

REVIEW PAPER:

**RESEARCH STATUS OF ESSENTIAL OILS EXTRACTED
FROM PHILIPPINE PLANTS***

FELICISIMA D. UÑALIVIA

*Pharmaceutical and Cosmetic Products Development Program
National Institute of Science and Technology
Manila, Philippines*

ABSTRACT

This is a brief discussion of natural products research on essential oils, which includes its objectives and importance, and the research studies currently going on at the Pharmaceutical and Cosmetic Products Development Program of the National Institute of Science and Technology.

Essential oils are essences considered the last possible and sublime extract of the most condensed form of the plant or drug. It is also called volatile oil because although it is a greasy liquid, the spot it leaves on brown wrapping paper loses its translucency and finally disappears. Essential oils are obtained from different parts of the plant by distillation, expression and extraction with low boiling solvents and enfleurage (Belardo, 1980).

Researches on essential oils are very much needed in our country because we are spending millions of pesos annually to pay for the importation of essential oils mostly from Europe and the United States, as reported in the importation data of two local companies utilizing these oils (Colgate Palmolive, Philippines and Wrigley's Philippines), despite the fact that the Philippines is one of the tropical countries rich in essential oil-yielding plants (Anzaldo, 1982).

One of the main reasons for the lack of essential oil industries in our country is the large investment needed in its production. However, we are now trying to develop the production of these oils in response to the needs of our people. Our institute for example, has directed its efforts towards the utilization of indigenous materials.

*Presented at the Regional Seminar on Chemistry of Natural Product Research Related to Agro-Industry held at Medan, Indonesia, March 21-24, 1983.

There are 2 major aspects of study on essential oils, the scientific and economic since the production of the oils is intended for possible commercialization. The scientific aspect is concerned with the selection of the best method of extraction of the oil with the highest percentage yield. The physical and chemical analyses of the extracted oils are also undertaken in order to establish the quality and stability of the oils which deteriorate fast due to several factors like temperature, humidity, oxidation, time, bacteria and storage. On the other hand, the economic aspect covers the financial problems like the equipment for the production, the modern chemical analysis of the oil and the over-all expenses.

Essential oils are very much in demand in the Philippines especially in the pharmaceutical and cosmetic industries. They are extensively used as odorants in our local perfumeries and other cosmetic industries, in the soap and detergent, and in the pesticide manufacturing industries and as flavorants in the manufacture of pharmaceuticals, and in the food industries as in the manufacture of candies, soft drinks and fruit juices.

Based on the country's demand for this commodity and in an effort to conserve foreign exchange, the National Institute of Science and Technology (a research agency of the National Science and Technology Authority) embarked on a series of research studies from these natural raw material sources. Studies were made on the fresh rind from the ripe fruit of *Citrus medica* Linn., locally known as citron and "limon real," which contains 0.3876% essential oil. The physical and chemical properties of the oil were determined and the constituents of the oil were analyzed and identified with the use of thin-layer chromatography, gas liquid chromatography and spectrophotometry (Anzaldo, Concha and Espenida, 1976). The fresh flowers of *Plumiera obtusa* L., locally known as "Kalachucho" and frangipani in English, was subjected to hydro-steam distillation and organic solvent extraction. The percent yield was 0.017% for the hydro-steam distillation, and 0.39% using petroleum ether extraction (30°-60°). The physical and chemical properties of the oil were also determined. Thin-layer chromatography, UV spectrophotometry, gas liquid chromatography and mass spectrophotometry were used for the qualitative analysis and identification of the oil constituents (Anzaldo, Concha and Uñalivia, 1977). The leaves of *Citrus mitis* Blanco, locally known as "kalamansi" gave a percentage yield of 0.77% by hydro-steam distillation. Thin-layer chromatography showed the presence of nerol, B-pinene and terpinene (Anzaldo, 1980). Studies of the fresh rind of kalamansi fruit are currently undertaken. Another plant worked on is *Piper nigrum* commonly known as "paminta". The leaves containing the oil are being studied as potential source of oil for utilization in pharmaceutical dosage forms. The extracted oil contains geraniol which is used in the

preparation of Vitamin A (Anzaldo, 1980). The leaves of *Premna odorata* Blanco, locally known as "alagau" and *Blumea balsamifera* (L.) DC., locally known as "sambong", were extracted of their essential oils. Thin-layer chromatography and gas liquid chromatography were used in the identification of the oil constituents (Anzaldo, 1981). Another plant studied is *Vitex negundo* Linn., locally known as "lagundi". The isolated and identified constituents of the oil from its leaves are B-pinene, B-caryophyllene, citral and camphene (Manalo, 1982). Essential oils from "ilang-ilang" flowers (*Cananga odorata*) were extracted by steam distillation. The history of the oil dates back to the eighteenth century when Philippine ilang-ilang oil was exported to European countries especially France. The ilang-ilang trees were introduced into French territories which led to the cultivation of the plant in large areas for commercial production of the essential oils, which later displaced the Manila oils from world market. Despite repeated attempts to revive the industry after World War I the Manila industry never recovered (Anzaldo, 1982). Recent studies of ilang-ilang oil involved the effect of maturity and wilting on the yield of essential oil. It was found out that wilting does not affect the yield of the oil. The mature fresh flowers gave higher yields as compared to immature and old flowers. Comparative studies with other flower oils showed that the ilang-ilang flowers gave the highest yield of oil which was also the most fragrant (Quilao, Manalo, Realeza, Lizo and Cabañero, 1981). Further studies of the effect of wilting on the quality of the oil are being undertaken.

Because of this essence, a research has been started on the new developments in cologne formulation utilizing the ilang-ilang flower oil. There are now a thousand and one essential oil products known in the world market (Manalo, Coronel, Anzaldo and Orlina, 1982).

The studies on essential oils are envisioned to be carried on to the pilot-plant stage. In this connection the Engineering Department of our institute has fabricated a model for small-scale distillation. At present this model is in the trial stage to be brought for demonstration to the rural areas where specific raw materials for essential oil production abound (Anzaldo, 1981). It is hoped that this will generate cottage industries for essential oil production and eventually lay the groundwork for the revival of most of essential oil industries in the Philippines.

Finally hereunder are the following suggestions recommended to improve the essential oil industry in the country for maximum utilization:

1. Since gathering of some of the volatile oil-containing plants is seasonal, there should be control and restriction in collection;

otherwise, there would be no source of growth for the succeeding years.

2. Planting of several volatile oil-containing plants should be encouraged and given due attention.
3. The collection of the plants (especially the flowers) should be improved, including the methods of drying and preparation.
4. Establish the essential oil industry in the Philippines by giving incentives to farmers and developers. The fact that today the pharmaceutical and cosmetic industries utilize a large amount of these oils, apparently there will be an inexhaustible demand for the product. It will redound to increased employment and assurance of a new source of revenue for the government.
5. Give more effective advertisement in essential oil utilization through the radio, television, newspaper ads, science fairs and symposia.

With this I reiterate that this commodity if given due attention will be a lucrative industry among the working class.

ACKNOWLEDGEMENT

The author is grateful to Josefina B. Manalo, Violeta Q. Coronel and Minda Flor T. Brandares of the Pharmaceutical and Cosmetic Products Development Program for their kind assistance and to Dr. Felicidad E. Anzaldo and Prof. Bienvenido Miranda for making my trip to Indonesia possible thru UNESCO.

REFERENCES

1. Anzaldo, Felicidad E., J.A. Concha and H. Espenida. 1976. Extraction of Essential Oil from *Citrus medica* Linn. *Philip. J. Pharm. Assn.* 62 (1-4): 48.
2. Anzaldo, Felicidad E., J.A. Concha and F.D. Uñalivia. 1977. Extraction of Essential Oil from "Kalachucho" Flowers (*Plumiera obtusa* L.). *J. Philip. Pharm. Assn.* 63: (1-4):35.
3. Anzaldo, Felicidad E., 1980. Essential Oil Production in the Philippines Problems and Prospects. *NSDB Tech. J.* 5 (2):67-68.
4. _____ 1981. Production and Utilization of Essential Oils in the Philippines. *NSDB Tech. J.* 6 (2): 15.

5. _____ 1982. Production and Utilization of Essential Oils, Spices and Pigments: State of-the-Art and Trends. *Proceedings of Seminar – Workshop on Essential Oils, Spices and Pigments, Philippine International Convention Center Manila.* (7).
6. Belardo, Luz O., 1980. Essential Oils. *Trans. Nat. Acad. Sci. & Tech.* 2: 26.
7. Manalo, Josefina B., 1982. A Study of Lagundi Oil: The Essential Oil of *Vitex negundo* Linn. (Fam. Verbenaceae) Growing in the Philippines. *Philip. J. Sci.* 111 (3-4):77-97.
8. Manalo, J.B., V. Q. Coronel, F.E. Anzaldo and G.P. Orlina. 1982. New Development in Cologne Formulations Utilizing Ilang-Ilang Flower Oil. *NSDB Tech. J.* 7 (2):21-22.
9. Quilao, Sayra S., J.B. Manalo, P. Realeza, M.T. Liao and R. Cabañero. 1981. Even Wilted Ilang-Ilang Yields Quality Essence. *Farming Today.* 7 (3):60.