Review article

Ferula asa-foetida and Curcuma longa in traditional medical treatment and diet in Nepal

D. Eigner a, D. Scholz b,*

a Institute for Tibetology and Buddhist Studies, Spitalgasse 2–4, A-1090 Vienna, Austria
b Sandoz Forschungsinstitut, A-1235 Vienna, Austria

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Abstract

Food and eating have powerful symbolic value among the hinduistically-influenced ethnic groups of Nepal. In addition, food plays a major role in the concepts of illness and curing and constitute an integral part of traditional medical prescriptions. Materials that are consumed in 0.5–1.5 g amounts in the daily diet (e.g. the spices turmeric and asafoetida) are used in minute amounts for medical purposes. Why? Three hypotheses are offered here to discuss this issue. © 1999 Elsevier Science Ireland Ltd. All rights reserved.

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1. Introduction

Food and eating have a powerful symbolic value among the hinduistically-influenced ethnic groups of Nepal (Stone, 1983). With food, the gods are worshipped and ancestors sustained, and through food the caste status is distinguished. Similarly food is used to mark the main division in the spiritual hierarchy: higher spirits must be fed ritually purer food; hence, many substances offered to the low spirits are considered unfit (impure) for the higher deities.

* Corresponding author.

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on plant material. Of the 25 plants used in the prescriptions, the following eight are also part of the common daily diet in Nepal: *Curcuma longa* L. (Zingiberaceae), *Ferula asa-foetida* L. (Apiaceae), *Zanthoxylum armatum* DC. (Rutaceae), *Psidium guajava* L. (Myrtaceae), *Sesamum indicum* L. (Pedaliaceae), *Citrus aurantifolia* (Christm.) Swingle (Rutaceae), *Artemisia vulgaris* L. (Asteraceae), and rice (*Oryza sativa* L. Poaceae). Honey and the spice *battis masala* (a mixture consisting of 32 ingredients) are also used. These traditional prescriptions contain small amounts of materials that are consumed daily in much higher quantities. Why? What are the additional benefits? Using *Curcuma longa* and *Ferula asa-foetida* as examples, an attempt is made to address this issue.

2. *Curcuma longa*

*Curcuma longa* is a perennial herb that measures up to 1 m high with a short stem and tufted leaves (Kapoor, 1990). The parts used are the rhizomes, which are ovate, oblong, pyriform or cylindrical and often short-branched. They are yellow to yellowish-brown in color.

2.1. Chemical constituents

The chemical constituents are as follows: moisture 13.1%; protein 6.3%; fat 5.1%; mineral matter 3.5%; carbohydrates 69.4%. The essential oil (5.8%), obtainable by steam distillation of the rhizomes, has the following constituents: α-phellandrene 1%, sabinen 0.6%, cineol 1%, borneol 0.5%, zingiberene 25%, and sesquiterpenes 53% (Kapoor, 1990). Curcumin (3–4%) is responsible for the yellow color. In addition, the monodemethoxy and bisdemethoxy derivatives of curcumin have been isolated from the rhizome (Voppel et al., 1990).

2.2. Medicinal use

The rhizome is a household remedy in Nepal. The powdered rhizome is considered to be stimulating, carminative, purifying, anti-inflammatory, and anthelmintic. Externally the rhizome mixed with alum is also applied as a paste to wounds, bruises, inflamed joints, and sprains (Department of Medicinal Plants, 1982). Current traditional Indian medicine uses it for biliary disorders, anorexia, cough, diabetic wounds, hepatic disorders, rheumatism and sinusitis—when translated into terms of modern medicine (Jain and DeFilippis, 1991).

2.3. Pharmacological action

Turmeric powder applied to septic or aseptic wounds in rats and rabbits accelerates the healing process. Dietary turmeric shows adjuvant chemoprotection in experimental forestomach and oral cancer models of Swiss mice and Syrian golden hamsters (Azuine and Bhide, 1994). Extracts exhibit anti-inflammatory activity after parenteral application in standard animal models. Curcumin and the essential oil are mainly responsible for these actions (Yegnanarayan et al., 1976). Both cause increased bile secretion in dogs. *Curcuma longa* has been advocated for use in liver disorders, but evidence for an effect in humans is not yet available. Curcumin and related compounds are claimed for anti-HIV-1 and HIV-2 activity in a recent patent application (Pardee et al., 1994) and some modest activity against the viral proteases has been found. A phase I/II dose-ranging, pharmacokinetic, safety, and efficacy study of oral curcumin is projected (Abrams et al., 1995). This study will answer the question of oral absorption in human, which till now has been thought to be rather low ((Ammon and Wahl, 1991), but this does not exclude a local action in the gastrointestinal tract (Ammon and Wahl, 1991; for a review see also Tang and Eisenbrand, 1992).

2.4. Use in the notebook

*Curcuma longa* is part of two recipes: one for purification of the blood, the other for menstrual and abdominal problems. In the first recipe, it is mixed with resin of *Psidium guajava*, with *Bergenia ligulata* (Wall.) Eng. (Saxifragaceae), honey, *Sesamum indicum*, and an unknown resin, which
has had to be wrapped around a cow. Everything is mixed together and eaten. In the second recipe a mixture is prepared from *Curcuma longa*, *Orchis incarnata* L. (Orchidaceae), *battis masala* (a mixture of 32 spices), honey, *Citrus aurantifolia*, *Sesamum indicum*, and shellac. Again everything is mixed together, and put on the inner and outer side of the patient’s hand, from where he/she eats it (Eigner and Scholz, 1990). Doses: each freshly prepared mixture contains around 0.5 g of ground rhizome of *Curcuma longa*. It is administered only once daily (Eigner and Scholz, 1990).

2.5. Dietary use

Turmeric is one of the most widely used spices in Nepali cooking. Vast quantities go into curries and give them their brilliant yellow color. It is also an important spice in dal, the most frequently eaten dish of lentils in rural Nepal. A typical dal recipe (Abdullah, 1978) consists of: 2 cups of dal, 5 cups water, 2 teaspoons turmeric, 5 drops asa-foetida water, 1 teaspoon black pepper, 1 teaspoon black cumin seeds, 30 g fresh ginger, 1/2 cup ghee (clarified butter), 1 big onion, 2 teaspoons chopped coriander leaves, 2 green chillies, and salt to taste. The dal is washed and soaked for 15 min. Chopped onion and ginger are fried in ghee until light brown, cumin seeds are then added and the mixture fried for an additional minute. Dal, turmeric, and salt are added to boiling water followed by cooking on low fire. When the dal is nearly cooked, fried onion, ginger, cumin seeds, chopped coriander leaves, green chillies and black pepper are added and all is cooked for 5 min. It is served with rice. The daily serving per person contains around 0.5–1.5 g turmeric.

3. Ferula asa-foetida

This plant grows wild in Kashmir, Iran and Afghanistan. It has an unpleasant smell, is herbaceous and perennial and grows up to 2 m high (Kapoor, 1990). The part used is an oleogum resin, obtained by incision from the root, and called asa-foetida (Kapoor, 1990).

3.1. Chemical constituents

Glucuronic acid, galactose, arabinose and rhamnose have been isolated from the gum (Kapoor, 1990). Taste and smell are due to sulfur containing compounds. Disulfides as well as symmetric tri- and tetrasulfides have been isolated (Rajanikanth et al., 1984). Umbelliferone, the farnesiferoles A, B and C, ferulic acid (Caglioti et al., 1958; Caglioti et al., 1959), and the cumarin derivatives foetidin and kamolonol are also present (Hofer et al., 1984).

3.2. Medicinal use

In Nepal asa-foetida is considered to be sedative, carminative, antispasmodic, diuretic, anthelmintic, and emmenagogue, as well as an expectorant. It is an aphrodisiac, and increases the sexual appetite (Eigner and Scholz, 1990). Daily dose is around 0.2–0.5 g.

3.3. Pharmacological action

Asa-foetida has not been studied much. It produces slight inhibition of the growth of *Staphylococcus aureus* and *Shigella sonnei*, and some of the sulfur compounds show pesticidal activity. Higher doses taken orally cause diarrhoea, meteorism, headaches, dizziness, and enhanced libido (Kapoor, 1990).

3.4. Use in the notebook

Asa-foetida is part of a formula against witchcraft. “If a witch sucks (leaving a blue bruise or stain) on some part of the body the following four things should be applied without speaking: wood of *Maclura cochinchinensis* (Lour. Moraceae) Corner, of *Solanum torvum* swartz (Solanaceae), and *Smilax lanceafolia* Roxb. (Liliaceae), and asa-foetida. These things are mixed and rubbed on a rock to produce the paste for application” (Eigner and Scholz, 1990).
3.5. Dietary use

Asa-foetida has been commonly used in Nepal for many centuries, especially in minute amounts as powder or asa-foetida water, and as a flavouring agent in many curries or lentil preparations. Asa-foetida water is prepared by mixing one teaspoon ground spice into one cup of hot water. A typical recipe is described in the section 2.5. In general, around 50–200 mg twice a week are consumed per person.

4. Results

The data presented here show that turmeric and asa-foetida are consumed regularly in the everyday Nepali diet. Both spices are popular household remedies and components of many prescriptions used in traditional healing. The pharmacology of turmeric and its main chemical constituents have been studied quite carefully, indicating the effectiveness of this drug also in terms of ‘Western medicine’ (Kleinman, 1987). Asa-foetida has been studied less than turmeric, but it seems likely that its beneficial effects can also be pharmacologically rationalized. In traditional treatments asa-foetida is consumed in amounts comparable to those in the daily diet. The daily intake of turmeric from curries and dal is higher than during a treatment. In addition the remedies are taken only once a day for 1–4 days. Therefore, there must be different factors (i.e. other than the strictly ‘pharmacological’ ones) at work. We offer the following hypotheses hoping to give some new insights into the complex relationship between food, spices and medicinal plants in indigenous medical prescriptions.

4.1. The ayurvedic hypothesis

In the ancient Indian ayurvedic system disease is thought to result from imbalances between the Tridoshas Vaata, Pitta and Kapha of an individual (Kapoor, 1990). Food and medicines carry the qualities of hot, cold, and neutral (Foster, 1984). These qualities influence the above mentioned imbalance. Unmodified spices and medicinal herbs are generally considered as hot or cold (Sui et al., 1993).

The village medical practitioners in general and, even more so, their patients have only rudimentary knowledge of the complex theories of the ayurvedic treatment. They maintain, however, a number of related ideas about the required diet in accordance with this food classification system (Nicheter, 1980). Food is thought to enhance and facilitate the actions of medicines and to provide means for balancing their extreme qualities. By adding spices (or food) to prescriptions, the healer is thus able to regulate the quality of the remedy for the necessary individual treatment in accordance with these concepts of illness.

4.2. The bioavailability enhancer hypothesis

In ayurveda, black pepper (Piper nigrum Linn.), long pepper (Piper longum Linn.) and ginger (Zingiber officinalis Rosc.) are collectively termed Trikatu, and are essential ingredients of numerous prescriptions, used for a wide range of disorders. Use of the same herbs for different ailments is intriguing unless they possess some unique activity that is useful in multidrug combinations. Several studies have now shown that Trikatu possesses bioavailability enhancing effects (Johri and Zutshi, 1992).

Curcuma longa is related to ginger. Both belong to the Zingiberaceae and contain compounds which are quite similar from a chemical point of view (turmeric: the curcumin group, ginger: the gingerol, gingerdiol group) (Tang and Eisenbrand, 1992).

Therefore, it seems likely that turmeric has a similar enhancer activity, which makes it a very useful additive to medical prescriptions. Whether enhancement of bioavailability is a general effect of hot spices or not, is still an open question, but it is a well known effect that the kind of food and the time of eating in relation to drug taking (‘three times a day after meal’) strongly influences the oral uptake of drugs.

The bioavailability hypothesis is an explanation in terms of ‘Western medicine’.
4.3. The psycho-dynamic interaction hypothesis

The distinction between naturally-caused illness and illness in which evil spirits play an essential role is an important concept in traditional medicine in Nepal (Blustain, 1976). Spirits attack men because they are hungry. Correspondingly, most curing ceremonies involve ritual feeding.

The jhankri or shaman (a specialist for the treatment of spirit-caused illnesses) also applies herbal remedies (e.g. as described in the notebook), but always combined with ritual actions and the recitation of magic words. Psychodynamic interactions occur between shaman and patient (Stone, 1977). Due to the ritual and social importance of food and the strong connection between well-being and food, it may be necessary for the healer (the patient generally does not know the ingredients of the preparation given to him during treatment), to have at least some amount of 'good food', e.g. ghee, honey, turmeric or asa-foetida, in his remedy. In that way he feels more confident about its power. This additional confidence could be transferred to the patient. This hypothesis offers an understanding at the level of individual feelings during the interaction between patient and healer. It is quite often used to explain the 'placebo effect'. (For an in-depth discussion (symbolic healing) see Dow 1986.)

5. Discussion and conclusion

Ethnobotanical investigations have resulted in a large body of descriptive data. Phytochemical, pharmacological and ethnomedical information of a lot of indigenous plants and prescriptions exist, but quite often these data are only distantly related to the original indications. One reason is the difficulty in translating traditional interpretations of illness into terms of Western medicine due to a different understanding of the meaning of illness and its function in the specific cultural context. Therefore the questions of how do traditional formulae work, have to be addressed again and again, because a too hasty allopathic explanation of efficacy could result in leading efforts in the wrong direction, wasting money, time and energy and discrediting further engagement. In addition, neuroendocrine-immunology (NEI), a fast growing field of research, has gained significant new insights into interactions between the central neuronal network and the immune system (Salvino and Dardenne, 1995) indicating also from a scientific point of view the importance of additional factors such as psychodynamic interactions for the efficacy of medical treatment.

Food and spices play a major role in concepts of illness and curing in Nepal. Next to their importance for general well-being, they are quite often parts of traditional formulae. They are therefore, in our opinion, a good starting point for studying these questions of efficacy. We choose turmeric and asa-foetida as examples to show some of the problems related to the interpretation of effectiveness. Both are important ingredients of indigenous formulae. Nevertheless the data presented here show that the daily intake of both from curries and dal is higher than during a treatment. That means factors other than strict pharmacological ones must be at work. We offer here three hypotheses, which we feel are relevant for explanations of efficacy. The bioavailability hypothesis is an explanation in terms of Western medical science, and the ayurvedic hypothesis has allopathic and mainly cultural elements, whereas the psychodynamic hypothesis leads to the field of ethnopsychology and psycho-neuroendocrine-immunology. We believe, all (and maybe additional hypotheses) contribute to an understanding as to why food and spices are so often part of traditional medical prescriptions. Their relative importance may vary from case to case and awaits additional studies. “In fact, Asian cuisine is characterized by the adaptation of irritants. Consider for example the importance of ginger, garlic, red onions, tamarind, turmeric, and chilli in both the medical and the culinary traditions of Asia. The issue is not, whether they are foods or medicines, but rather that they are all part of the same system, which strengthens and refreshes the body” (Van Esterik, 1988). We hope, our analysis of additional effects provide a basis for further discussion and research into effectiveness of traditional treatment.
References


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