

(40). 2-Alkanones are also among the typical products of a number of *Lasius* (41, 42) and *Acanthomyops* species (43). We also detected small amounts of an unknown compound with the probable chemical formula  $C_{20}H_{38}$ , although we were unable to precisely determine its structure. Such a formula was found in *P. obscuricornis* and *P. apicalis* and characterized as a diterpene (4). The occurrence of diterpenes in combination with hydrocarbons appears to be common in members of the tribe Ponerini.

A very low titer of 2-tridecyl acetate was once found in the formicine ant, *Cataglyphis viaticus*, while dodecyl butyrate was isolated from *Cataglyphis bombycinus* (40). No explanation has ever been provided on the probable function of these compounds in the studied ant species.

It is still not known why only the two species of *P. chinensis* and *P. sennaarensis* are of public health importance, while the substances required to induce symptoms are found in the venom glands of a much broader spectrum of species (4, 27). Two reasons for the paucity of sting reaction reports attributed to the other species can be hypothesized. First, most stings were not sufficiently severe for victims to seek medical attention. Second, the causative agent in cases of severe reactions may have been misidentified by victims and medical practitioners as another ant or arthropod species. Morgan et al. examined *Pachycondyla apicalis* and found a mixture of five proteins. They believe that compounds such as pyrazines and piperazinedione in the venom secretions of *P. apicalis* are made from amino acids (4). Pyrazines of the abdominal secretions of *P. sennaarensis* and *P. obscuricornis* could not be formed from amino acids because no peptide or protein was detected in their venom gland. Plant sources may explain the origin of such compounds (4).

After many years of studying stinging ants, many questions on the biology, ecology, behavior, defense and medical importance of these species have remained. Our working group is currently working on different geographic populations of *P. sennaarensis* in the hope of finding answers to some of these emerging questions.

## ACKNOWLEDGEMENTS

The authors express their immense gratitude to Prof. B. Bolton (London) and Dr. J. L. Cook (Texas) who identified our specimens from southeastern and southern Iran. We also thank Dr. John Sloggett (the Netherlands) and Dr. Mohammad Omrani (Shahrekord University of Medical Sciences) for reviewing a draft of the manuscript.