Utilization of Essential Oils Isolates and Aroma Chemicals Section

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New method for oil recovery from distillation waters, Alexander Fleisher, Essential Oils & Spices, Israel

During water-steam distillation, a considerable part of essential oil often remains in distillation waters. This part, enriched in oxygenated compounds, should be extracted for the achievement of a true replica of plant smell and for oil yield increase. For rose and similar oils, such extraction is of the utmost importance, since the distillation water contains the main part of the oil. Known extraction processes are, as a rule, complicated and expensive. Widely used cohobation often yields oils of inferior smell caused by partial chemical alterations.

The described new oil recovery method is based on modified frontal liquid chromatography. Distillation water flows continuously through the column packed with blocks of porous polytetrafluorethylene (PTFE), which holds on its surface about 20% V/V of low boiling water immiscible organic solvent. The saturated solvent is periodically replaced by a fresh one without stopping the process. The time of column saturation is calculated from efficiency datum (HETP) and the distribution coefficient of the most polar oil constituent in the water-solvent system. Preparation of the liquid phase support in blocks provides stability and efficiency for large diameter columns (200-400 mm HETP is about 20-50 mm). Use of PTFE excludes any changes in oil composition.

Essential oils could be quantitatively extracted from 500 l/h of distillation water in a column of 300 mm diameter and 600 mm working layer height. Depending on the oil nature, the volume of solvent needed for complete extraction accounts for 1-3% of the water volume. This method was successfully applied for recovery of rose, basil, origanum, geranium and caraway oils.

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The potential of some tropical pines as sources of marketable turpentine, J. J. W. Coppen, C. L. Green, P. Greenhalgh, B. Keeble and M. J. Milchard, Tropical Products Institute, England

Turpentine is the largest volume essential oil produced in the world with an annual production of approx. 250,000 tonnes. In addition to its unprocessed traditional uses, it has assumed a considerable importance as a source of isolates for the chemical industry. A recent TPI market study concludes that despite competition from other products there are good growth prospects for turpentine usage in fragrance, flavour and polyterpene resin manufacture. Future production from existing supply sources will at best stabilise, whilst it is likely that a declining proportion will enter world trade. Opportunities exist for new suppliers of turpentine possessing desirable characteristics, particularly in some tropical countries where suitable labour and pine resources are available. The results of a turpentine screening exercise for some tropical pines of significance in plantation programmes are presented. The extent of composition variation within a species according to geographical seed source and the importance of appropriate provenance selection is illustrated by the Central American species Pinus caribaea var. hondurensis, P. oocarpa, P. pseudostrobus and P. tenuifolia and with the S.E.Asian pine, P. kesiya. Certain provenances of P. caribaea var. bahamensis and P. patula are identified as rich sources of beta-phellandrene.

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A brief introduction of essential oils in the People's Republic of China, Wu Rui-kun and Huang Zhi-xi, Scientific Research Institute of Fragrance & Flavor Industry, Ministry of Light Industry, China

A general feature of the resources and utilization of essential oils as well as the analytical works in China are briefly described. The history of essential oil plants being used as medicine in China can be traced back to several thousand years ago. The use of essential oil plants as fragrance and flavor materials in China also has a long history. Before 1949, only a few kinds of essential oils were produced, such as peppermint, star anise, cassia, terpentine and camphor oil. Since the birth of New China, over three hundred essential oil plants from 60 families have been exploited. Now about one hundred essential oil plants are used to produce essential oils, concretes and absolutes. Many aroma chemicals are derived from them. Some of the important essential oil plants are mentioned. Analysis of the main constituents of domestic essential oils has gained popular interest recently. The important constituents of some new essential oils are briefly reviewed.

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The effect of storage of some essential oils in contact with metals, Dr. A. L. Jayawardene, Ceylon Institute of Scientific & Industrial Research, Sri Lanka

The deterioration of essential oils when stored in contact with some metals has been a recurring problem in the industry. Only a few investigations into this problem have been reported in literature. This paper will report the results of studies on the effect metals such as aluminum, tin and zinc had on essential oils produced in Sri Lanka, over contact periods ranging from one month to twenty-four months. As far as possible actual storage conditions such as area of metal in contact with a quantity of oil were simulated on a laboratory scale. Gas liquid chromatography was used at all stages to determine the changes in composition which occurred during the period of storage. The specimens were also examined for any

physical changes. It was observed that oils with phenolic constituents (eugenol) reacted extremely rapidly with zinc and formed a precipitate over a period of time. In contrast those oils containing monoterpene hydrocarbons reacted much faster in the presence of aluminum than with either zinc or tin. Only oil of eucalyptus was found to be stable over a long period if loss of 1,8-cineol could be prevented. Aluminum though inert can be used only for short periods for storage of some oils.

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Le physiologiste et le parfumeur, E. Roudnitska, Art & Parfum, France

Echange d'idées avec A. Holley au sujet de : Le parfumeur débutant devant sa pallette (Dragoco Report 1/82). Holley réfléchit sur l'exercice Néroli que Roudnitska donnait à ses élèves. Celui-ci répond par des précisions sur les conditions d'une bonne olfaction et sur la genèse de la composition. Holley parle de ses travaux sur le bulbe olfactif et de la découverte de fibres nerveuses qui, à contre-courant, reviennent du cerveau vers le bulbe. Il donne son interprétation de leur finalité et demande à Roudnitska ce qu'il en pense. Celui-ci, élargissant la discussion précédente, émet sa propre hypothèse sur le rôle de ces fibres "centrifuges". Il montre comment s'exerce l'esprit d'analyse au cours d'une olfaction, l'effort mental qu'implique cette recherche, les qualités intellectuelles et morales nécessaires pour former le sens critique et l'esprit de synthèse. Il évoque ses débuts d'analyste en 1926 à Grasse où, en s'entraînant, il était parvenu à trouver, au nez et à la troisième décimale près, la densité des essences d'Ylang.

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Tagetes in perfumery, J. Meynadier, J. M. Meynadier, J. L. Peyron, L. Peyron, Cliniques Saint Charles, Department of Dermatology, France

Among the numerous kinds of "Tagetes" existing through the world, only a few are used for their odorous or coloring qualities: tagetes glandulifera (perfumes) and tagete erecta (food colouring). Extracts such as essential oil, concrete, absolute show interesting pesticide qualities and an important photobiological activity. They also show a tendency towards resinification. Their typical components are terpenic acyclic carbides and ketones and polythiophenic compounds with or without substitutes, whose proportions depend on the species, the part of the plant and the stage of its development, taking into account the absence of sesquiterpenic lactones and alcaloids. The study of different types of extracts like that of "tagetes" coming from different geographical areas was carried out by CCM and restricted to thiophenic and acetylenic components. The photobiological activity of various extracts coming from "tagetes glandulifera" is being studied on the human being by irradiation using ultraviolet A rays given out by a Xenon Osram 2500 W lamp. These extracts have a strong phototoxic activity probably linked to the presence of alcynylthiophenic by-products.

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Natural and artificial flavours compounded from essential oils and aroma chemicals, Victor Koh Ah Sai, Bush Boake Allen, Singapore

The complex chemical composition of many essential oils have been elucidated by analytical technics such as GC-MS and their active ingredients synthesis artificially. This means that creative flavourists can potentially duplicate any fruit flavour present in nature or generated by cooking process, e.g., roast beef aroma, freshly brewed coffee aroma, or by fermentation process as soy sauce. In a sparkling beverage like lemonade a water soluble lemon essence is required whereas in a cloudy orange crush an emulsion form of orange oil is incorporated to give a stable soft drink. In sugar confectionery where solubility and micsibility is not a problem, essential oils can be added directly into the cooked hot sugar glucose mass on the forming table. Artificially compounded essential oils from terpene fractions and nature identical synthetics offer very competitive cost effective products compared to natural essential oils e.g., our local "musk line" called Kalamansi in Philippines which is not offered commercially and mango flavour oil which is not found in nature. Elaboration on synthetics that could be used.

How is an artificial flavour created? Discussions on flavour profiles and flavour perception including some examples of aroma chemicals important for recognition of related flavour profiles like durian, pandan, coconut milk, and the aroma chemicals and essential oils used in Manila and Havana flavours which are widely used for flavouring Kretek clove cigarettes in Indonesia.

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Computerisation of GC/MS analyses, David T. Green, PPF International, England

A highly automated system for the analysis and identification of components of complex fragrance materials is presented. Whilst in its present form, the system is applicable mainly to the perfumery industry, the techniques used are readily adaptable to the analysis of other types of complex mixtures, e.g., alcoholic beverages or flavours. The acquisition of GC/MS data is achieved using a combination of a quartz capillary column gas chromatograph with a quadruple mass spectrometer. The system is equipped with automatic GC injection facilities and is controlled by its own dedicated computer. The hardware of this system will be outlined. The data acquired by the above hardware are analysed by computer using programs written in a high level language. These programs edit the data and store the scans of interest in a separate file. Each flagged scan is compared with a specially constructed library of spectra of relevant compounds. If an identification is effected, the GC peak is then quantified. The process is completed by the generation of quantitative and qualitative reports on the mixture.

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Normalisation Internationale des Huiles essentielles, E. Sales, Secretariat du Comite Technique ISO/TC 54, Portugal

Ce travail rapporte l'activitée du Comité Technique 54 de l'Organisation Internationale de Normalisation (ISO), quis'occupe de la normalisation dans le domaine des "Huiles Essentielles". Il commence par faire reference aux activitées de l'ISO, à leurs Membres, à leurs travaux techniques, aux relations avec les autres organisations internationales, et à la procedure d'élaboration et d'implementation des Normes Internationales. Aprés il décrit l'activitée du Comité ISO/TC 54, en referant les travaux conclus, en cours ou futurs. Le rapport inclut encore des listes des Normes publiées, des projets de Normes aprovés, ou en vue d'approbation par les Membres de l'ISO, ainsi que les avant-projets en étude et les travaux futurs. Un graphic est aussi presenté, afin de montrer l'evolution du travail du Comité jusqu'au present.

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Development of chemotypes of wild savory (Satureia Montana L. Labiaceae) maintained in culture with particular reference to the antibacterial activity of their essential oils, J. Pellecuer, Ph. Alain, M. Simeon de Buochberg, M. Attisso, and M. Jacob, Centre de Recherche et de Development des Plantes a Usage Pharmaceutique, France

Chemical analysis was made of the essential oils of wild Savory (Satureia montana L. Labiaceae) collected from natural sites and maintained in culture for several years. The possible value of the essential oils as chemotherapeutic agents was evaluated by determining their Minimal Inhibitory Concentrations against bacterial species using an appropriate technique. Clear antibacterial activity, especially against Gram positive bacteria was demonstrated.