Through this column we intend to record the work of innovators in our society who are making and using their own products and technology at home or in small-scale industries. Also we would include some articles and information from ethnobotanical reports. It is hoped that this would lead to further research and acknowledge innovator’s innovations.

We invite authors/readers to contribute details of their innovations and share their knowledge for common good.

Utilization of termite, *Odontotermes formosanus* by tribes of South India in medicine and food

V Wilsanand
Department of Zoology
Sree Narayana College, Alathur, Palakkad (Dist.), Kerala - 678 682, India
E-mail: wilsanand@yahoo.com

Abstract

Termites form an important part of the diet of human beings around the world including India. It is also a rich source of food for various other vertebrates and plants. By food value, termites are rich source of protein, thus forming an important diet for pregnant women and children. Termites are also used in South Indian folk medicine. Many South Indian tribes including 'Kannikaran', 'Paniyan', 'Palliyan', 'Sholaga', 'Irular', and 'Kota' have been using the termite *Odontotermes formosanus* Shiraki for the treatment of asthma, a disease likely to be deteriorated by viral infection. 'Kannikaran' and 'Palliyan' tribes also have been using *O. formosanus* as food to enhance lactation in women. Preliminary studies confirm the antimicrobial potentialities of *O. formosanus*, besides a role in growth and development, thus supporting the tribal remedies. Present paper is a compilation of information from literature on utilization of termites as medicine and food.

**Keywords:** Entomophagy, Ethnozoology, Termite, *Odontotermes formosanus*, South Indian Tribes, Zootherapy.

**IPC code; Int. cl.** ^7^ — A23L 1/00, A61K 35/64

Introduction

Entomophagy, the consumption of insects by human beings, has known long before (Bodenheimer, 1951). Approximately 491 species of edible insects have been recorded on a worldwide basis. Insects and other arthropods are also widely used as drugs in traditional medicine (Pemberton, 1999). Animal based medicines have always played a significant role in the healing practices, magic rituals and religions of indigenous and western societies all over the World (Angeletti *et al.*, 1992, Rosner, 1992). Although the phenomenon of zootherapy is wide spread, it has only recently aroused interest of researchers. Some are focusing on its cultural aspects while others are studying the pharmacological effects of the substances involved (Costa Neto, 1999).

India is gifted with immense wealth of faunal and floral diversity. There are about 45,000 species of plants and 81,000 species of animals (MoEF, 1994). The tribals who depend on plants and animals for their day-to-day life and health problems are the real custodians of the knowledge of medicinally important plants and animals. Most of the knowledge accumulated by the tribals on medicinal plants and animals are unknown to the
scientific community. Ethnozoological studies conducted among the South Indian tribes by Solavan et al (2004) revealed that 'Kannikaran', 'Paniyan', 'Palliyan', 'Sholaga', 'Irular' and 'Kota' tribes have been using the termite *Odontotermes formosanus* for the treatment of asthma. Besides, 'Kannikaran' and 'Palliyan' tribes have been using *O. formosanus* as food to enhance lactation in women.

**Utilization**

**As Medicine**

As mentioned earlier, 'Kannikaran' and 'Palliyan' tribes of South India have been also using *O. formosanus* as food to enhance lactation in women. The use of termite as human food in the South and North Eastern parts of India has been abundantly reported (Forbes, 1813; Maxwell-Lefroy, 1909; Gope & Prasad, 1983; Rajan, 1987). Forbes (1813) mentioned that termites are eaten by the local tribes in Mysore and the Carnatic regions. Maxwell-Lefroy (1909) stated that the termite queens are eaten in some parts of South India. He states further that every boy of 12 to 14
years of age is said to be given a termite queen to eat to endure fatigue and run well. Gope and Prasad (1983) revealed that insects represent the cheapest source of animal protein in Manipur and the termite *Odontotermes feae* Linn. formed one of the important insect foods. Rajan (1987) reported that in the North Arcot district of Tamil Nadu, the winged termites known as *Eesal* in Tamil, are collected and sold to the merchants in the market by a forest tribe known as 'Irumbars'. The termites are fried as it is or fried along with groundnut by adding Bengal gram, puffed rice, salt and spices and sold. The fried pulses, spices and salt enhance the taste. In Karnataka, the winged termite is known as *Eechalu hula*. Rajan (1987) also noted that in some villages of Karnataka, the queen termite is collected and fed raw to weak children.

The consumption of termite by human beings has been known long before. Hunter-gatherer people of Africa have, in fact, long used termite to supplement their diets (Bodenheimer, 1951). The termite formed an important part of human diet in many parts of Africa. The common species of termites used as food in various region of the world are summarized in Table 1.

Analysis of the major organic nutrients in the termite *O. formosanus*, used by the South Indian tribes for treating asthma and as food to enhance lactation in women, revealed a high percentage of protein (47) followed by lipids (9) and carbohydrates (2). Dietary supplementation with the termite *O. formosanus* to Swiss albino mice significantly increased the percentage growth rate and number of litters delivered when compared to the control groups fed with normal rodent pellets (unpublished work), thus supporting the tribal remedial measures. Termites are a valuable source of protein, fat, and essential amino acids in the diets of both primates and modern humans (Harris, 1971). By food value, termites are rich source of protein. While a rump steak yields 322 calories per 100 grams, and codfish 74, termites provide 560 calories per 100 grams (Hickin, 1971). Insects vary widely in fat and thus energy content. Termites rank among the highest in fat content. Phelps et al (1975) reported a calorific value of 761 kcal (~3196kJ)/100g (ash-free, dry wt basis) for the winged sexual forms of the African termite, *Macrotermes falciger*, while the winged forms of another African species, *M. subhyalinus* were found to contain 613 kcal (~2575kJ)/100g (dry wt) (Oliveira et al, 1976). Winged adults of the termite, *M. subhyalinus*, are high in magnesium and copper, (Oliveira et al, 1976). The high content of iron and zinc in many edible insects is of particular interest. Iron deficiency is a major problem in women’s diets in the developing world, particularly among pregnant women, and especially in Africa (Orr, 1986). Thus, termite formed an important diet for pregnant women and children of African countries (Silow, 1983). The women even regard eating

### Table 1 : Common termite species used as human diet in various regions

<table>
<thead>
<tr>
<th>Termite species</th>
<th>Region</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>O. feae</em> Linn.</td>
<td>Asia</td>
<td>Gope and Prasad (1983)</td>
</tr>
<tr>
<td><em>Reticulitermes flavipes</em> (Kollar)</td>
<td>Asia</td>
<td>Somnasang et al (1986)</td>
</tr>
<tr>
<td><em>Macrotermes bellicosus</em> (Smeathman)</td>
<td>Africa</td>
<td>Silow (1983)</td>
</tr>
<tr>
<td><em>M. falciger</em> (Gerstacker)</td>
<td>Africa</td>
<td>Chavunduka (1975), Phelps et al (1975)</td>
</tr>
<tr>
<td><em>M. natalensis</em> (Haviland)</td>
<td>Africa</td>
<td>Fasoranti and Ajiboye (1993), Silow (1983)</td>
</tr>
<tr>
<td><em>M. subhyalinus</em> (Rambur)</td>
<td>Africa</td>
<td>Oliveira et al (1976)</td>
</tr>
<tr>
<td><em>M. mossambicus</em> (Hagen)</td>
<td>Africa</td>
<td>Silow (1983)</td>
</tr>
<tr>
<td><em>Pseudacanthotermes</em> sp.</td>
<td>Africa</td>
<td>Oliveira et al (1976)</td>
</tr>
<tr>
<td>S. snyderi Emerson</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Macrotermes</em> sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cornitermes</em> sp.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
termite clay as a means to provide uterus with building material and to help it to form the foetus properly. Non-pregnant women may also eat termite clay when they feel weak (Silow, 1983).

Studies on dietary supplementation of termite to Swiss albino mice, *Mus musculus* Linn., treated separately with pesticides like Acephate and Endosulfan, significantly decreased the toxic effect of pesticides and increased litter production more than those given the pesticides alone both in the F0 and F1 generations, implying that the components of termite may be inducing the activities of detoxifying enzymes present in Swiss albino mice (unpublished data). High nutritive value of the termite coupled with its probable antitoxic role strongly suggests the possibility of termite as an alternative protein rich viable feed particularly for poultry.

**Conclusion**

To conclude, termites have not been exploited in a large way mainly because of the difficulty in harvesting large numbers and extracting them from soil debris. Studies on termite culture on a commercial scale and its use as an alternative protein rich feed for poultry and other pharmacological potentialities would probably go a long way.

**References**

18. Oliveira JFS, Carvalho SJ, Passos de Sousa RFX, Bruno de Sinao M and
Promotion of insect eating

Entomophagy (the eating of insects) has yet to become a regular diet activity for most people in the United States and Europe in spite of the superior nutritional content of edible insects compared to other animals. Other cultures around the world have made insects a main ingredient in their diets, providing an excellent source of protein. Insects are an inexpensive substitute for meat in many developing countries.

In Mexico, grasshoppers and other edible insects are sold by the pound in village markets and are fried before being eaten. Many are sold in cans as fried grasshoppers, chocolate covered ants, etc. Tortillas are served with red and white corn worms in many Mexico city restaurants. Columbian citizens enjoy eating a variety of insects such as termites, palm grubs and ants. Ants are ground up and used as a spread on breads. Popular insects eaten in the Phillipines are June beetles, grasshoppers, ants, mole crickets, water beetles, katydids, locusts and dragonfly larvae. In parts of Africa, ants, termites, beetle grubs, caterpillars and grasshoppers are eaten. Some insects such as termites are eaten raw soon after catching, while others are baked or fried before eating. The giant waterbug roasted and eaten whole is a favourite food in Asia.

Sago grubs are popular for cooks in Papua New Guinea, most often boiled or roasted over an open fire. Other edible insects eaten in this country include larvae of moths, wasps, butterflies, dragonflies, beetles, adult grasshoppers, cicadas, stick insects, moths and crickets. By weight, termites, grasshoppers, caterpillars, weevils, house flies and spiders are better sources of protein than beef, chicken, pork or lamb according to the Entomological Society of America. Also, insects are low in cholesterol and low in fat (http://ohioline.osu.edu/hyg-fact/2000/2160.html).


