyots which exhibit beneficial actions on the skin surface. It is recommended for use in sensitive facial lotions, moisturisers and sensitive skin products.

The Reishi mushroom itself has enjoyed an elevated position in the Far East, where it is considered a Taoist elixir of life (the mushroom of deathlessness) and once reserved for the

Emperor, it has a long association with longevity and increased spiritual energy. It is said to boost the immune system and reduces free radicals associated with the ageing process by 50%.

Tsuriganedake (Forries fomatorius) is known as Amadou in the USA. In Japan it has been used as a dressing to staunch the flow of blood from deep wounds and in the form of a tea for the treatment of the flu, colds, asthma, bronchitis and general debility. It is used in many food delicacies which are particularly consumed in the Autumn and Winter months. Traditional cosmetics use in the Far East is for treatment and repair of signs of skin ageing.

Analysis of the chemical constituents reveals moisturising polysaccharides, flavonoids that act as free radical scavengers and saponins that exhibit antiphlogistic action. Cyclic AMP is also present. This has been shown to be effective in the prevention of skin cell ageing. It has been reported as acting as a secondary messenger for the metabolic processes in inner cells which effectively prevents cellular changes and defers the early signs of ageing.

Tsuriganedake is recommended for use in after-sun preparations, facial lotions, haircare products, creams and lotions for rough and irritated skin and moisturising preparations.

The above products all utilise aqueous extracts, but many beneficial properties are associated with oil-soluble functional chemicals from the fungi, *Fornistopsis officinalis*, Eburiko, is a mushroom used extensively as a food-stuff, a general tonic and a natural anti-oxidant and bactericide. The belt of waxes from around the mushroom margin is extracted to yield a rich mushroom oil which is used sparingly in the seasoning of foods.

#### SKINCARE BENEFITS

The oil is used medicinally to treat slow healing wounds, for smoothing dry, coarse and chapped skin, as a novel source of g-linoleic acid, all transretinoic acid and fungal omega-3-polyunsaturated fatty acids and other polyunsaturated fungal lipids used for the repair of skin tissues and wound healing. . . eczema, psoriasis and phlebitis.

The super critical CO<sub>2</sub> extracted oil is recommended for use in sensitive skin products, facial tonics and creams, hair shampoos, liquid soap preparations and rinse off skin and hair products.

Mannentake (*Gonoderma lucidum*) is mainly a food source mushroom which for medicinal applications are as a tonic for general debility and as a natural antibiotic. The rich mushroom oil, extracted from the waxes affords a fatty oil which is used sparingly in seasoning foods. Medicinally, it is used to treat and remove warts, swellings and to smooth the coarse and chapped skin.

Identified constituents are ganodermenonol which exhibits anti-histamine action on the skin, vegetable sterols which exhibit circulation stimulating properties and unsaturated C14 - C18 fatty acids which impart moisturising care.

Moisture regulating amino acids and octadecanoate which exhibits surface immune stimulation are also present. The caprylic/capric triglyceride extract of Mannentake may be useful in moisturising products, day and night creams and lotions, cleansing milks and liquid soap preparations.

A similar chemical mix may also be extracted from *Fornistopsis pinicolo*, the red-belted polypore known in Japan as, Tsugararomoshitake. Additionally, it provides a source of an oil soluble red dye. Traditional cosmetics applications include the treatment of dry, coarse and chapped skin and as a natural red dye.

This has been just a brief look at a new, novel source of functional cosmetics ingredients. For a marketing view with a difference, sample the world of mushrooms to your new formulations.

#### REFERENCES

1. Grieve M, A. Modern Herbal, Penguin Books, ISBN 0-14-046440-9.
2. Willis, SA. The Pharmaceutical Journal, 251, 227-229. (1995).
3. Michèle D. Leigh, The Japanese Way of Beauty, Thorsons, ISBN 0-7225-2976-7.

#### OTHER READING

Jordan, M. Mushroom Magic,

Elm Tree Books, London, ISBN 0-241-12844-7

Mcdonald Encyclopaedia of Mushrooms.

"Dr Allan Onions, Honeywill & Stein, Sutton, Surrey, UK, Tel: +44 (0) 181 770 7090, Fax: +44 (0) 181 770 7295

Acknowledgment for advice and encouragement to Dr Balasubramaniam M, Ph.D Campo Research Singapore. Reprinted CTMS March 1995