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การวิเคราะห์จากคลังข้อมูลทางภาษา

VOCABULARY IN COSMETIC SCIENCE ABSTRACTS:
A CORPUS-BASED ANALYSIS



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ตาระนิพนธ์นี้เป็นส่วนหนึ่ง ของการศึกษาหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
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บทคัดย่อ

สารนิพนธ์ฉบับนี้มุ่งเน้นวิเคราะห์คำศัพท์ในบทคัดย่อเกี่ยวกับวิทยาศาสตร์เครื่องสำอาง โดยแต่ละบทคัดย่อแบ่งเป็น 4 ขั้นตอนคือ การนำเสนอวัตถุประสงค์ การบรรยายวิธีวิจัย การแสดงผลการวิจัย และ การสรุปผลการวิจัย บทคัดย่อวิทยาศาสตร์เครื่องสำอางที่ใช้ในการวิจัยเก็บจากบทคัดย่อจำนวน 247 บทความ ซึ่งรวบรวมจากวารสารชื่อ “Journal of Cosmetic Science” และ “International Journal of Cosmetic Science” ระหว่างปี พ.ศ. 2545-2549 เครื่องมือที่ใช้ในการวิเคราะห์คำศัพท์เป็น โปรแกรมคอมพิวเตอร์ 3 ชนิด คือ “Web Frequency Indexer v. 1.3” “Web VP v. 2.5 Classic” และ “WordSmith รุ่นที่ 3.0” แนวทางในการวิเคราะห์คำสันธานอ้างอิงตามหนังสือ ‘Dictionary of Language and Linguistics’ โดย Hartman and Stork (1972) และ ‘Longman Grammar of Spoken and Written English’ โดย Biber et al. (1999).

ผลการวิเคราะห์คำศัพท์พบว่า คำนามที่พบมากที่สุดคือ ‘skin’ คำกริยาคือคำว่า ‘used’ คำคุณศัพท์ได้แก่ ‘cosmetic’ คำกริยวิเศษณ์ได้แก่ ‘also’

ผลการวิเคราะห์ลักษณะของคำศัพท์พบว่า ศัพท์ที่ใช้ในบทคัดย่อวิทยาศาสตร์เครื่องสำอาง มีลักษณะเป็นศัพท์เทคนิคค่อนข้างสูงเมื่อเปรียบเทียบกับถ้อยคำในหนังสือทั่วไป จากคำที่ศึกษาทั้งหมด 49,627 คำ ประกอบไปด้วยคำศัพท์พื้นฐานร้อยละ 68.23 คำศัพท์ทางวิชาการร้อยละ 9.89 คำศัพท์เทคนิคและคำอื่นๆที่ไม่ได้ประกอบอยู่ในกลุ่มข้างต้นร้อยละ 21.83

ผลที่ได้จากการวิเคราะห์คำสันธานในบทคัดยอดังกล่าว เมื่อแยกตามความหมายพบว่า คำสันธานประเภท ‘enumeration and addition’ ปรากฏมากที่สุดคิดเป็นร้อยละ 52.42 ตามมาด้วยประเภท ‘contrast/concession’ ร้อยละ 24.43 ‘result/inference’ ร้อยละ 14.50 ‘apposition’ ร้อยละ 5.34 ‘summation’ ร้อยละ 2.80 และ ‘transition’ ร้อยละ 0.51 ตามลำดับ โดยสรุปคำสันธานมีการนำมาใช้มากที่สุดในช่วงขั้นตอนการแสดงผลการวิจัย

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CHAPTER 1

INTRODUCTION

1.1 Statement and Significance of the Problems

It is now widely accepted that English has acquired the status of an international language, especially for science and technology. As a result, research articles in English have become one of the main channels for distributing and advancing scientific knowledge among English-speaking and non English-speaking scientists. The ability to read and write research articles in English is important for success in science and technology. However, Swales (1990) stated that nobody can read all interesting journals or expects to read thoroughly every pertinent research article. The abstract, therefore, is the first section that a reader should consider because it summarizes the information of the whole article. Besides, many scientists use abstracts to filter the existing literature when conducting research into a certain topic or when trying to keep up-to-date with the latest advances in their field of interest.

Nevertheless, scientific abstracts including high lexical density make them difficult to both read and write (Halliday, 1993). Maliwan (1985) claimed that the most important problem for non-native speakers of English, including Thai researchers, is the accuracy of the English language usage. To be able to understand or produce scientific abstracts effectively, non-native speakers of English need to be aware of both the organization and the linguistic features associated with the abstracts in their fields of interest. In particular, they must understand the communicative purposes of abstracts and the appropriate lexical choices that are conventionally used to express the communicative purposes of each section of an abstract. As Zimmerman (1997) pointed out, vocabulary is central to language and of critical importance to the typical language learner. To achieve the overall communication purpose in foreign language, it is also important to know that the use of connectors (e.g. *however, therefore, in other words*) is one aspect of English grammar that demonstrates register variation.

There were many people interested in studying the organization or linguistic features associated with the abstracts in their fields of interest such as Bhatia (1993), who investigated the organization of published English journal abstracts. The result showed that an abstract normally consists of four moves: introducing purpose, describing methodology, summarizing results, and presenting conclusions. In 2000, Phanthama studied and compared the organization and linguistic

features (reporting verbs) of the abstracts of English medical journals and those written in English by Thai researchers. Orasan (2001) conducted a corpus study on scientific abstracts to analyze lexical level from word frequency list. His study applied aspects of move analysis and a corpus analysis to find out pattern in scientific abstracts (See Chapter II for more details).

Nowadays, cosmetic science is very popular in many universities since the cosmetic industry becomes more technologically advanced and focused. Therefore, this study applies key aspects of move analysis and corpus-based study to analyze English vocabulary in four moves of cosmetic science abstracts, i.e. Purposes, Methods, Results, and Conclusions. The findings from this study will be expected to provide a guideline for students and scientists to develop their skills in reading and writing abstracts. Furthermore, this study can be beneficial for teachers and course designers in designing teaching materials for language students.

1.2 Goals and Objectives

This study aimed to compile a corpus of cosmetic science abstracts and analyze English vocabulary in four moves of abstracts, i.e. Purposes, Methods, Results, and Conclusions.

There are three main objectives as follows:

1.2.1 To analyze lexical vocabulary in each move of cosmetic science abstracts in terms of nouns, verbs, adjectives, and adverbs.

1.2.2 To analyze general, academic, and technical vocabulary in the corpus of cosmetic science abstracts.

1.2.3 To identify connectors in each move of cosmetic science abstracts.

1.3 Scope or Limitations of the Study

There are eight limitations in this study.

1.3.1 The analysis of the vocabulary in this study was focused on lexical vocabulary, i.e. nouns, verbs, adjectives, and adverbs and vocabulary levels, namely general, academic, and technical words.

1.3.2 Samples in this study were 247 abstracts obtained from International Journal of Cosmetic Science (Europe) and Journal of Cosmetic Science (U.S.) published during the year 2002-2006 (See Chapter III for more details).

1.3.3 Cosmetic science abstracts were grouped into four categories, namely Hair Care, Make Up, Skin Care, and Others. The division of the categories was based on the market research from U.S. Commercial Service American Embassy (2007: Online).

1.3.4 All sentences of abstracts were classified into four moves based on Bhatia's move theory (Bhatia, 1993): introducing **purpose**, describing **methodology**, summarizing **results**, and presenting **conclusions**.

1.3.5 The "*General Service List*" created by West (1995) was used as the guidelines for identifying the general vocabulary.

1.3.6 The "*Academic Word List*" created by Coxhead (2000) was used as the guidelines for identifying the academic vocabulary.

1.3.7 The online tool "*Web VP v. 2.5 Classic*" created by Nation (2006) was used as the guidelines for identifying the technical vocabulary.

1.3.8 The guidelines on the connector analysis were based on '*Dictionary of Language and Linguistics*' written by Hartmann and Stork (1972) and '*Longman Grammar of Spoken and Written English*' written by Biber et al. (1999).

1.4 Process of the Study

There were four main stages in the process of this study: data collection, data analysis, results and discussions, and conclusions and suggestions.

1.4.1 Data Collection

1.4.1.1 164 abstracts were gathered from the online journal titled "*International Journal of Cosmetic Science*" (Europe), whereas 146 abstracts were gathered from the printed journal titled "*Journal of Cosmetic Science*" (U.S.) published during the year 2002-2006.

1.4.1.2 Cosmetic science abstracts were grouped into four categories, namely Hair Care, Make Up, Skin Care, and Others. The division of the categories is based on the market research from U.S. Commercial Service American Embassy (2007: Online).

1.4.1.3 Each abstract was divided into sentences. All sentences were grouped into 4 separated moves: Purposes, Methods, Results, and Conclusions based on Bhatia's move theory (Bhatia, 1993).

1.4.1.4 Corpus Compilation

After cosmetic science abstracts were scanned from the printed journal (*Journal of Cosmetic Science*) and downloaded from the online journal (*International Journal of Cosmetic Science*), all of them were stored as plain-text files (*.txt).

1.4.2 Data Analysis

1.4.2.1 Corpus Tools

The online tool "*Web Frequency Indexer v. 1.3*" created by Nation (2001) was used to examine tokens, word types, and type/token ratio. Additionally, it was used to generate the word lists in the corpus of cosmetic science abstracts. Another online tool "*Web VP v. 2.5 Classic*" created by Nation (2006) was used to categorize vocabulary into four groups: K1 words (1-1000 General vocabulary), K2 words (1001-2000 General vocabulary), AWL (Academic), Off-list words (Technical vocabulary and Low frequency words). Finally, the concordancing software "*WordSmith Tools Version 3.0*" created by Scott in 1996 was used to find out connectors.

1.4.2.2 Content Analysis

After 247 cosmetic science abstracts were selected for analysis, each abstract was divided into sentences. In order to analyze vocabulary in four moves of abstracts, all sentences were grouped into 4 separated moves; Purpose, Method, Result, and Conclusion based on Bhatia's move theory (Bhatia, 1993). The vocabulary analysis was carried out as follows:

Firstly, the frequency of occurrence of the tokens, word types, and type/token ratio in the corpus of cosmetic science abstracts were calculated by using the online tool "*Web Frequency Indexer v. 1.3*". Secondly, lexical vocabulary in each move of cosmetic science abstracts was analyzed in terms of nouns, verbs, adjectives, and adverbs. Thirdly, general, academic, and technical vocabulary in the corpus of cosmetic science abstracts were analyzed by using the online tool "*Web VP v. 2.5 Classic*". Finally, connectors in each move of cosmetic science abstracts were identified and grouped into six main types, namely enumeration and addition, summation, apposition, result/inference, contrast/concession, and transition.

1.4.3 Results and Discussions

The findings were shown and discussed according to the objectives of this study. The overall results were presented in terms of number of tokens, word types, type/token ratio, and word frequency lists. The results of lexical vocabulary analysis were presented in form of word

frequency and percentage. The results of general, academic, and technical vocabulary analysis were shown in form of percentage and word frequency. The results of connector analysis were presented in form of word frequency and percentage. The results were then followed by discussions.

1.4.4 Conclusions and Suggestions

The conclusions and suggestions for further studies were given.

1.5 Definitions

Academic Vocabulary:	Words included in the Academic Word List (AWL) created by Coxhead (2000).
Bhatia's Move Theory:	Four moves of abstracts including introducing purpose , describing methodology , summarizing results , and presenting conclusions discovered by Bhatia (1993).
Concordance:	A primary tool in all corpus studies which enables a researcher to find all occurrences of a given word, a part of word, or combinations of words within the context in a corpus of texts.
Corpus:	A collection of linguistic data, either compiled as written texts or spoken texts, and usually stored in a computer-readable form.
Function Words:	Words usually indicate meaning relationships and interpret units containing lexical words, by showing how the units are related to each other. They include determiners, pronouns, prepositions, auxiliary verbs, and conjunctions (Biber et al., 1999).
General Vocabulary:	Words included in the General Service List (GSL) created by West (1953).
Lexical Vocabulary:	The main carriers of information in a text, namely nouns, verbs, adjectives, and adverbs (Biber et al., 1999).
Move:	A segment of an article abstract. Each move demonstrates a particular intention or purpose while contributing to the overall communicative purpose of the text (Swales, 1990).

Technical Vocabulary:	Terms occur frequently in a specialized text than in texts outside the area (Nation, 2001).
The Academic Word List (AWL):	The list of 570 word families of specialized vocabulary selected with reference to the frequency of use in academic texts: Arts, Commerce, Law and Science.
The General Service List (GSL):	The list of the most frequent 2,000 words of English (West, 1953)
Tokens or Running Words:	Every word form in a text (Nation, 2001). For example, the sentence <i>'The concordancer is a computer program'</i> consists of 6 tokens.
Word Types or Different Words:	A token occurring more than one in different position was counted as one word type. For example, the sentence <i>'It is widely accepted that high frequency items in the language should receive the main pedagogical focus in the content of curriculum'</i> consists of 22 tokens. The word 'in' occurs twice, while 'the' occurs 3 times. Therefore, there are totally 19 word types since the same word is counted only once.
Type/Token Ratio:	The relative proportions of types and tokens.

CHAPTER 2

LITERATURE REVIEW

This chapter is divided into six main parts. The first part begins with characteristics of abstracts. The second part reviews the previous research in corpus-based specialized texts. The third part describes the background of linguistic corpora. The fourth part presents vocabulary levels. The fifth part focuses on word classes. In the last part of this chapter, connectors are described.

2.1 Characteristics of Abstracts

This section is divided into five parts: definitions of abstracts, importance of abstracts, types of abstracts, moves in English abstracts, and linguistic features of abstracts.

2.1.1 Definitions of Abstracts

According to Cleveland (1983), an abstract summarizes the essential contents of a particular knowledge record and is a true surrogate of the document. It is a time saving device that can be used to find particular parts of the article without reading it (Graetz, 1985). These definitions emphasize the most important function of an abstract, i.e. its role as a replacement for an entire document or highlighting what is important in the document.

2.1.2 Importance of Abstracts

The abstract is the most important part of the paper because it is the means of disseminating the research widely. Its chief function is to report the most essential new scientific information in the paper in an abbreviated form. It is impossible for scientists to read all the research papers that interest them, even in their discipline. Moreover, for papers written in unfamiliar languages apart from English (e.g. Thai, French), the abstract is the only section most likely to be read and it may be the only part that is available to some readers as screening device (Wilkinson, 1991).

2.1.3 Types of Abstracts

Generally, there are two types of abstracts: descriptive or indicative and informative (Eisenberg, 1982; Day, 1988; Huckin and Olsen, 1991). An indicative or descriptive abstract is written to inform readers about the kind of information in the paper. It gives little actual information about the research. The descriptive abstract is written for readers interested in retrieving the article rather than in obtaining the information from it, that is, primarily librarians, bibliographers, and research scientists searching the literature. This type of abstract usually appears in review papers, reference reports, government reports, or literature.

Unlike descriptive abstract, an informative abstract is to report the research rather than to describe the paper. It is written for scientists who want a brief digest of the research, that is, any new methods, results, concepts, or conclusions. This type of abstract is most commonly used for scientific papers.

2.1.4 Moves in English Abstracts

The abstract usually consists of one paragraph or about 200-250 words and stands independent of the paper. Based on Bhatia's (1993) research on abstracts, an English abstract normally consists of four moves: introducing **purpose**, describing **methodology**, summarizing **results**, and presenting **conclusions**. This pattern is also accepted by many researchers (Day, 1988; Maher, 1990; Phantama, 2000; Swales, 1990). The details of the four moves are as follows:

Move One: Introducing **Purpose**. This move gives a precise indication of the author's intention, thesis or hypothesis which forms the basis of the research being reported. It may also include the goals or objectives of research or the problem that the author wishes to tackle.

Move Two: Describing **Method**. In this move, the author gives a good indication of the experimental design, including information on the data, procedures or method (s) used and, if necessary, the scope of the research being reported.

Move Three: Summarizing **Results**. This is an important aspect of abstracts where the author mentions his observations and findings and also suggests solutions to the problem, if any, posed in the first move.

Move Four: Presenting **Conclusions**. This move is meant to interpret results and draw inferences. It typically includes some indication of the implications and applications of the present findings.

According to Wilkinson (1991), an abstract consists of four parts: **objectives, methods, results, and conclusions**. The details of each part are as follows:

2.1.4.1 Introduction

The introduction states the subject of the paper, either as the purpose or the objective of the research or as the research problem. It may include a characterization of the study. One way to avoid slipping into a general introduction when beginning an abstract is to start with a sentence that addresses the paper or the study: *this paper, this study, this research*.

2.1.4.2 Methods

If the title states the purpose clearly, the abstract may start directly with the methods. This section is very important because it enables readers to understand the kind of approach to solve the problem that was used. In papers in which the methods are complex, they are reported in greater detail. If the new methods or techniques are the focus of the research, the methods may make up most of the abstract.

2.1.4.3 Results

Results are the most important part of the abstract since they are the new additions to scientific knowledge. In fact, the results may dominate the abstract. In general, quantitative data are important for reporting scientific results.

2.1.4.4 Discussion and Conclusion

Although the discussion is an important part of the paper, it is not included in the abstracts. In general, it should be omitted from the abstract. Therefore, only the conclusion, that is the inferences drawn, is included in the abstract.

On this basis, the ideal abstract consists largely of methods and results, an opening sentence stating the research objective and a closing sentence stating the conclusion. However, the abstract does not represent all parts of the paper, and those included are not equally condensed.

In this study, four moves have been considered, i.e. purposes, methods, results, and conclusion. It was noticed that some abstracts could be considered to follow the expected structure. In the rest of them, more than one move could be identified in one sentence. Therefore, this study mainly focused on the theme of each sentence.

The following example shows moves in the cosmetic science abstract.

The objective of this study was to evaluate formulations containing adenosine to reduce periorbital lines and glabellar frowns in a blind, randomised, placebo-controlled study. One hundred twenty-six female volunteers between 45 and 65 years of age fulfilled inclusion criteria for periorbital lines. They were provided with two of three products (cream with adenosine, dissolvable film with adenosine or placebo), to be applied to the periorbital area on each side of the face (84 subjects per product). Eighty-four of these subjects also fulfilled the inclusion criteria for glabellar frowns, and received placebo or cream with adenosine to be applied to the glabellar area. Products were applied twice daily for 2 months, and evaluation was performed under dermatological supervision at 0, 3 and 8 weeks using Fast Optical *in vivo* Topometry of human Skin (FOITS) analysis to describe skin profile. Both adenosine-containing products led to significant improvements in skin smoothness in the periorbital area. Improvements were evidenced after 3 weeks of product application as measured by *Ra* and *Rz* parameters using the FOITS technique, and were steadily confirmed after 2 months, despite severe climatic conditions and independently of the analysis technique that was used with the FOITS data. Adenosine-containing cream also significantly improved glabellar frowns. This study demonstrates the potential beneficial effects of adenosine-containing products on crow's feet and glabellar facial wrinkles.

Figure 2.1 Example of Cosmetic Science Abstracts

As shown in Figure 2.1, the red part is the purpose; the blue part is the method; the green part shows the findings, and the brown part is the conclusion of the study.

2.1.5 Research on Linguistic Features of Abstracts

There have been many research studies on the linguistic features of abstracts both in Thailand (Phantama 2000) and abroad (Graetz 1985 and Orasan 2001).

According to Graetz's (1985) research on abstracts, an abstract usually had particular linguistic features. For example, it was found that full sentences, the past tense, impersonal

passive were used whereas negatives were not. Moreover, abbreviations, jargons, symbols and other language shortcuts that might lead to confusion were rarely used.

In Thailand, Phantama (2000) studied and compared the organization and linguistic features (reporting verbs) of the abstracts of English medical journals written by native speakers and Thai researchers. She found that *verb to be* is mostly used in both groups of abstracts.

Orasan (2001) conducted a corpus study on scientific abstracts to analyze lexical level from word frequency list. His study applied aspects of move analysis and a corpus analysis to find out pattern in scientific abstracts. The overall results showed that the nouns *paper* (499 times), *study* (170 times), *research* (154 times), and *work* (111 times) are used commonly to make a reference to the paper. With regard to the word *paper*, it usually appears in constructions like: *this paper* (360 times) or *the paper* (115 times). In many cases, the word *paper* is used as the subject of verbs like: *present* (62 times), *describe* (50 times), *be* (45 times), *introduce* (15 times). In each abstract, the moves were manually classified to analyze groups of words which signal the type of each move. The results revealed that firstly, the introduction move is to provide the reader with some background information and to explain what has been done in the field. This move usually makes references to previous work using expressions like: *prior work*, *previous work*. Secondly, the problem move is explicitly signaled through phrases like: *we describe*, *we present*. Thirdly, the method move enables readers to understand the kind of approach to solve the problem that was used. Some sentences from this section are marked by using phrases like: *an alternative solution*, *the approach described here uses*. Fourthly, it has been noticed that whenever the verb *show* is used, it appears in the result move in phrases like: *it is shown*. In addition to the verb *show*, other phrases are also used for marking this move (e.g. *this work provided*, *reveal*, *yield*, *find*). Besides these phrases, words which refer to measures are used (e.g. *limited*, *compare*, *quantify*). Connectors, which hardly appear in the other moves, are quite frequent in this one (e.g. *however*, *in addition*). Lastly, the conclusion move contains an explicit reference to the abstract (e.g. *this work provides*, *these observations suggest*). In addition, phrases like: *this paper conclude*, *as a conclusion*, or adverbs (e.g. *therefore*, *as a result*) are used to mark the beginning of the conclusion move.

2.2 Previous Research in Corpus-based Specialized Texts

There have been several studies in specialized texts. In the project of Sutarsyah et al., (1994), a general academic corpus and economic text corpus were used in order to specify and

compare the vocabulary in the general academic corpus and the economic text corpus. The findings revealed that technical vocabulary is more frequent in economic texts than in the general academic corpus and words that occur frequently in the economic texts may not arise in the general academic corpus. Additionally, it is observed that the frequency of technical vocabulary is low in the general corpus due to the fact that the corpus itself covers a variety of disciplines.

In 1993, Flowerdew conducted a Biology corpus to compare the vocabulary in the biology text corpus and the COBUILD general corpus. The results demonstrated that both mainly contain function words. Both corpora showed that the 10 most frequent words are all function words, as displayed in Table 2.1 below:

Table 2.1 List of 10 Most Frequent Words

Biology Corpus		COBUILD General Corpus	
1. the	6. in	1. the	6. in
2. and	7. are	2. of	7. that
3. of	8. to	3. and	8. I
4. is	9. it	4. to	9. it
5. a	10. this	5. a	10. was

(Flowerdew, 1993)

With regard to nouns used in both corpora, it can be seen that both corpora differ greatly in the word lists. Almost all of the top 20 nouns in the Biology corpus are related to the discipline of biology; however, the COBUILD corpus contains several words of general English, as indicated in Table 2.2:

Table 2.2 List of Top 20 Nouns in the Biology Corpus and COBUILD General Corpus

Top 20 nouns in the Biology Corpus		Top 20 nouns in the COBUILD General Corpus	
1. cell	11. energy	1. time	11. life
2. cells	12. concentration	2. people	12. men
3. water	13. organisms	3. way	13. face
4. membrane	14. cytoplasm	4. man	14. house
5. food	15. animal	5. years	15. kind

Table 2.2 (Continued)

6. plant	16. stem	6. work	16. year
7. root	17. structure	7. world	17. place
8. molecules	18. body	8. thing	18. home
9. plants	19. part	9. day	19. sort
10. wall	20. animals	10. children	20. end

(Flowerdew, 1993)

In 2002, Kaewphanngam conducted a corpus analysis of psychology texts in order to identify high frequency technical and academic vocabulary. The results revealed that most of the frequent words are function words and content words which are highly topic-related words to the subject of psychology.

From many studies in corpus-based specialized texts, the findings indicated that every field has its own set of specialized terms, which are found commonly in the particular fields.

2.3 Background of Linguistic Corpora

2.3.1 Definitions of Corpus

A corpus (plural: corpora) is a body of written text or transcribed speech which can serve as a basis for linguistic analysis and description (Kennedy, 1998:1). The COBUILD dictionary (2003) defines a corpus as *“a large collection of written or spoken texts that is used for language research”*. Nowadays the term ‘corpus’ refers to a collection of linguistic data, either written or spoken texts, and usually stored in a computer-readable form (Boswood, 1997: 253).

According to Biber et al. (1998: 4-5), the characteristics of corpus-based analysis are as follows:

- It is empirical, analyzing the actual patterns of use in natural texts.
- It utilizes a large and principled collection of natural texts, known as a “corpus”, as the basis for analysis.
- It makes extensive use of computers for analysis, using both automatic and interactive techniques.
- It depends on both quantitative and qualitative analytical techniques.

Over the last three decades the compilation and analysis of corpora stored in computerized database has led to a new scholarly enterprise known as corpus linguistics.

2.3.2 Types of Corpus

Corpora can differ in a number of ways according to the purpose for which they were compiled. According to Hunston (2002: 14), corpora are classified into two ways, i.e. general and specialized corpora.

2.3.2.1 General Corpora

A general corpus is a collection of texts of as many different types as possible in order to study features of the language in general, independently of the styles of particular types of texts (Tribble and Jones 1990: 15). It may include written or spoken language, or both (Sinclair, 1991: 17). Some well-known general corpora are demonstrated as follows:

2.3.2.1.1 The Brown Corpus

The first machine-readable corpus for linguistic research was *'The Brown Corpus of Standard American English'*. It consists of one million words of the written English printed in the United States in the year 1961. To make the corpus a good standard reference, samples in the Brown Corpus were taken from fifteen different text categories.

2.3.2.1.2 The Lancaster-Oslo/Bergen (LOB) Corpus

Between 1970 and 1978, a corpus of written British English was compiled at the University of Lancaster and the University of Oslo in collaboration with the Norwegian Computing Centre for the Humanities at Bergen. The LOB Corpus was intended to be a British English counterpart to the Brown Corpus. It consists of 1 million words of written language taken from the same categories as the Brown Corpus.

2.3.2.1.3 The COBUILD

The COBUILD project was carried out by the university of Birmingham in 1987. The compilers of the Collins COBUILD English Language Dictionary started to collect a corpus of texts on computer for dictionary making and language study. They had to daily access to a corpus of approximately 20 million words. New texts were added to the corpus, and in 1991 it was launched as the Bank of English (BoE). More and more data have been added to the BoE, and the latest release (1996) included some 320 million words.

2.3.2.2 Specialized Corpora

A specialized corpus is a corpus of texts of a particular type, such as newspaper editorials, textbooks, and academic articles in a particular subject, lectures, casual conversations, and so on. It is used to investigate the linguistic features that characterize a particular type of text (Hunston, 2002: 15).

In this study, the corpus of cosmetic science abstracts is the specialized corpus because it is relevant to one particular interest or discipline, i.e. cosmetic science abstracts collected from journals.

2.4 Vocabulary Levels

According to Nation (2001), vocabulary is divided into four levels: high frequency words, academic vocabulary, technical vocabulary, and low frequency words.

2.4.1 High Frequency Words

High frequency words or general vocabulary are the most frequent 2,000 words of English included in the General Service List (GSL) by Michael West in 1953. This vocabulary typically covers around 80% of the running words of academic texts and newspapers, and around 90% of conversations and novels. Nation (2001) suggests that the most frequent 2,000 words or high frequency words remain the best starting point for many learners embarking on academic study at university or college.

2.4.2 Academic Vocabulary

Academic vocabulary has been recognized as having an important role in teaching and learning vocabulary for academic purposes. This kind of vocabulary has been called sub-technical vocabulary or semi-technical vocabulary (Jordan, 1997). Both sub-technical vocabulary and academic vocabulary have been used widely, but the term academic vocabulary has been used more frequently in recent years. Linguists give similar definitions of academic vocabulary as the words that occur across several kinds of subject disciplines. They are not found only in the specific subjects or highly technical resources but also almost all of them can be found in different kinds of academic texts. In 2000, the Academic Word List (AWL) was composed by Coxhaed at the school of Linguistics and Applied Language Studies at Victoria University of Wellington, New Zealand. He studied 3.5 million running words in written academic texts by using range and frequency criteria. AWL includes 570 word families of specialized vocabulary

selected with reference to the frequency of use in academic texts: Arts, Commerce, Law and Science. The total number of 570 word families was sub-divided into 10 lists ranging from List 1 containing the most frequent words to List 10 containing the least frequent words. In text coverage, academic words in the AWL cover around 8 to 10% of all words in a text and 94% of the total words can be found in 28 subject areas. It shows that word lists are very useful in teaching English and can be used to serve as the basis for course books, especially for teaching academic vocabulary.

2.4.3 Technical Vocabulary

Technical vocabulary can be found in any specific field of knowledge and is useful for learners with specific goals in reading academic texts of certain disciplines. It consists of terms that occur frequently in a specialized text than in texts outside the area, and covers about 5 % of the running words in specialized texts.

2.4.4 Low Frequency Words

The fourth level of vocabulary consists of all the remaining words of English including proper names, abbreviations, and numbers. There are thousands of these words, and they typically cover around 5% of the running words in texts.

2.5 Word Classes

Biber et al. (1999) categorized word classes into three families according to their main functions and their grammatical behavior: lexical words, function words, and inserts.

2.5.1 Lexical words

Lexical words are the main carriers of meaning in a text. There are four main classes of lexical words: nouns, lexical verbs, adjectives, and adverbs.

2.5.1.1 Nouns

Nouns commonly refer to concrete entities, such as people and things in the external world (e.g. *book, girl*), but they may also denote qualities and states (e.g. *freedom, friendship*).

2.5.1.2 Verbs

Verbs can have one of two major roles in a verb phrase: main verb or auxiliary verb. Main verbs, such as the verb *went* in the following example, can stand alone as the entire verb phrase:

(1). *I **went** into the empty house.*

In contrast, auxiliary verbs, such as the verbs *can* and *be* in the following example, occur together with some main verb (in this case *cited*):

(2). *Instances **can be** [cited] where this appears not to be the case.*

Some verbs used as auxiliaries may occur independently (be, have, do). Other verbs function as auxiliaries and must be used with a lexical verb (shall, will, can, must, may, should, would, could, might).

There are three major classes of verbs: lexical verbs (also called full verbs, e.g. *run, eat*), primary verbs (*be, have, and do*), and modal verbs (e.g. *can, will, might*). These classes are distinguished by their roles as main verbs and auxiliary verbs.

2.5.1.3 Adjectives

Most typically, adjectives describe the qualities of people, things, and states of affairs: a **heavy** box, he is **guilty**, the situation is **serious**. In addition, many adjectives are gradable. That is, they can be compared and modified for the degree or level of the quality: *heavier, very heavy, extremely serious*.

2.5.1.4 Adverbs

There are seven main categories of adverbs: place, time, manner, degree, additive/restrictive, stance, and linking adverbs.

Place adverbs express distance, direction, or position; **Time adverbs** express position in time, frequency, duration, and relationship; **Manner adverbs** express information about how an action is performed. Many of these adverbs have *-ly* suffixes, taking their meaning from the adjectives that they are derived from; **Adverbs of degree** describe the extent of a characteristic. They can be used to emphasize that a characteristic is either greater or less than some typical level;

Additive adverbs show that one item is being added to another; **Stance adverbs** can be used to express three types of stance: epistemic, attitude, and style; **Linking adverbs** serve to make connections between spans of discourse. They show how the meaning of one section of text is related to another. The role of linking adverbs serves as adverbials.

This study mainly focuses on linking adverbs or connectors in the corpus of cosmetic science abstracts according to the objectives of the study (See 2.6 for more details).

Adverbs are divided into two major roles according to their functions: **modifiers** and **adverbials**.

In a clause, adverbs can either be integrated into an element of the clause or function themselves as an element of the clause. In the first case, the adverbs serve as **modifiers**; in the second, they are **adverbials**.

Most commonly, adverbs that are integrated into another element of the clause modify an adjective or another adverb, as in the following examples (the modified word is underlined).

(3). *I am **almost** positive she borrowed that off Barbie!*

(4). *First, health service managers must be able to price their services **reasonably** accurately for trading purposes.*

In (3) the adverb *almost* modifies the adjective *positive*, while in (4) the adverb *reasonably* modifies the adverb *accurately*.

In contrast, examples 5 and 6 illustrate adverbs that are themselves elements of the clause:

(5). ***Surprisingly**, the choked voice resumes.*

(6). *And shortly Rabbit too is asleep. **Strangely**, he sleeps soundly, with Skeeter in the house.*

2.5.2 Function words

Function words usually indicate meaning relationships and interpret units containing lexical words, by showing how the units are related to each other. They can be categorized in terms of word classes such as determiners, pronouns, prepositions, auxiliary verbs, and conjunctions.

Determiners normally precede nouns, and are used to help clarify the meaning of the noun; **Pronouns** fill the position of a noun or a whole noun phrase. The reference of a pronoun is usually made clear by its context; **Prepositions** are linking words that introduce prepositional phrases. The prepositional complement following a preposition is generally a noun phrase, so prepositions can also be seen as linking words that connect other structures with noun phrases; **Auxiliary verbs** were divided into two kinds: primary auxiliaries and modal auxiliaries. Both are used to build up complex verb phrases and cannot occur alone unless a lexical verb is recoverable from the context.

There are two types of words traditionally called **conjunctions** in English: **coordinators** (coordinating conjunctions), and **subordinators** (subordinating conjunctions).

Coordinators are used to indicate a relationship between two units such as phrases or clauses. They link elements which have the same syntactic role, and are at the same level of the syntactic hierarchy. Thus, in any structure [X + coordinator + Y], X and Y are equivalent. The main coordinators are *and*, *but*, and *or*, with a core meaning of addition, contrast, and alternative, respectively. In the following example, the coordinated elements are marked by []:

(7). [I don't want to speak too soon], **but** [I think I have been fairly consistent this season].

The coordinators are closely related to adverbs occurring as linking adverbials, but, unlike the latter, their position is fixed at the clause boundary. Compare the flexibility of the adverbial *nevertheless* with the coordinator *but* in the following examples:

(8). They **nevertheless** carved out a 5.7 per cent share of the overall vote.

(9). *They **but** carved out a 5.7 per cent share of the overall vote.

Subordinators are linking words that introduce clauses (known as dependent clauses) which cannot stand alone without another clause (called the main clause).

(10). You can hold her [**if** you want].

The subordinator shows the connection of meaning between the main clause and the subordinate clause. In the above example, the subordinator *if* shows a relation of 'condition'. Some examples of subordinators are *after*, *as*, *because*, *if*, *since*, *while*, and so on.

In the case of coordination, the two elements have the same status. However, in the case of subordination, the dependent clause starting with the subordinator is embedded in the main clause. This can be shown by nested brackets [[]]:

(11). *[[As they watched,] a flash of fire appeared.]*

2.5.3 Inserts

Inserts are found mainly in spoken language. They do not form an integral part of a syntactic structure, but they are inserted rather freely in the text. Generally, they are often marked off by a break in intonation in speech, or by a punctuation mark in writing:

(12). *Well, we made it.*

The characteristic of the inserts carries emotional meanings, such as *oh, ah, wow*, used to express a speaker's emotional response to a situation, or *yeah, no, okay* used to signal a response to what has just been said.

In this thematic paper, the inserts are not studied because cosmetic science abstracts are commonly written in the form of reporting. Therefore, they do not occur in the corpus of cosmetic science abstracts.

2.6 Connectors

In this study, the guidelines on the connector analysis were based on 'Dictionary of Language and Linguistics' written by Hartmann and Stork (1972) and 'Longman Grammar of Spoken and Written English' written by Biber et al. (1999).

Dictionary of Language and Linguistics (Hartmann and Stork, 1972) defines a **connector** as a conjunctive adverb such as *therefore* which links two or more sentences. Biber et al., (1999: 558) defines a conjunctive adverb or linking adverb as an adverb which serves to make connections between spans of discourse. It shows how the meaning of one section of text is related to another. The role of linking adverbs functions as adverbials. Consequently, the primary function of linking adverbials is to state the speaker/writer's perception of the relationship between two units of discourse. Because they explicitly signal the connections between passages of text, linking adverbials are important devices for creating textual cohesion.

According to Biber et al., (1999: 558), linking adverbs are categorized into six major types: enumeration and addition, summation, apposition, result/inference, contrast/concession, and transition.

2.6.1 Enumeration and Addition

In the first case, linking adverbs can be used to enumerate pieces of information or to signal the addition of items to a list. They include ordinal numbers such as *first* and *second*, and adverbs such as *finally* and *lastly*:

(13). *This new structure must accomplish two special purposes. **First**, as part of overcoming the division of Europe there must be an opportunity to overcome through peace and freedom the division of Berlin and Germany. **Second**, the architecture should reflect that America's security remains linked to Europe.*

Other linking adverbs for enumeration include *firstly*, *secondly*, *thirdly*, *in the first/second place*, *first of all*, *to begin with*, *next*, *then*.

In the second case, linking adverbs simply mark the next unit of discourse as being added to the previous one:

(14). *Each of these crystal systems is represented by a primitive lattice. **In addition**, there are seven multi-primitive lattices.*

(15). *Feedback tends to be used to stabilize systems, not to randomize them. **Similarly**, natural systems would probably evolve to avoid chaos.*

Other additive linking adverbs include *also*, *by the same token*, *further*, *furthermore*, *likewise*, and *moreover*.

2.6.2 Summation

Linking adverbs marking summation show that a unit of discourse is intended to conclude or sum up the information in the preceding discourse:

(16). **In sum**, then, to account for a synchronic assimilation from [k] to [t] under this view, the processes of tier promotion and complex segment simplification must apply along with the spreading of the assimilation feature.

(17). **To conclude**, we may place the three notions of saliency in an ordered relation as follows: <...>

Other linking adverbs for summation include *all in all*, *in conclusion*, *overall*, *to conclude*, and *to summarize*.

2.6.3 Apposition

Linking adverbs of apposition show that the following piece of text is equivalent to, or included in, the point made in the preceding discourse. They may introduce the second unit as a restatement of the first, reformulating it in some way or stating it more explicitly:

(18). *The current edition* <....> *shows that road users cover their track costs by a factor of 2.4 to 1. In other words users of all types pay almost two and a half times as much in taxes as is spent on all road costs from building, maintenance and signs, right down to the provision of police, traffic wardens and even grass cutting and hedge-trimming of the verges.*

In many cases, the second unit of text is an example. It is information that is logically included in part of the previous text (here marked in []):

(19). *If a population becomes highly entrained, [its diversity is greatly reduced].*

For example, *the ages structure could become very narrow.*

Other linking adverbs of apposition include *that is*, *for instance*, *namely*, and *specifically*. Some of them used in writing are Latin abbreviations, *e.g.* ('for example'), *i.e.* ('that is'), *viz.* ('namely').

2.6.4 Result/inference

Linking adverbs in the result/influence category show that the second unit of discourse states the results or consequence of the preceding discourse:

(20). *I once acquired a set of recordings of a Bach piano concerto. I was very fond of it, but my mother was forever criticizing and chastising my poor taste <...> **Consequently**, I now hardly listen to Bach.*

(21). *As the spatial file contains all the geometric relationships necessary to specify the body, this can be used to generate any pictorial view. It is **thus** not necessary to produce an engineering drawing specifically for the purpose of showing everyone what it looks like.*

Other linking adverbs in the result/inference category include *therefore, hence*.

2.6.5 Contrast/concession

The category of contrast/concession is broader than many other categories of linking adverbials, containing items that in some way mark incompatibility between information in different discourse units, or that signal concessive relationships. Some linking adverbs clearly mark contrasts, alternatives, or differences:

(22). *Many statutory water companies are already saddled with high borrowings. **In contrast**, the water authorities are going into the private sector flush with cash.*

(23). *All fans should be speed-controlled. **Alternatively**, a system of variable fan speed on a motorized thermostat or electronic control will give full automation on all fans.*

Other linking adverbs more clearly mark a concessive relationship, showing that the subsequent discourse expresses something contrary to the expectations raised by the preceding clause.

(24). *Now that the lawyers have taken over, science will never be able to reach a verdict, and **anyway** it no longer matters.*

In some cases, elements of contrast and concession are combined in uses of linking adverbs:

(25). *Until recently hypobiosis was not considered to be a feature of this genus. **However**, there is now ample evidence in temperature areas that hypobiosis plays an important part in the epidemiology, the seasonal occurrence being similar to that of *Ostertagia spp.**

Other examples of contrast/concession linking adverbs can be grouped according to their primary meaning:

- Focus on contrast, e.g. *on the other hand, conversely, instead, on the contrary, in contrast, by comparison.*
- Focus on concession, e.g. *anyhow, besides, nevertheless, still, in any case, at any rate, in spite of that, after all.*

However, this grouping is not absolute, '*besides*' can also be used as a linking adverb for addition:

(26). *The house was too expensive and too big. **Besides**, I'd grown fond of our little rented house.*

2.6.6 Transition

These linking adverbs mark the insertion of an item that does not follow directly from the previous discourse. The new information is signaled as only loosely connected, or unconnected, to the previous discourse, as in the following example:

(27). *It seems clear there is nothing for it but to go back and attack the first difficulties again. **Incidentally**, one way to motivate yourself if things do get sticky is to imagine that you have to explain the subject to the class the next day.*

Other linking adverbs for transition include *meanwhile, now*.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter describes the research procedure used in this study. It is divided into four main parts: characteristics of journals, data collection, corpus design, and data analysis.

3.1 Journals on Cosmetic Science

Two Cosmetic Science Journals were selected as the source of the study.

The first one was "*Journal of Cosmetic Science*" (the printed journal), which was first published in July 1947 by the Society of Cosmetic Chemist (U.S.). It is the oldest international journal in the field of cosmetic science and it has been issued periodically until the present time. At first, it was published under the title 'Journal of the Society of Cosmetic Chemists' and then the title was changed into 'Journal of Cosmetic Science' in 1998. It has been issued 6 times a year.

The second one was "*International Journal of Cosmetic Science*" (the online journal), which was first published in February 1979 by the Society of Cosmetic Scientists (Europe). It is the second international journal in this field. It has been published in English and French six times a year regularly.

3.2 Data Collection

3.2.1 The population of this study were 310 abstracts from both journals published during the year 2002 to 2006.

3.2.2 The 310 abstracts were grouped into four categories: Hair Care, Make Up, Skin Care, and Others. 'Others' refers to abstracts that are not included in the three main categories. The division of the categories is based on the market research from U.S. Commercial Service American Embassy (2007: Online).

3.2.3 Stratified Random Sampling was used to select samples in this study.

3.2.4 80% of the population were drawn for the content analysis, as shown in Table 3.1.

Table 3.1 Number of Cosmetic Science Abstracts Drawn for the Content Analysis

Name of Journals	Categories of Abstracts	Population Size	Samples
			80 % of Population
Journal of Cosmetic Science (U.S.)	Hair Care	45	36
	Make Up	3	2
	Skin Care	55	44
	Others	43	34
	Total	146	116
International of Cosmetic Science (Europe)	Hair Care	18	14
	Make Up	4	3
	Skin Care	97	78
	Others	45	36
	Total	164	131

3.2.5 The total number of abstracts in the corpus was 247. The ratio of the total abstracts from “*Journal of Cosmetic Science*” to those from “*International Journal of Cosmetic Science*” was 116:131 or 1: 1.13. There were 50 abstracts for Hair Care, 5 abstracts for Make Up, 122 abstracts for Skin Care, and 70 abstracts for Others, as shown in Table 3.2.

Table 3.2 Total Abstracts of Each Category

Categories of Abstracts	Journal of Cosmetic Science (U.S.)	International Journal of Cosmetic Science (Europe)	Total Abstracts
Hair Care	36	14	50
Make Up	2	3	5
Skin Care	44	78	122
Others	34	36	70
Total	116	131	247

3.2.6 In order to analyze vocabulary in four moves of abstracts in further steps, each abstract was divided into sentences. All sentences were grouped into 4 separated moves: Purposes, Methods, Results, and Conclusions based on Bhatia's Move Theory (Bhatia, 1993).

The following example shows how an abstract can be classified into 4 moves.

Move 1 Purpose:

The objective of this study was to evaluate formulations containing adenosine to reduce periorbital lines and glabellar frowns in a blind, randomised, placebo-controlled study.

Move 2 Method:

One hundred twenty-six female volunteers between 45 and 65 years of age fulfilled inclusion criteria for periorbital lines. They were provided with two of three products (cream with adenosine, dissolvable film with adenosine or placebo), to be applied to the periorbital area on each side of the face (84 subjects per product). Eighty-four of these subjects also fulfilled the inclusion criteria for glabellar frowns, and received placebo or cream with adenosine to be applied to the glabellar area. Products were applied twice daily for 2 months, and evaluation was performed under dermatological supervision at 0, 3 and 8 weeks using Fast Optical in vivo Topometry of human Skin (FOITS) analysis to describe skin profile.

Move 3 Result:

Both adenosine-containing products led to significant improvements in skin smoothness in the periorbital area. Improvements were evidenced after 3 weeks of product application as measured by Ra and Rz parameters using the FOITS technique, and were steadily confirmed after 2 months, despite severe climatic conditions and independently of the analysis technique that was used with the FOITS data. Adenosine-containing cream also significantly improved glabellar frowns.

Move 4 Conclusion:

This study demonstrates the potential beneficial effects of adenosine-containing products on crow's feet and glabellar facial wrinkles.

3.2.7 Corpus Compilation

116 abstracts selected from the printed journal (*Journal of Cosmetic Science*) were scanned by using Optical Character Recognition (OCR), whereas 131 abstracts selected from the online journal (*International Journal of Cosmetic Science*) were downloaded. The data obtained from both journals were stored as plain-text files (*.txt).

3.3 Corpus Design

3.3.1 Size of Samples

Size of samples depends on the purposes of an individual corpus study. Though a corpus should be as large as possible, the actual size can be determined according to each circumstance (Sinclair, 1991). As Kennedy (1998) points out a huge corpus does not necessarily represent a language or a variety of a language any better than a smaller corpus. According to Hann's (1989) suggestion, a sample of approximately 20,000 words is large enough to produce statistically reliable results in terms of frequency and distribution. In particular research, the corpus may consist either of a total population of texts or of a sample of texts from a given population (Kennedy, 1998). Because of the limitations of time, the corpus of this study consisted of 247 samples or about 49,627 words.

3.3.2 Corpus Tools

In this study, the online tool "*Web Frequency Indexer v. 1.3*" created by Nation in 2001 was used to calculate the frequency of occurrence of the tokens, word types, and type/token ratio. The ability of this tool is that it optionally generates the word list in three forms as follows:

- Most frequency order
- Least frequency order
- Alphabetical order

Consequently, "*Web Frequency Indexer v. 1.3*" in Figure 3.1 was used to generate the word frequency lists in the corpus of cosmetic science abstracts.

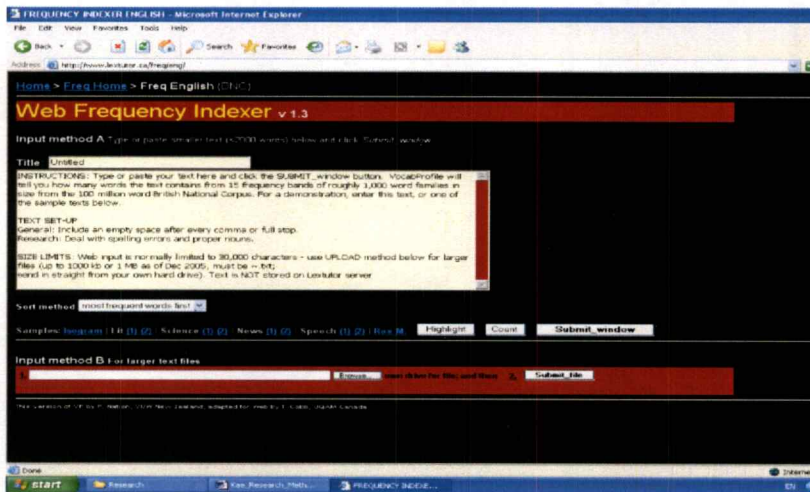


Figure 3.1 Web Frequency Indexer v. 1.3 by Nation (2001)

Another online tool in Figure 3.2 called “Web VP v. 2.5 Classic” created by Nation in 2006 was used to categorize words into four groups as follows:

- K1 words (1-1000 General vocabulary)
- K2 words (1001-2000 General vocabulary)
- AWL (Academic vocabulary)
- Off-list words (Technical vocabulary and Low frequency words)

Moreover, the ability of “Web VP v. 2.5 Classic” is that it calculates the percentage of text coverage in each group of vocabulary occurring in the corpus.

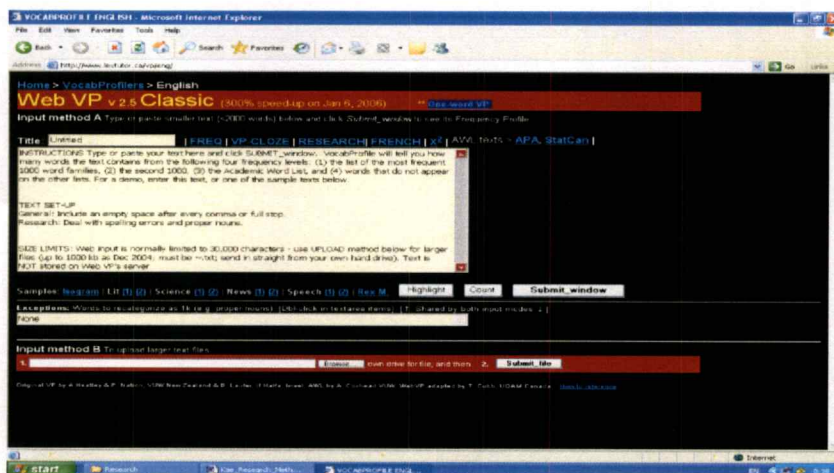


Figure 3.2 Web VP v. 2.5 Classic by Nation (2006)

Finally, the concordancing software “*WordSmith Tools Version 3.0*” created by Scott in 1999 was used to find out the connectors. There are three main tools in this program which are WordList, Concord, and KeyWord. In this study, only concord was used to search for specific words in the texts. It is a computer program which makes a concordance. The aim of the concordance is to be able to see lots of examples of a word or phrase, in their contexts, as shown in Figure 3.3.

The screenshot shows a software window titled "AIM: 35 entries (sort: 5L,5L)". Below the title bar is a toolbar with various icons. The main area is a table with a header "Concordance" and a column "N". The table contains 10 rows of text excerpts, each with the word "aim" highlighted in red.

N	Concordance
9	pletely defined and understood. The aim of this paper is to summarize th
10	tic and pharmaceutical products. The aim of this work was first to realize a
11	cts covering different age groups. The aim of this study was to use two of \
12	EHP) in cosmetic preparations. The aim of this work is to evaluate the st
13	brics to extend the colour range. The aim of this study was to develop a ni
14	to form and stabilize emulsions. The aim of this study was to develop rapi
15	meter (GP) is more complicated. The aim of this study was to show the ef
16	nges in hairless mice epidermis. The aim of the present study was to eval
17	cing pro-inflammatory cytokines. The aim of this study was to develop hyd
18	redients were also investigated. The aim of this research was to develop :

Figure 3.3 Concordance Tool

Figure 3.3 illustrates that the specific word ‘aim’ appears in the middle of each line with the surrounding contexts in the concordance.

3.4 Data Analysis

After 247 cosmetic science abstracts were selected for analysis, 116 abstracts selected from the printed journal (*Journal of Cosmetic Science*) were entered into the database by scanning. At the scanning stage, Optical Character Recognition (OCR) software was used to scan them. Each text file was exported into a word document file (*.doc) and the spelling of all words in the texts was checked by using the spell-checker. Next, 131 abstracts selected from the online journal (*International Journal of Cosmetic Science*) were downloaded from the internet and stored as another word document file. Finally, the data obtained from both the printed journal and the online journal were stored as plain-text files (*.txt).

There were 5 text files in the corpus of cosmetic science abstracts as follows:

- Total Group (Total.txt)
- Purpose Group (Purpose.txt)
- Method Group (Method.txt)
- Result Group (Result.txt)
- Conclusion Group (Conclusion.txt)

The online tool "*Web Frequency Indexer v. 1.3*" was used to generate the word frequency lists of each text files and calculate the frequency of occurrence of the tokens (running words), word types, and type/token ratio of the whole corpus.

In this study, lexical vocabulary in each move of cosmetic science abstracts was analyzed from the word frequency lists in terms of nouns, verbs, adjectives, and adverbs. The results were presented in form of word frequency and percentage. Next, general, academic, and technical vocabulary in the corpus of cosmetic science abstracts were analyzed by using the online tool "*Web VP v. 2.5 Classic*". The results were presented in form of percentage of text coverage and word frequency. Finally, the concordancing software "*WordSmith Tools Version 3.0*" was used to find out the connectors. The connectors in each move of cosmetic science abstracts were identified and grouped into six main types, namely enumeration and addition, summation, apposition, result/inference, contrast/concession, and transition. The frequency and percentage of the occurrence of connectors were presented.

CHAPTER 4

RESULTS AND DISCUSSIONS

This chapter focuses on the results and discussions of vocabulary in cosmetic science abstracts. The first part displays corpus findings which contain the statistical analysis of the whole corpus, and word frequency statistics. The second part focuses on lexical vocabulary in each move of abstracts in terms of nouns, verbs, adjectives, and adverbs. The third part shows the frequency of occurrence of general, academic, and technical vocabulary found in the corpus of cosmetic science abstracts. The last part presents connectors in each move of abstracts.

4.1 Corpus Findings

This section is divided into two parts: Statistical Analysis of the Whole Corpus, and Word Frequency Statistics.

4.1.1 Statistical Analysis of the Whole Corpus

The statistical details of the corpus of cosmetic science abstracts show a summary of the contents of a corpus. Table 4.1 summarizes the number of the tokens (running words), word types, and type/token ratio. The type/token ratio is computed to show how many times each word type occurs in the corpus.

Table 4.1 Statistical Details of the Whole Corpus

Tokens	49,627
Word Types	6,792
Type/Token Ratio	1:7

From Table 4.1, the whole corpus selected from 247 cosmetic science abstracts consists of 49,627 tokens or running words. There are 6,792 word types or different words in this corpus since a recurrent word is counted only once. For the whole corpus, the ratio of a word type to tokens is 1:7. This means that each word is repeated 7 times on average throughout the corpus of cosmetic science abstracts.

4.1.2 Word Frequency Statistics

This section presents two main word frequency findings. First, it reveals the top twenty words of the whole corpus (see Appendix A for more details). Second, it shows the top twenty lexical vocabulary in each part of speech.

Table 4.2 Top 20 Words in the Corpus of Cosmetic Science Abstracts

Rank	Frequency	% of occurrence	Word
1.	3415	6.88	the
2.	2388	4.81	of
3.	1555	3.13	and
4.	1275	2.57	in
5.	1078	2.17	to
6.	984	1.98	a
7.	554	1.12	was
8.	489	0.99	with
9.	423	0.85	that
10.	414	0.83	by
11.	409	0.82	skin
12.	404	0.81	were
13.	392	0.79	is
14.	386	0.78	for
15.	363	0.73	on
16.	343	0.69	as
17.	343	0.69	hair
18.	285	0.57	this
19.	232	0.47	from
20.	212	0.43	an

Table 4.2 shows the top twenty words in the corpus of cosmetic science abstracts. The function words occur in the top ten ranks. Those words are *the, of, and, in, to, a, was, with, that,* and *by*. They are accounted for 25.3 % of the total list.

With regard to *verb to be* in the corpus of cosmetic science abstracts, it is found that 'was' (554 times) is most often used in the corpus.

Next, the top twenty lexical vocabulary in the corpus of cosmetic science abstracts are shown in Table 4.3 below. They are grouped into 4 main parts of speech: nouns, verbs, adjectives, and adverbs.

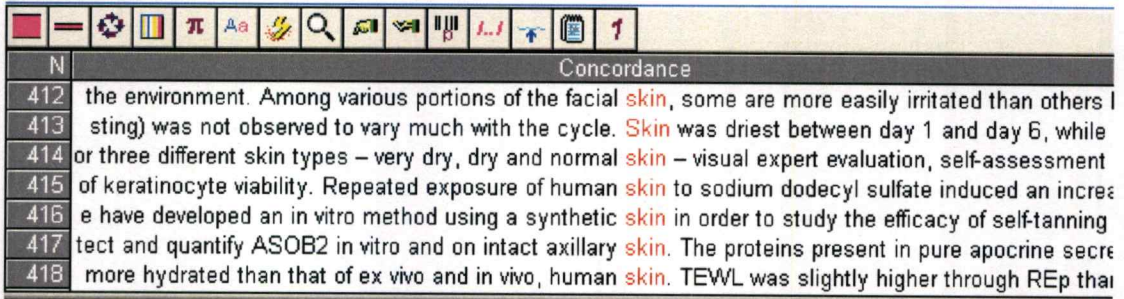
Table 4.3 Top Twenty Lexical Vocabulary of the Whole Corpus

Noun	Freq.	Verb	Freq.	Adjective	Freq.	Adverb	Freq.
1. skin	409	1. used	111	1. cosmetic	103	1. also	104
2. hair	343	2. showed	79	2. different	99	2. significantly	49
3. study *	180	3. found	78	3. human	93	3. only	43
4. results	143	4. compared	69	3. new	53	4. thus	27
5. acid	123	5. obtained	63	4. significant	53	5. respectively	20
6. method	96	6. increased	51	5. higher	44	/	
7. test *	93	7. investigated	49	6. present *	39	/	
8. products	91	8. measured	49	7. various	42	/	
9. effect	89	9. observed	49	8. axillary	41	/	
10. water	83	10. based	46	9. high	39	/	
11. surface	80	11. applied	45	10. active	36	/	
12. formulations	79	12. tested	45	11. aqueous	35	/	
13. oil	75	13. show	44	12. lower	33	/	
14. properties	73	14. reduced	39	13. effective	32	/	
15. studies	67	15. determined	36	14. important	32	/	
16. treatment	67	16. evaluated	36	15. topical	32	/	
17. vitro	65	17. performed	34	16. natural	31	/	
18. effects	64	18. suggest	33	17. clinical	28	/	
19. model	62	19. prepared	32	18. normal	27	/	
20. extract	60	20. developed	30	19. stable	26	/	

* The words can also be used as other parts of speech, but less frequently, e.g. 'study' is identified as a noun (180 times) and a verb (10 times), 'present' is used as an adjective (39 times) and a verb (4 times).

As can be seen in Table 4.3, nouns appear at the high frequency in the corpus of cosmetic science abstracts concerning with either the topic of cosmetic science such as 'skin' (409 times), 'hair' (343 times) or the reference to the paper, i.e. 'study' (180 times) and the finding, i.e. 'results' (143 times).

As 'skin' occurs at the highest rank in the corpus of cosmetic science abstracts, the concordance lines of this word are selected to show its circumstance, as illustrated in Figure 4.1:

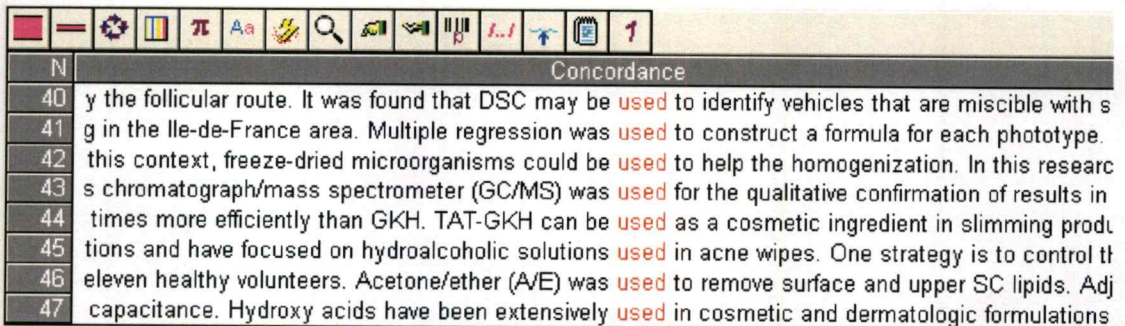


N	Concordance
412	the environment. Among various portions of the facial skin, some are more easily irritated than others
413	(sting) was not observed to vary much with the cycle. Skin was driest between day 1 and day 6, while
414	or three different skin types – very dry, dry and normal skin – visual expert evaluation, self-assessment
415	of keratinocyte viability. Repeated exposure of human skin to sodium dodecyl sulfate induced an increa
416	e have developed an in vitro method using a synthetic skin in order to study the efficacy of self-tanning
417	ect and quantify ASOB2 in vitro and on intact axillary skin. The proteins present in pure apocrine secre
418	more hydrated than that of ex vivo and in vivo, human skin. TEWL was slightly higher through REp th

Figure 4.1 Concordance of 'skin' in the whole corpus

In addition, almost all of the top 20 verbs in the corpus of cosmetic science abstracts appear in the past simple tense (V_2) or past participle (V_3) form such as 'used', 'found', 'compared', 'obtained', 'measured' and so on. According to Wilkinson (1991: 365), the passive voice is commonly used in scientific writing. That is, in passive voice, the subject is acted upon, and the action of the verb falls on the subject. Especially, the focus of the sentence is on what happens to the subject, not what the subject does.

As 'used' (freq. 111) is the most frequent verb in the corpus of cosmetic science abstracts, concordance lines of this word are selected to show its circumstance.



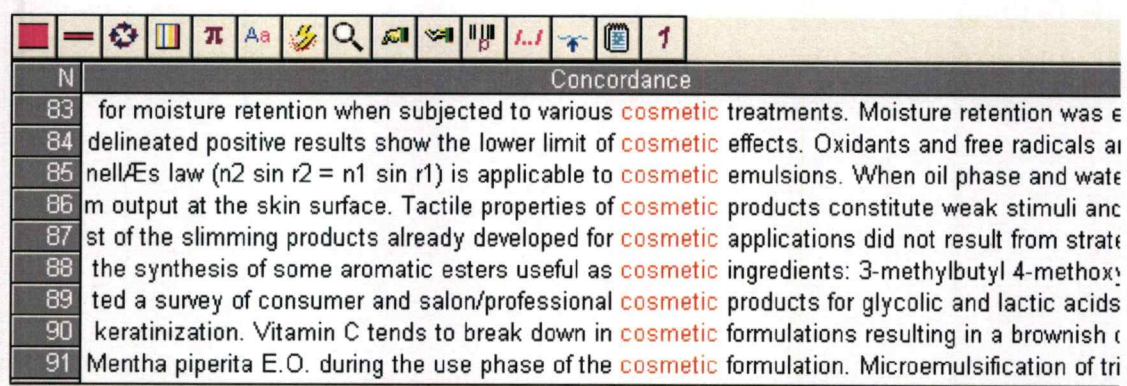
N	Concordance
40	y the follicular route. It was found that DSC may be used to identify vehicles that are miscible with s
41	g in the Ile-de-France area. Multiple regression was used to construct a formula for each phototype.
42	this context, freeze-dried microorganisms could be used to help the homogenization. In this researc
43	s chromatograph/mass spectrometer (GC/MS) was used for the qualitative confirmation of results in
44	times more efficiently than GKH. TAT-GKH can be used as a cosmetic ingredient in slimming produ
45	tions and have focused on hydroalcoholic solutions used in acne wipes. One strategy is to control th
46	eleven healthy volunteers. Acetone/ether (A/E) was used to remove surface and upper SC lipids. Adj
47	capacitance. Hydroxy acids have been extensively used in cosmetic and dermatologic formulations

Figure 4.2 Concordance of 'used' in the whole corpus

As illustrated in Figure 4.2, the word 'used' appears in the corpus of cosmetic science abstracts in form of passive voice (V. to be + V₃). The following sentences are the example of the word 'used' in the corpus of cosmetic science abstracts.

- (1) *TAT-GKH can be used as a cosmetic ingredient in slimming products, with both penetration enhancement and lipolytic effect without cytotoxicity.*
- (2) *A gas chromatograph/mass spectrometer (GC/MS) was used for the qualitative confirmation of results in this work.*

In terms of adjectives, it is found that 'cosmetic' appear at the highest rank (103 times) in the corpus of cosmetic science abstracts. Therefore, concordance lines of this word are selected to show its circumstance.



N	Concordance
83	for moisture retention when subjected to various cosmetic treatments. Moisture retention was e
84	delineated positive results show the lower limit of cosmetic effects. Oxidants and free radicals ai
85	nell/Es law ($n_2 \sin r_2 = n_1 \sin r_1$) is applicable to cosmetic emulsions. When oil phase and wate
86	m output at the skin surface. Tactile properties of cosmetic products constitute weak stimuli anc
87	st of the slimming products already developed for cosmetic applications did not result from strate
88	the synthesis of some aromatic esters useful as cosmetic ingredients: 3-methylbutyl 4-methoxy
89	ted a survey of consumer and salon/professional cosmetic products for glycolic and lactic acids
90	keratinization. Vitamin C tends to break down in cosmetic formulations resulting in a brownish c
91	Mentha piperita E.O. during the use phase of the cosmetic formulation. Microemulsification of tri

Figure 4.3 Concordance of 'cosmetic' in the whole corpus

The following sentences are the example of the word 'cosmetic' in the corpus of cosmetic science abstracts.

- (3) *Collagen is an important component for **cosmetic** formulation, where it is an effective natural humectant with high substantivity.*
- (4) *Integrating toxicity assessment of new **cosmetic** ingredients early in the R&D cycle would help avoid developing ingredients with limited or no market potential due to toxicity concerns.*

For adverbs, the word 'also' (freq. 104) is the most frequent adverb in the corpus of cosmetic science abstracts. Therefore, concordance lines of this word are selected to show its circumstance.

C ALSO: 105 entries (sort: 5L,5L)	
N	Concordance
40	ith the FOITS data. Adenosine-containing cream also significantly improved glabellar frowns. This
41	ncentrations (up to 200-fold less than usual) was also investigated. The color and odor of cosmetic
42	on the marker for sebum output evaluations. We also determined the cosmetic outcome of this ap
43	rticularly effective. The hair strand test, which can also be performed ex vivo, is a new method to fin
44	arrower than in Caucasian hair. In addition, it was also found that there are differences in how cuticl
45	dissolution of HAP. In H ₂ O ₂ /NaF solution, DCPD also transformed easily to FHAP and CaF ₂ , which
46	oncentrations exhibited higher DPM levels. It was also found that the duration of the DPM signal, d
47	cultured human keratinocytes and fibroblasts was also less compromised by increasing concentrat
48	tly when topically applied (IC ₅₀ = 0.5 mg/cm ²). It also inhibited UVB-induced ear edema (49% inhi
49	and thermal data implied that although there were also interactions between gum of acacia and bot

Figure 4.4 Concordance of 'also' in the whole corpus

The word 'also' is a linking adverb to signal that a new item of discourse is being added to previous ones. The following sentence is the example of the word 'also' in the corpus of cosmetic science abstracts.

(5) *For this purpose, anhydrous cream, gel and w/o emulsion were prepared and applied to the volunteers' inner forearms. A commercial topical preparation containing a known moisturizer, Vitamin E, was **also** chosen and used for comparison.*

4.2 Lexical Vocabulary in Each Move of Cosmetic Science Abstracts

The first objective of this study is to analyze the lexical vocabulary in each move of cosmetic science abstracts in terms of nouns, verbs, adjectives, and adverbs.

According to Biber et al. (1999: 55), lexical words are the main carriers of information in a text. They can be subdivided into the following word classes: nouns, verbs, adjectives, and adverbs. The results of lexical vocabulary analysis are divided into four parts: Purpose Move, Method Move, Result Move, and Conclusion Move.

4.2.1 Lexical Vocabulary in the Purpose Move

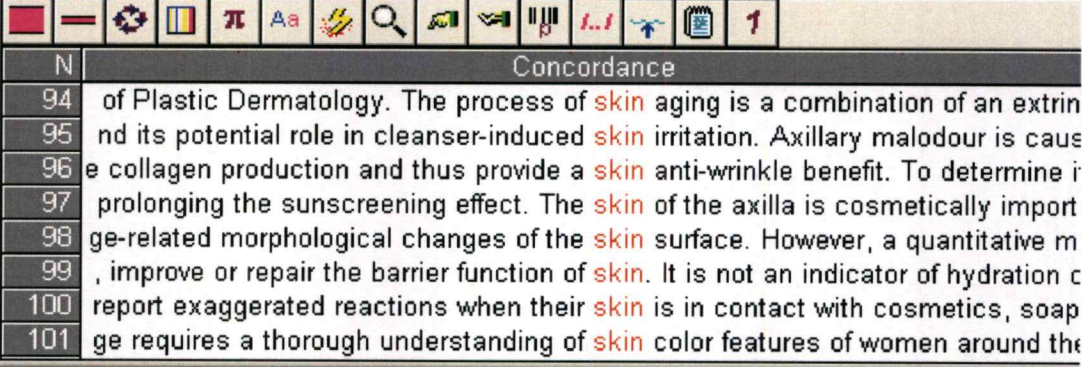
Table 4.4 shows the top twenty lexical vocabulary in the purpose move of cosmetic science abstracts (see Appendix B for more details). They are grouped into four main parts of speech: nouns, verbs, adjectives, and adverbs.

Table 4.4 Top Twenty Lexical Vocabulary in the Purpose Move

Noun	Freq.	Verb	Freq.	Adjective	Freq.	Adverb	Freq.
1. skin	133	1. investigated	31	1. cosmetic	55	1. also	22
2. hair	103	2. used	21	2. human *	32	2. often	9
3. study *	92	3. evaluate	19	3. different	29	3. previously	8
4. properties	37	4. known	18	4. various	24	4. mainly	7
5. acid	35	5. developed	16	5. present *	22	5. especially	6
6. aim	35	6. assess	14	6. new	21	6. recently	6
7. products	35	7. based	13	7. axillary	20	/	
8. effect	31	8. determine	13	8. important	20	/	
9. effects	30	9. studied	13	9. most	19	/	
10. method	28	10. reported	11	10. active	17	/	
11. cosmetics	23	11. compared	10	11. natural	17	/	
12. activity	22	12. investigate	10	12. main	12	/	
13. vitro	22	13. compare	9	13. topical	10	/	
14. work	22	14. evaluated	9	14. available	9	/	
15. model	20	15. presented	9	15. chemical	9	/	
16. studies	20	16. applied	8	16. cutaneous	9	/	
17. objective*	16	17. designed	8	17. stable	9	/	
18. surface	19	18. examined	8	18. volatile	9	/	
19. water	19	19. measure *	8	19. aqueous	8	/	
20. stratum	18	20. determined	7	20. facial	8	/	

* The words can also be used as other parts of speech, but less frequently, e.g. 'study' is identified as a noun (92 times) and a verb (5 times), 'objective' is identified as a noun (16 times) and an adjective (3 times) in the purpose move.

As shown in Table 4.4, the noun 'skin' appears at the highest rank (133 times) in the purpose move of cosmetic science abstracts. Thus, concordance lines of this word are selected to show its circumstance.



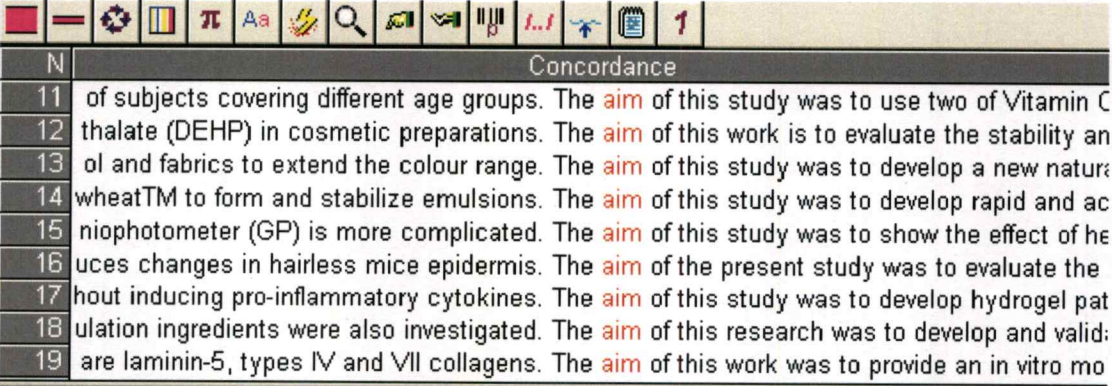
N	Concordance
94	of Plastic Dermatology. The process of skin aging is a combination of an extrin
95	nd its potential role in cleanser-induced skin irritation. Axillary malodour is caus
96	e collagen production and thus provide a skin anti-wrinkle benefit. To determine i
97	prolonging the sunscreensing effect. The skin of the axilla is cosmetically import
98	ge-related morphological changes of the skin surface. However, a quantitative m
99	, improve or repair the barrier function of skin . It is not an indicator of hydration c
100	report exaggerated reactions when their skin is in contact with cosmetics, soap
101	ge requires a thorough understanding of skin color features of women around the

Figure 4.5 Concordance of 'skin' in the purpose move

The following sentence is the example of the word 'skin' in the purpose move.

(6) *The aim of the present study was to measure the speed of propagation of ultrasound shear waves in the **skin** irritated by anionic surfactants.*

Interestingly, the noun referred to the author's intention, goals or objectives, i.e. the word 'aim' (35 times) is quite often used in the purpose move, as shown in the figure 4.6 below.



N	Concordance
11	of subjects covering different age groups. The aim of this study was to use two of Vitamin C
12	thalate (DEHP) in cosmetic preparations. The aim of this work is to evaluate the stability an
13	ol and fabrics to extend the colour range. The aim of this study was to develop a new natura
14	wheatTM to form and stabilize emulsions. The aim of this study was to develop rapid and ac
15	niophotometer (GP) is more complicated. The aim of this study was to show the effect of he
16	uces changes in hairless mice epidermis. The aim of the present study was to evaluate the
17	hout inducing pro-inflammatory cytokines. The aim of this study was to develop hydrogel pat
18	ulation ingredients were also investigated. The aim of this research was to develop and valid:
19	are laminin-5, types IV and VII collagens. The aim of this work was to provide an in vitro mo

Figure 4.6 Concordance of 'aim'

Notably, '*investigated*' (freq. 31) is the most frequent verb occurring in the purpose move, as shown in the following concordance:



N	Concordance
6	ties. The photolightening behavior of red hair was investigated . Red hair was found to lighten to
7	dy the photolightening behavior of blond hair was investigated . Although adhesion failure in hair
8	ts on hair fiber induced by blow-drying have been investigated . Scalp hair length assessments t
9	A control cream containing no polymer was also investigated . Sun exposure during leisure acti

Figure 4.7 Concordance of '*investigated*'

The following sentence is the example of using the word '*investigated*' in the purpose move of cosmetic science abstracts.

(7) *The photolightening behavior of red hair was **investigated**.*

In terms of adjectives, '*cosmetic*' (55 times) is most found in the purpose move of cosmetic science abstracts. The following sentence is the example of the word '*cosmetic*' in the purpose move of cosmetic science abstracts.

(8) *The purpose of this paper is to study the stability of lipoic acid in the presence of vitamins A (as palmitate) and E (as acetate) in semisolids for **cosmetic** use.*

For adverbs, the word '*also*' (22 times) is the most frequent adverb in the purpose move. It is a linking adverb to signal that a new item of discourse is being added to previous ones. Besides, adverbs such as '*often*', '*previously*', '*mainly*', '*especially*', '*recently*' are also found.

The following sentence is the example of the word '*also*' in the purpose move of cosmetic science abstracts.

(9) *The effect of season on product discrimination was **also** explored.*

4.2.2 Lexical Vocabulary in the Method Move

Table 4.5 shows the top twenty lexical vocabulary in the method move of cosmetic science abstracts (see Appendix C for more details). They are grouped into four main parts of speech: nouns, verbs, adjectives, and adverbs.

Table 4.5 Top Twenty Lexical Vocabulary in the Method Move

Noun	Freq.	Verb	Freq.	Adjective	Freq.	Adverb	Freq.
1. skin	90	1. used	58	1. different	35	1. also	17
2. hair	65	2. measured	29	2. human *	21	2. then	17
3. test *	49	3. prepared	26	3. cosmetic	20	3. daily	9
4. study *	48	4. performed	24	4. healthy	15	4. only	8
5. method	35	5. applied	25	5. various	13	5. twice	8
6. phase	32	6. obtained	23	6. aqueous	11	6. respectively	6
7. water	32	7. determined	22	7. clinical	11	7. finally	5
8. acid	30	8. evaluated	22	8. new	9	/	
9. surface	30	9. based	18	9. active	7	/	
10. subjects	29	10. compared	17	10. axillary	7	/	
11. analysis	25	11. assessed	15	11. chemical	7	/	
12. products	24	12. carried	15	12. facial	7	/	
13. formulations	23	13. conducted	14	13. multiple *	7	/	
14. product	23	14. tested	14	14. present	7	/	
15. measurements	22	15. analyzed	12	15. quantitative	7	/	
16. volunteers	22	16. investigated	14	16. high	6	/	
17. model	21	17. studied	12	17. natural	6	/	
18. types	20	18. calculated	11	18. several	6	/	
19. methods	19	19. identified	10	19. specific	6	/	
20. oil	19	20. treated	10	20. natural	6	/	

* The words can also be used as other parts of speech, but less frequently, e.g. the word 'test' is identified as a noun (49 times) and a verb (2 times).

As illustrated in Table 4.5, the noun 'skin' appears at the highest frequency in the method move of cosmetic science abstracts. Besides, the word 'test' is identified as a noun (49 times) to describe the procedures used in the experiment. The examples are shown in the following sentences.

(10) *One strategy is to control the penetration of SA into the skin.*


(11) *The test was performed on 24 subjects.*

Interestingly, the results also reveal that nouns, i.e. 'subjects' (29 times) and 'volunteers' (22 times) are used quite often for stating information about common demographic characteristics, selection and numbers, as shown in the following sentences:

(12) *The subjects studied included 85 healthy Caucasian females (ages 20-69 years) living in Cincinnati in the U.S. and 70 Japanese females (ages 20-69 years) living in Tokyo.*

(13) *Clinical testing of the extract was carried out using 40 healthy female volunteers.*

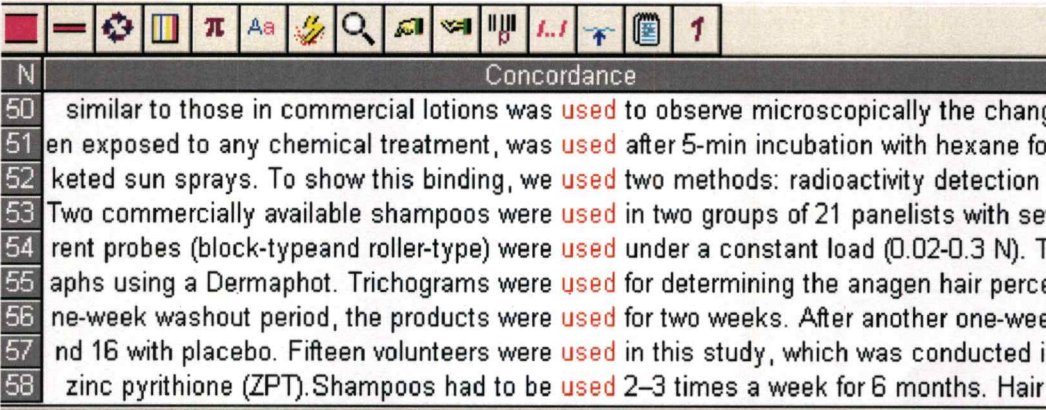
The concordance lines of the word 'subjects' are shown in Figure 4.8 below.



N	Concordance
20	e periorbital area on each side of the face (84 subjects per product). Eighty-four of these s
21	ticles were ranked similarly for both groups of subjects. The peroxide value of hemp-seed
22	dark and light axillary skin sites of 20 female subjects, of whom seven had hyperpigmenti
23	g/burn control). The test was performed on 24 subjects. The tape stripping method was us
24	would rank eleven test materials the same as subjects 18 to 45 years of age. The test ma
25	m the 21-day test were compared. Forty-one subjects completed this study of six test m
26	point of the study was the division of the test subjects according to their skin type. To ge
27	atment, study conducted on postmenopausal subjects who were and were not on HRT an
28	kage'. The study was performed in 25 healthy subjects of both sexes. Occlusive patches
29	as applied to the wound for 15 seconds. The subjects were asked to report the intensity

Figure 4.8 Concordance of 'subjects'

For verbs, the word 'used' (58 times) is the most frequent verb for describing procedures used in the experiment. The concordance lines of this word are selected to show its circumstance.



N	Concordance
50	similar to those in commercial lotions was used to observe microscopically the change
51	en exposed to any chemical treatment, was used after 5-min incubation with hexane for
52	keted sun sprays. To show this binding, we used two methods: radioactivity detection
53	Two commercially available shampoos were used in two groups of 21 panelists with se
54	rent probes (block-type and roller-type) were used under a constant load (0.02-0.3 N). T
55	raphs using a Dermaphot. Trichograms were used for determining the anagen hair perc
56	ne-week washout period, the products were used for two weeks. After another one-wee
57	nd 16 with placebo. Fifteen volunteers were used in this study, which was conducted i
58	zinc pyrithione (ZPT). Shampoos had to be used 2-3 times a week for 6 months. Hair

Figure 4.9 Concordance of 'used' in the method move

The following sentence is the example of the word 'used' in the method move of cosmetic science abstracts.

(14) *Microspectrophotometric and electrophoretic methods were **used** to characterize and quantify the effects of primary damage to hair from chemical and photochemical oxidative processes.*

In terms of adjectives, the word 'different' (35 times) is the most frequent adjective in the method move. The example is shown in the following sentence:

(15) *A multicentre study for measuring skin hydration with 349 volunteers was carried out in six **different** laboratories.*

For adverbs, it is noticed that both 'also' (17 times) and 'then' (17 times) are the most frequent adverb in the method move of cosmetic science abstracts, as shown in the following sentences:

(16) *A commercial topical preparation containing a known moisturizer, Vitamin E, was **also** chosen and used for comparison.*

(17) *These methods were **then** evaluated in respect of their reproducibility and classification properties.*

4.2.3 Lexical Vocabulary in the Result Move

Table 4.6 illustrates the top twenty lexical vocabulary in the result move of cosmetic science abstracts (see Appendix D for more details). They are grouped into four main parts of speech: nouns, verbs, adjectives, and adverbs.

Table 4.6 Top Twenty Lexical Vocabulary in the Result Move

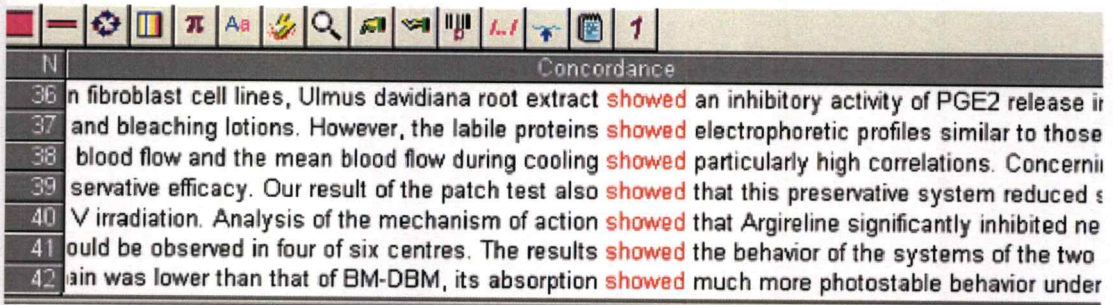
Noun	Freq.	Verb	Freq.	Adjective	Freq.	Adverb	Freq.
1. skin	131	1. showed	67	1. significant	46	1. also	57
2. hair	129	2. found	65	2. more	45	2. significantly	45
3. results	70	3. compared	40	3. higher	34	3. only	27
4. acid	50	4. increased	40	4. human	29	4. well	23
5. concentration	45	5. observed	39	5. different	24	5. respectively	14
6. effect	38	6. show	32	6. lower	23	/	
8. oil	35	7. obtained	27	7. most	22	/	
9. treatment	34	8. reduced	26	8. high	20	/	
10. light	32	9. tested	25	9. similar	19	/	
11. increase *	31	10. used	21	10. effective	17	/	
11. formulations	28	11. revealed	20	11. less	17	/	
12. extract	27	12. demonstrated	18	12. aqueous	15	/	
13. study *	24	13. measured	18	13. highest	14	/	
14. test	26	14. shown	18	14. low	13	/	
15. surface	25	15. decreased	15	15. same	13	/	
16. water	25	16. induced	15	16. fatty	12	/	
17. levels	24	17. resulted	15	17. sensitive	12	/	
18. control	23	18. treated	15	18. maximum	11	/	
19. products	23	19. shows	13	19. active	11	/	
20. shampoo	23	20. based	12	20. axillary	11	/	

* The words can also be used as other parts of speech, but less frequently, e.g. 'study' is identified as a noun (24 times) and a verb (2 times).

From Table 4.6, the noun 'skin' (131 times) occurs at the highest frequency in the result move of cosmetic science abstracts. The following sentence is the example of the word 'skin' in the result move of cosmetic science abstracts.

(18) *The results show that the formulation had relatively minor effects on the permeability coefficients of ATA through cadaver skin in all cases except for the isopropyl myristate solution.*

In terms of verbs, the word 'showed' (67 times) is the most frequent verb for describing the results. The concordance lines of this word are selected to show its circumstance.



N	Concordance
36	n fibroblast cell lines, Ulmus davidiana root extract showed an inhibitory activity of PGE2 release in
37	and bleaching lotions. However, the labile proteins showed electrophoretic profiles similar to those
38	blood flow and the mean blood flow during cooling showed particularly high correlations. Concerni
39	servative efficacy. Our result of the patch test also showed that this preservative system reduced s
40	V irradiation. Analysis of the mechanism of action showed that Argireline significantly inhibited ne
41	ould be observed in four of six centres. The results showed the behavior of the systems of the two
42	ain was lower than that of BM-DBM, its absorption showed much more photostable behavior under

Figure 4.10 Concordance of 'showed'

As illustrated in Figure 4.10, the word 'showed' appears in the result move of cosmetic science abstracts in form of past simple tense (V₂). The following sentence is the example of the word 'showed' in the result move of cosmetic science abstracts.

(19) *After hydrolysis, HPLC experiments **showed** that the composition of the polysaccharide extract was mainly rhamnose, galactose, and glucose.*

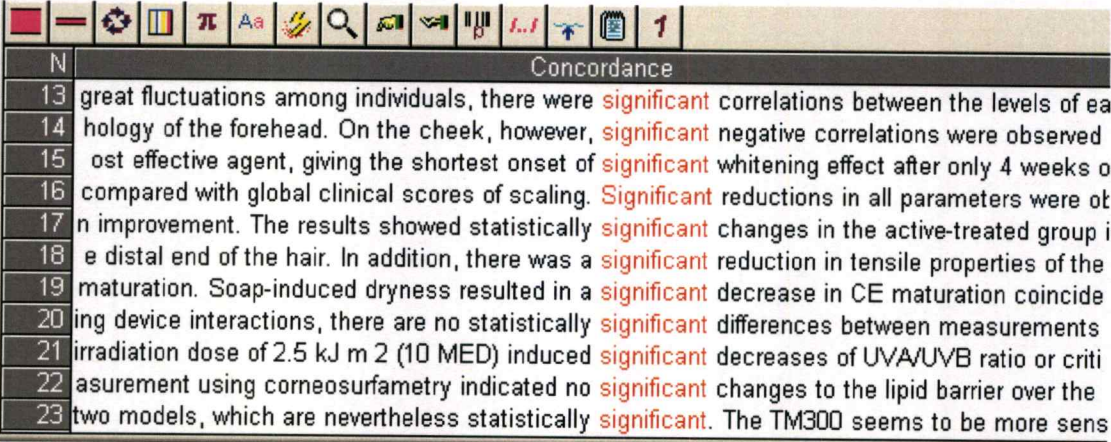
Interestingly, in the result move of cosmetic science abstracts, both active and passive forms of this verb 'show' were used. The following sentences are the example of the words 'show', 'shown', and 'shows' in the result move of cosmetic science abstracts.

(20) The results **show** that this *in vitro* test system is a reliable tool to predict the efficacy of self-tanning products.

(21) As a result of this study, on about two hundred subjects for each race, it was **shown** that there were statistically meaningful differences between all these attributes for the two hair types.

(22) This study **shows** that this sphinganine-derived ceramide (i.e. C18-dhCer) binds to African–American hair and protects it from weakening caused by chemicals.

For adjectives, it is found that most of them are comparative adjectives such as ‘more’, ‘higher’, ‘lower’, ‘less’, ‘highest’, and so on. Notably, the word ‘significant’ (46 times) is the most frequent adjective found in the result move of cosmetic science abstracts. Thus, the concordance lines of this word are selected to show its circumstance.



N	Concordance
13	great fluctuations among individuals, there were significant correlations between the levels of ea
14	hology of the forehead. On the cheek, however, significant negative correlations were observed
15	ost effective agent, giving the shortest onset of significant whitening effect after only 4 weeks o
16	compared with global clinical scores of scaling. Significant reductions in all parameters were ot
17	n improvement. The results showed statistically significant changes in the active-treated group i
18	e distal end of the hair. In addition, there was a significant reduction in tensile properties of the
19	maturation. Soap-induced dryness resulted in a significant decrease in CE maturation coincide
20	ing device interactions, there are no statistically significant differences between measurements
21	irradiation dose of 2.5 kJ m ² (10 MED) induced significant decreases of UVA/UVB ratio or criti
22	asurement using corneorosometry indicated no significant changes to the lipid barrier over the
23	two models, which are nevertheless statistically significant . The TM300 seems to be more sens

Figure 4.11 Concordance of ‘significant’

The example of using the word ‘significant’ in the result move of cosmetic science abstracts is shown in the following sentence.

(23) Although the average contents of the lipids showed great fluctuations among individuals, there were **significant** correlations between the levels of each lipid, which allowed for the classification of the hair lipids into four groups.

Similar to other moves, the word 'also' (57 times) is the most frequent adverb in the result move of cosmetic science abstracts. The following sentence is the example of the word 'also' in the result move of cosmetic science abstracts.

(24) *In vivo irritation studies **also** showed that the surfactant system is the most important factor controlling irritancy.*

Moreover, the word 'significantly' is known to function as adverb and it occurs quite often in the result move. The concordance lines of this word are selected to show its circumstance.



N	Concordance
17	1% solution in 50% ethanol was found to be significantly better at reducing underarm ma
18	es, with the exception of skin redness, were significantly different in the EPO group com
19	ness, fatigue resistance and roughness had significantly improved by 12.9, 7.7, 4.7, 16.7
20	n Japanese females. The sagging score was significantly higher in Caucasian females th
21	s maintained for five hours. NMF application significantly decreased TEWL and significant
22	f recovered from deep stratum corneum were significantly softer and weaker than CER rec
23	y]-7H-furo[3,2-g][1]benzopyran-7-one). They significantly inhibited tyrosinase synthesis in
24	re, the high-depositing ZnPTO shampoo was significantly superior compared with the low-
25	nd hyperplasia. Topical application of taurine significantly decreased transepidermal water
26	mechanism of action showed that Argireline significantly inhibited neurotransmitter releas

Figure 4.12 Concordance of 'significantly'

The following sentence is the example of the word 'significantly' in the result move of cosmetic science abstracts.

(25) *The sag score decreased in skin treated with the sag treatment lotion, but the change was not **significantly** different from that of the placebo treated skin.*

(26) *Panelists of Chinese ancestry did not show **significantly** lower baseline microflora levels when compared to non-Chinese panelists.*

4.2.4 Lexical Vocabulary in the Conclusion Move

Table 4.7 displays the top twenty lexical vocabulary in the conclusion move of cosmetic science abstracts (see Appendix E for more details). They are grouped into four main parts of speech: nouns, verbs, adjectives, and adverbs.

Table 4.7 Top Twenty Lexical Vocabulary in the Conclusion Move

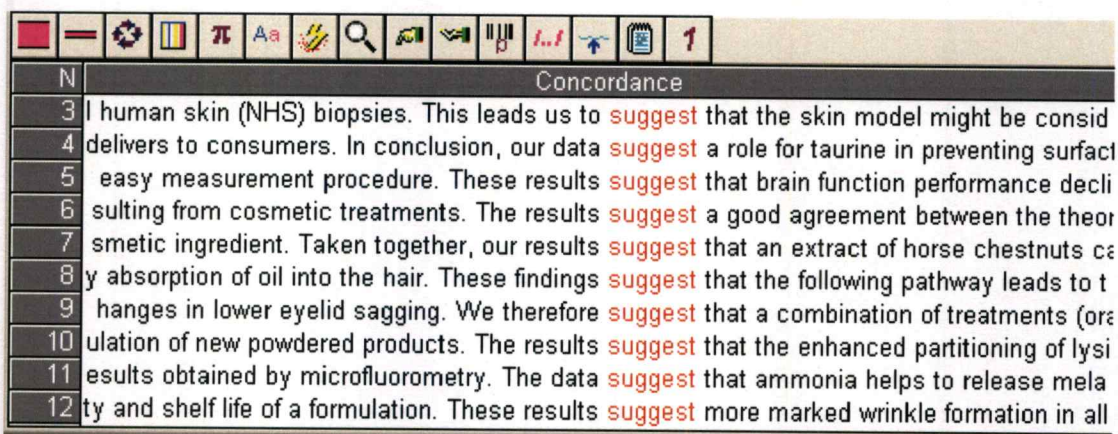
Noun	Freq.	Verb	Freq.	Adjective	Freq.	Adverb	Freq.
1. skin	55	1. suggest	31	1. cosmetic	15	1. thus	9
2. results	49	2. conclude	11	2. new	13	2. also	8
3. hair	46	3. used	11	3. more	12	3. therefore	8
4. method	17	4. concluded	8	4. different	11	4. consequently	5
5. study	16	5. obtained	7	5. useful	11	/	
6. data	15	6. increased	6	6. effective	10	/	
7. development	15	7. provide	6	7. human	9	/	
8. studies	15	8. reduced	6	8. than	9	/	
9. effects	13	9. suggests	6	9. topical	7	/	
10. conclusion	12	10. support	6	10. important	6	/	
11. formulations	11	11. indicate	5	11. normal	6	/	
12. oil	11	12. marked	5	12. potential *	5	/	
13. differences	10	13. reported	5	13. endogenous	5	/	
14. exposure	10	14. showed	5	14. oxidative	5	/	
15. function	10	15. affected	4	15. sensitive	5	/	
16. use *	9	16. appears	4	16. significant	5	/	
17. findings	9	17. considered	4	17. stable	5	/	
18. lipids	9	18. demonstrate	4	18. suitable	5	/	
19. products	9	19. evaluate	4	19. better	4	/	
20. subjects	9	20. found	4	20. easy	4	/	

* The words can also be used as other parts of speech, but less frequently, e.g. the word 'use' is identified as a noun (9 times) and a verb (4 times).

As can be seen in Table 4.7, the noun 'skin' (55 times) appears at the highest frequency in the conclusion move of cosmetic science abstracts. The example is shown in the following sentence:

(27) *This leads us to suggest that the skin model might be considered an alternative membrane to normal human **skin** for permeation screening tests.*

For verbs, the word 'suggest' (31 times) is the most frequent verb for presenting the conclusions. The concordance lines of this word are selected to show its circumstance.



N	Concordance
3	l human skin (NHS) biopsies. This leads us to suggest that the skin model might be consid
4	delivers to consumers. In conclusion, our data suggest a role for taurine in preventing surfact
5	easy measurement procedure. These results suggest that brain function performance decli
6	sulting from cosmetic treatments. The results suggest a good agreement between the theor
7	smetic ingredient. Taken together, our results suggest that an extract of horse chestnuts ca
8	y absorption of oil into the hair. These findings suggest that the following pathway leads to t
9	hanges in lower eyelid sagging. We therefore suggest that a combination of treatments (ora
10	ulation of new powdered products. The results suggest that the enhanced partitioning of lysi
11	results obtained by microfluorometry. The data suggest that ammonia helps to release mela
12	ty and shelf life of a formulation. These results suggest more marked wrinkle formation in all

Figure 4.13 Concordance of 'suggest'

The following sentence is the example of the word 'suggest' in the conclusion move of cosmetic science abstracts.

(28) *These results **suggest** that a portion of the stable proteins in normal hair was transformed into labile proteins upon permanent waving and bleaching treatments.*

Besides, the verb 'conclude' (11 times) is quite frequently found in the conclusion move. The examples of using the word 'conclude' in the conclusion move of cosmetic science abstracts are shown in the following sentences.

(29) We **conclude** that DSC could be used to identify appropriate vehicles for drugs whose follicular delivery depends on solubility.

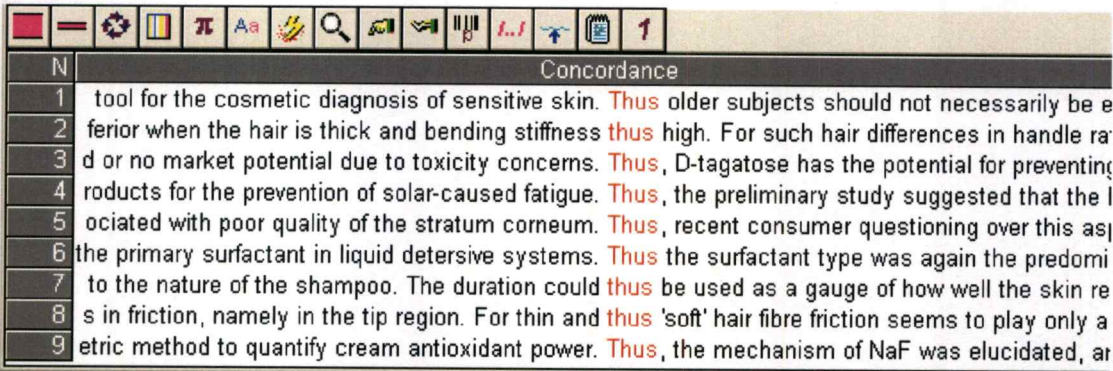
(30) The results lead to **conclude** that 'handle' is perceived as inferior when the hair is thick and bending stiffness thus high.

In terms of adjectives, the word 'cosmetic' (15 times) occurs most frequently in the conclusion move of cosmetic science abstracts. The example is shown in the following sentence:

(31) It is concluded that collagen has better physiological effects than those of gelatin and collagen hydrolysate as skin-care **cosmetic** materials.

Notably, adverbs, i.e. 'thus' (9 times), 'therefore' (8 times), and 'consequently' (5 times) appear in the conclusion move of cosmetic science abstracts. Similar to other moves, the adverb 'also' is found in the conclusion move.

As 'thus' is the most frequent adverb in the conclusion move of cosmetic science abstracts, concordance lines of this word are selected to show its circumstance.



N	Concordance
1	tool for the cosmetic diagnosis of sensitive skin. Thus older subjects should not necessarily be e
2	ferior when the hair is thick and bending stiffness thus high. For such hair differences in handle ra
3	d or no market potential due to toxicity concerns. Thus , D-tagatose has the potential for preventing
4	roducts for the prevention of solar-caused fatigue. Thus , the preliminary study suggested that the l
5	ociated with poor quality of the stratum corneum. Thus , recent consumer questioning over this asj
6	the primary surfactant in liquid deterative systems. Thus the surfactant type was again the predomi
7	to the nature of the shampoo. The duration could thus be used as a gauge of how well the skin re
8	s in friction, namely in the tip region. For thin and thus 'soft' hair fibre friction seems to play only a
9	etric method to quantify cream antioxidant power. Thus , the mechanism of NaF was elucidated, ar

Figure 4.14 Concordance of 'thus'

The following sentence is the example of the word 'thus' in the conclusion move of cosmetic science abstracts.

(32) **Thus**, D-tagatose has the potential for preventing and removing plaque development and for altering the subgingival microbiota.

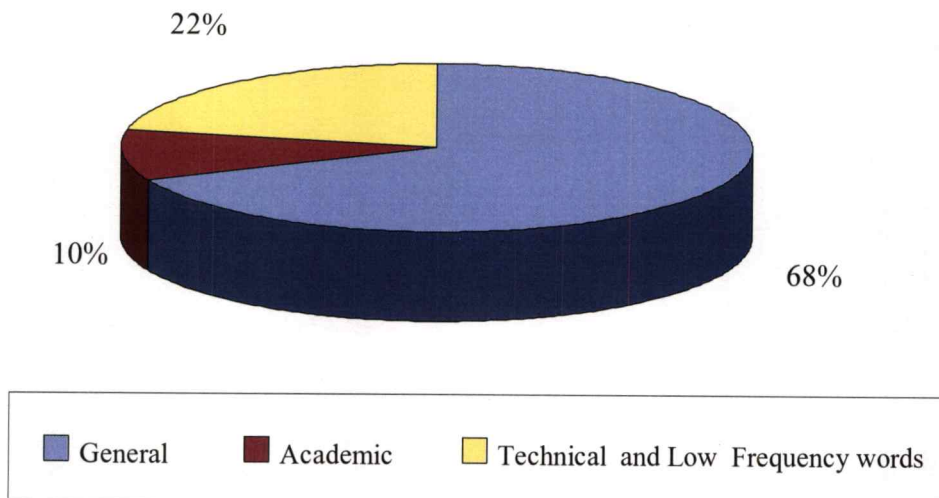
4.3 General, Academic, and Technical Vocabulary in the Corpus of Cosmetic Science Abstracts.

The second objective of this study is to analyze general, academic, and technical vocabulary in the corpus of cosmetic science abstracts. *Web VP v 2.5 Classic* by Nation (2006) was used to calculate the percentage of text coverage in each type of vocabulary, as shown in Table 4.8 below.

Table 4.8 Four Types of Vocabulary in the Corpus of Cosmetic Science Abstracts

Types of Vocabulary	% of text coverage
General	68.28
Academic	9.89
Technical and Low Frequency Words	21.83
Total	100

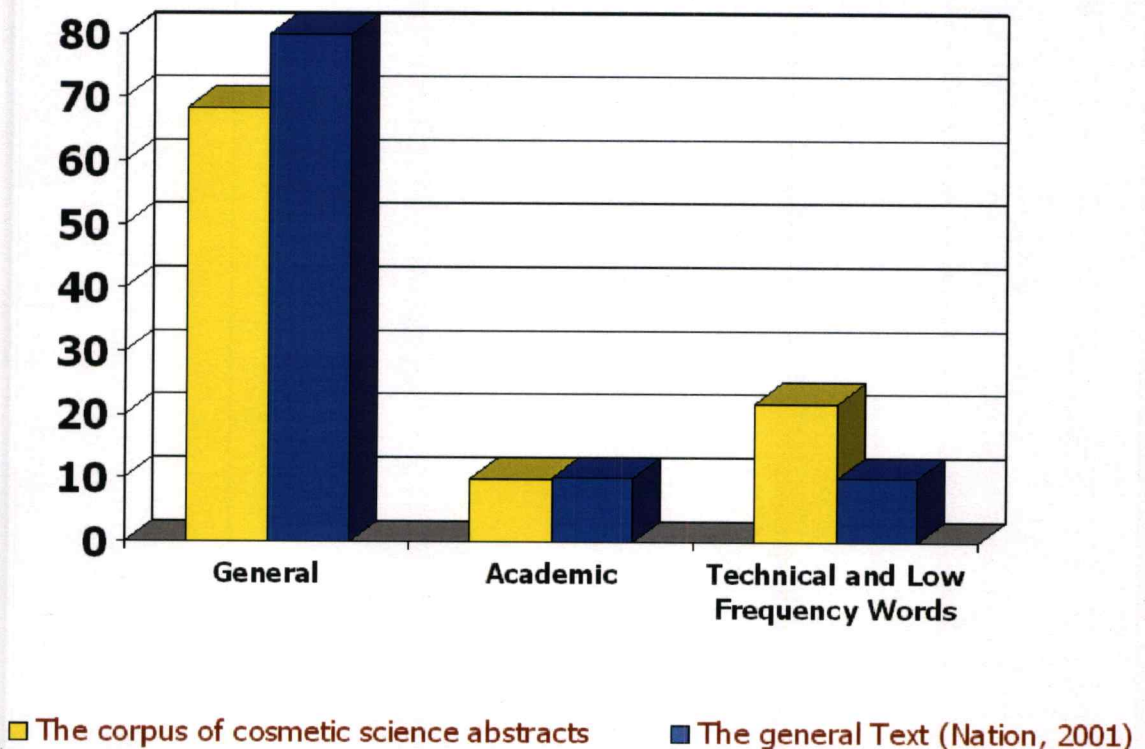
Table 4.8 shows the four types of vocabulary in the corpus of cosmetic science abstracts. It is found that there are 68.28% of general vocabulary, 9.89% of academic vocabulary, and 21.83% of the words including technical and low frequency words, as illustrated in graph 4.1 below:



Graph 4.1 Four Types of Vocabulary in the Corpus of Cosmetic Science Abstracts

The percentage of the types of vocabulary in the corpus of cosmetic science abstracts was compared with those of the GSL and the AWL. Nation (2001) estimated that in the general standard text, there are 80% of the GSL, 10% of the AWL, and 10% of the words outside the GSL and the AWL (5% of technical terms and 5% of the words outside those three groups).

With regard to the percentage of text coverage in the corpus of cosmetic science abstracts, general vocabulary is not as high as the percentage that is indicated by Nation. It covers 68.28% of text coverage. Additionally, academic vocabulary found in this corpus corresponds to other studies since it covers 9.89% of text coverage whereas it is 10% in the studies of Coxhead (1998). This finding supports the view of Nation (2001) that academic vocabulary tends to be words that occur across different subject disciplines, not in a certain field. They can be used in a diverse range of academic texts and are not identified as specialized or general words. According to the results of this study, the words outside the GSL and the AWL cover 21.83% of text coverage that is higher than 10% indicated by Nation. This indicates that language of cosmetic science abstracts is highly technical compared to the general text, as illustrated in graph 4.2 below:



Graph 4.2 Text Coverage of Each Type of Vocabulary

Next, *Web VP v 2.5 Classic* by Paul Nation (2006) was also used to find out general, academic, and technical vocabulary in the corpus of cosmetic science abstracts.

Table 4.9 below shows the top twenty general, academic, and technical vocabulary in the corpus of cosmetic science abstracts.

Table 4.9 Top Twenty General, Academic, and Technical Vocabulary of the Whole Corpus

General Vocabulary		Academic Vocabulary		Technical Vocabulary	
1. skin	409	1. method	96	1. acid	123
2. hair	343	2. formulations	79	2. cosmetic	103
3. study	190	3. obtained	63	3. vitro	65
4. results	143	4. extract	60	4. vivo	54
5. used	111	5. phase	59	5. efficacy	50
6. also	104	6. analysis	57	6. lipids	47
7. different	99	7. concentration	57	7. cells	43
8. test	96	8. data	56	8. cell	42
9. human	93	9. significant	53	9. cosmetics	42
10. products	91	10. formulation	51	10. emulsion	42
11. effect	89	11. investigated	49	11. axillary	41
12. water	83	12. significantly	49	12. lipid	40
13. surface	80	13. parameters	48	13. stratum	37
14. showed	79	14. exposure	46	14. acids	36
15. found	78	15. methods	44	15. corneum	36
16. oil	75	16. release	42	16. aqueous	35
17. properties	73	17. stability	40	17. proteins	35
18. compared	69	18. function	38	18. barrier	34
19. studies	67	19. evaluated	36	19. sunscreen	34
20. treatment	67	20. volunteers	36	20. vitamin	34

As shown in Table 4.9, general words concerning with the topics and structures of a corpus design appear at the high frequency such as 'skin', 'hair', 'study', 'result' and so on. For academic words, the word 'method' (96 times) is most frequently found in the corpus of cosmetic

science abstracts, followed by *'formulations'* (79 times), and *'obtained'* (63 times), respectively. Technical vocabulary found in the corpus of cosmetic science abstracts is related to either chemistry or biology areas, e.g. *'vivo'*, *'vitro'*, *'axillary'*, *'emulsion'*, *'aqueous'*, *'corneum'*.

4.4 Connectors

According to Biber et al. (1999), linking adverbs are classified into six major categories, i.e. enumeration and addition, summation, apposition, result/inference, contrast/concession, and transition. In this study, all types of connectors are found in the corpus. The results are divided into two parts: Connectors in Each Type of the Whole Corpus, and Connectors in Each Move of Cosmetic Science Abstracts.

4.4.1 Connectors in Each Type of the Whole Corpus

Table 4.10 Connectors in Each Type of the Whole Corpus

Type	Freq.	%	Connectors
1. Enumeration and Addition	206	52.42	
1.1 Enumeration	36	9.16	then (freq. 22 or 61.11%) finally (freq. 8 or 22.22%) first (freq. 4 or 11.11%) next (freq. 1 or 2.78%) second (freq. 1 or 2.78%)
1.2 Addition	170	43.26	also (freq. 105 or 61.76%) in addition (freq. 20 or 11.76%) moreover (freq. 16 or 9.41%) furthermore (freq. 16 or 9.41%) further (freq. 7 or 4.12%) similarly (freq. 5 or 2.94%) besides (freq. 1 or 0.59%)

Table 4.10 (continued)

2. Summation	11	2.80	in conclusion (freq. 9 or 81.82%) to conclude (freq. 1 or 9.09%) overall (freq. 1 or 9.09%)
3. Apposition	21	5.34	namely (freq. 9 or 42.86%) for example (freq. 6 or 28.57%) that is (freq. 3 or 14.29%) specifically (freq. 3 or 14.29%)
4. Result/inference	57	14.50	thus (freq. 27 or 47.37%) therefore (freq. 20 or 35.09%) consequently (freq. 8 or 14.04%) hence (freq. 2 or 3.51%)
5. Contrast/concession	96	24.43	however (freq. 53 or 55.21%) in contrast (freq. 5 or 5.21%) (in contrast to, freq. 8 or 8.33%) on the other hand (freq. 10 or 10.42%) still (freq. 7 or 7.29%) nevertheless (freq. 4 or 4.17%) on the contrary (freq. 3 or 3.13%) yet (freq. 3 or 3.13%) instead (freq. 1 or 1.04%) alternatively (freq. 1 or 1.04%) though (freq. 1 or 1.04%)
6. Transition	2	0.51	now (freq. 2 or 100%)
Total	393	100	-

Table 4.10 displays connectors in each type of the whole corpus. It indicates that the most common types of linking adverbs in the corpus of cosmetic science abstracts are

enumeration and addition (52.42%), followed by *contrast/concession* (24.43%), *result/inference* (14.50%), *apposition* (5.34%), summation (2.80%), and transition (0.51%), respectively.

4.4.2 Connectors in each move of cosmetic science abstracts

Table 4.11 Connectors in Each Move of Cosmetic Science Abstracts

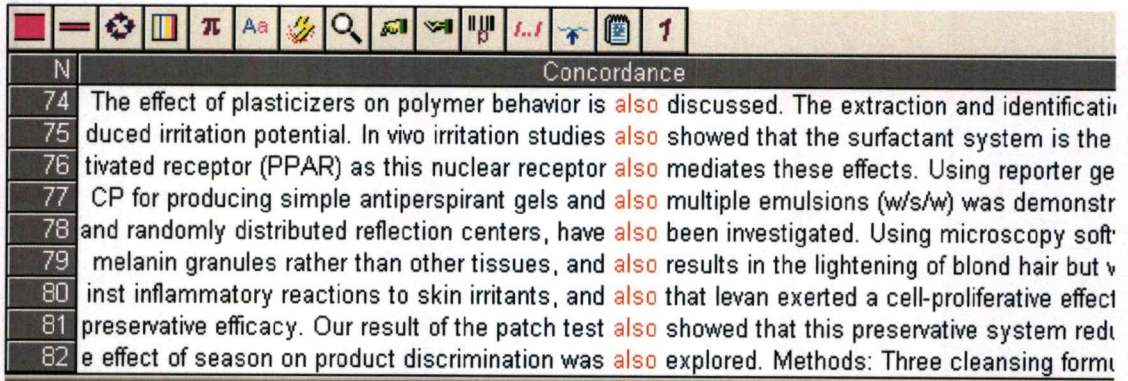
Category	Purpose	Freq.	Method	Freq.	Result	Freq.	Conclusion	Freq.
1. Enumeration and Addition								
1.1 Enumeration	-	-	then	17	finally	3	first	2
			finally	5	then	5	second	1
			first	2				
			next	1				
Total				25		8		3
1.2 Addition	also	22	also	17	also	58	also	8
	in addition	4	in addition	6	furthermore	11	in addition	2
	moreover	2	furthermore	3	moreover	10	further	1
	further	1	similarly	1	in addition	8	furthermore	1
	furthermore	1	moreover	1	further	5	moreover	3
					similarly	4		
					besides	1		
Total		30		28		97		15
2. Summation					overall	1	in conclusion	9
							to conclude	1
Total						1		10

Table 4.11 (Continued)

Category	Purpose	Freq.	Method	Freq.	Result	Freq.	Conclusion	Freq.
3. Apposition	for example	3	namely	4	for example	2	for example	1
	that is	2	specifically	1	namely	3	that is	1
	namely	1					namely	1
	specifically	1					specifically	1
Total		7		5		5		4
4. Result/ inference	thus	7	thus	4	thus	7	thus	9
	therefore	6	therefore	4	therefore	2	therefore	8
	consequently	2			consequently	1	consequently	5
	hence	1			hence	1		
Total		16		8		11		22
5. Contrast/ Concession	however	25	however	2	however	21	however	5
	alternatively	1	instead	1	in contrast	11	in contrast	2
	on the other hand	1	on the contrary	1	on the other hand	9	nevertheless	2
	still	6			on the contrary	2		
	yet	1			nevertheless	2		
					yet	2		
					still	1		
					though	1		
Total		34		4		49		9
6. Transition	now	2						
Total		2						
Grand Total		89		70		171		63

Table 4.11 presents connectors in each move of cosmetic science abstracts. It reveals that linking adverbs for *addition*, *apposition*, *result/inference*, and *contrast/concession* occur in every move of cosmetic science abstracts.

As 'also' is a linking adverb for addition occurring in every move of cosmetic science abstracts, concordance lines of this word are selected to show its circumstance.



N	Concordance
74	The effect of plasticizers on polymer behavior is also discussed. The extraction and identificati
75	duced irritation potential. In vivo irritation studies also showed that the surfactant system is the
76	tivated receptor (PPAR) as this nuclear receptor also mediates these effects. Using reporter ge
77	CP for producing simple antiperspirant gels and also multiple emulsions (w/s/w) was demonstr
78	and randomly distributed reflection centers, have also been investigated. Using microscopy soft
79	melanin granules rather than other tissues, and also results in the lightening of blond hair but v
80	inst inflammatory reactions to skin irritants, and also that levan exerted a cell-proliferative effect
81	preservative efficacy. Our result of the patch test also showed that this preservative system red
82	e effect of season on product discrimination was also explored. Methods: Three cleansing form

Figure 4.15 Concordance of 'also'

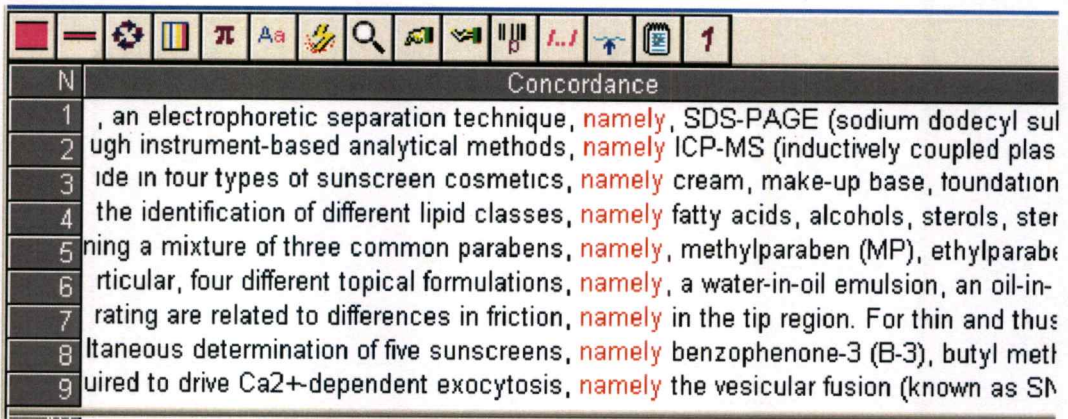
The example of using the word 'also' in the corpus of cosmetic science abstracts is shown in the following sentence.

(33) *This extent of deposition **also** shows a relationship with the effect of the vehicle on thermal behavior of the model sebum.*

As 'namely' is a linking adverb for apposition occurring in every move of cosmetic science abstracts, the example is shown in the following sentence.

(34) *The aim of this research was to develop and validate a high-performance liquid chromatographic (HPLC) method for simultaneous determination of five sunscreens, **namely** benzophenone-3 (B-3), butyl methoxydibenzoylmethane (BM), octyl methoxycinnamate (OM), octyl salicylate (OS) and homosalate (HS).*

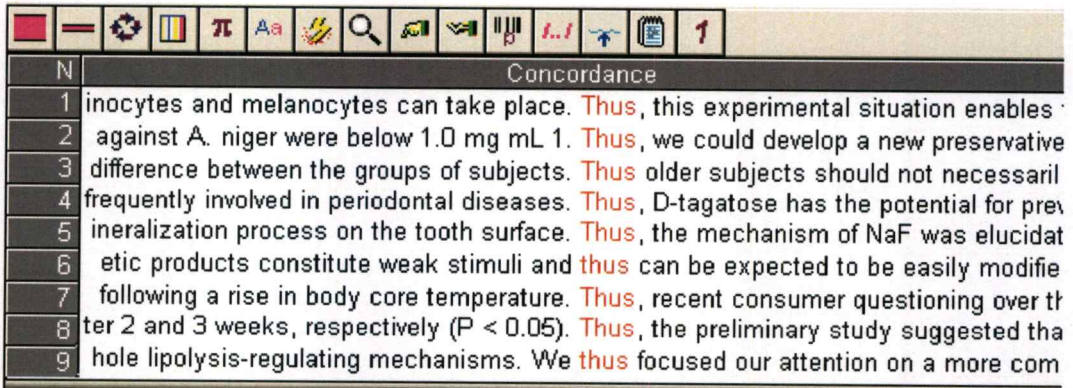
The concordance lines of the word 'namely' in the corpus of cosmetic science abstracts are shown in Figure 4.16 below.



N	Concordance
1	, an electrophoretic separation technique, namely , SDS-PAGE (sodium dodecyl sul
2	ugh instrument-based analytical methods, namely ICP-MS (inductively coupled plas
3	ide in four types of sunscreen cosmetics, namely cream, make-up base, foundation
4	the identification of different lipid classes, namely fatty acids, alcohols, sterols, ster
5	ning a mixture of three common parabens, namely , methylparaben (MP), ethylparabe
6	rticular, four different topical formulations, namely , a water-in-oil emulsion, an oil-in-
7	rating are related to differences in friction, namely in the tip region. For thin and thus
8	ltaneous determination of five sunscreens, namely benzophenone-3 (B-3), butyl metf
9	quired to drive Ca ²⁺ -dependent exocytosis, namely the vesicular fusion (known as SN

Figure 4.16 Concordance of 'namely'

As 'thus' is a linking adverb for result/inference occurring in every move of cosmetic science abstracts, concordance lines of this word are selected to show its circumstance.



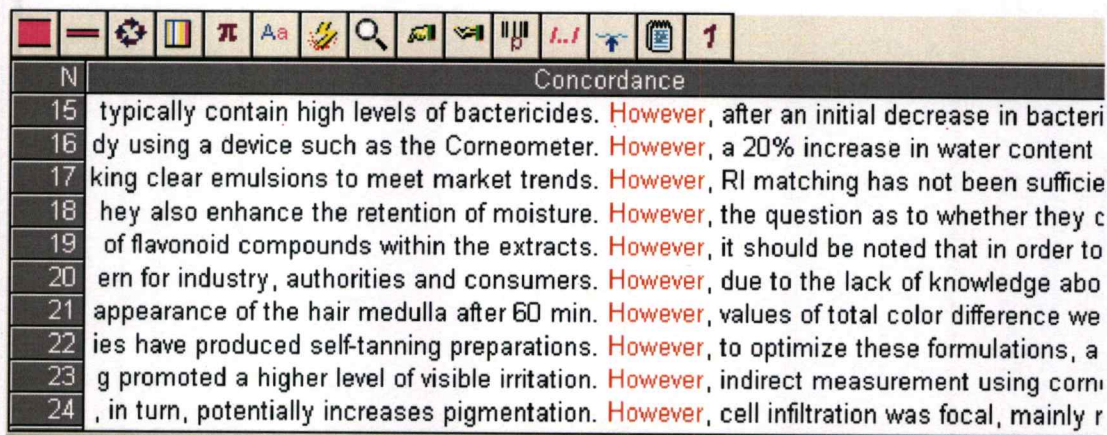
N	Concordance
1	inocytes and melanocytes can take place. Thus , this experimental situation enables
2	against <i>A. niger</i> were below 1.0 mg mL ⁻¹ . Thus , we could develop a new preservative
3	difference between the groups of subjects. Thus older subjects should not necessari
4	frequently involved in periodontal diseases. Thus , D-tagatose has the potential for prev
5	eneralization process on the tooth surface. Thus , the mechanism of NaF was elucidat
6	etic products constitute weak stimuli and thus can be expected to be easily modifie
7	following a rise in body core temperature. Thus , recent consumer questioning over th
8	ter 2 and 3 weeks, respectively (P < 0.05). Thus , the preliminary study suggested tha
9	hole lipolysis-regulating mechanisms. We thus focused our attention on a more com

Figure 4.17 Concordance of 'thus'

The example of using the word 'thus' in the corpus of cosmetic science abstracts is shown in the following sentence.

(35) *Thus, specular peak broadening is one of the important features to take into account when evaluating luster.*

As 'however' is a linking adverb for contrast/concession occurring in every move of cosmetic science abstracts, concordance lines of this word are selected to show its circumstance.



N	Concordance
15	typically contain high levels of bactericides. However , after an initial decrease in bacteri
16	dy using a device such as the Corneometer. However , a 20% increase in water content
17	king clear emulsions to meet market trends. However , RI matching has not been sufficie
18	hey also enhance the retention of moisture. However , the question as to whether they c
19	of flavonoid compounds within the extracts. However , it should be noted that in order to
20	ern for industry, authorities and consumers. However , due to the lack of knowledge abo
21	appearance of the hair medulla after 60 min. However , values of total color difference we
22	ies have produced self-tanning preparations. However , to optimize these formulations, a
23	g promoted a higher level of visible irritation. However , indirect measurement using corn
24	, in turn, potentially increases pigmentation. However , cell infiltration was focal, mainly r

Figure 4.18 Concordance of 'however'

The following sentence is the example of the word 'however' in the corpus of cosmetic science abstracts.

(36) **However**, the mixing process increased the apparent viscosity of salt-free shampoo.

When the connectors in each move are closely considered, it can be seen that linking adverbs for *summation* (10 times) and *result/inference* (22 times) are most often used in the conclusion move, while *addition* (96 times) and *contrast/concession* (50 times) are most often used in the result. Notably, connectors (171 times) are most often used in the part of result, comparing to other moves. This finding is similar to Orasan's study in 2001, which found that connectors, which hardly appear in the other moves, are quite frequent in this result move. As claimed by Wilkinson (1991: 355), results are the important part of the abstract because they are the new additions to scientific knowledge.

CHAPTER 5

CONCLUSIONS AND SUGGESTIONS

This chapter presents the conclusions and suggestions of the study. The first part focuses on the conclusions of this study. The second part concerns the implications of the study. In the last part of this chapter, the suggestions for further studies are given.

5.1 Conclusions

The study aimed to compile a corpus of cosmetic science abstracts and analyze English vocabulary in four moves of abstracts, i.e. Purposes, Methods, Results, and Conclusions. Three hundred and ten cosmetic science abstracts were collected from "*Journal of Cosmetic Science*" and "*International Journal of Cosmetic Science*" published during the year 2002 - 2006. The 310 cosmetic science abstracts were grouped into four categories, namely Hair Care, Make Up, Skin Care, and Others. Stratified Random Sampling was then used to select samples, 80% of population or 247 from 310 cosmetic science abstracts were drawn for the content analysis.

In order to analyze vocabulary in four moves of abstracts in further steps, each abstract was divided into sentences. After that, all sentences were grouped into 4 separated moves: Purposes, Methods, Results, and Conclusions based on Bhatia's Move Theory (Bhatia, 1993). Research Tools used in this study were "*Web Frequency Indexer v 1.3*" by Nation (2001), "*Web VP v 2.5 Classic*" by Nation (2006), and "*WordSmith Tools Version 3*". 116 abstracts selected from the printed journal (*Journal of Cosmetic Science*) were scanned by using Optical Character Recognition (OCR), whereas 131 abstracts selected from the online journal (*International Journal of Cosmetic Science*) were downloaded. The data obtained from both journals were stored as plain-text files (*.txt).

The lexical vocabulary in each move of abstracts was analyzed by using the online tool "*Web Frequency Indexer v 1.3*". This online tool was used to calculate the frequency of occurrence of the tokens, word types, and type/token ratio and to generate the word frequency lists in the corpus of cosmetic science abstracts. From the frequency list, the lexical vocabulary in each move of abstracts was analyzed in terms of nouns, verbs, adjectives, and adverbs. The results of lexical analysis were presented in form of word frequency and percentage.

In this study, general, academic, and technical vocabulary in the corpus of cosmetic science were analyzed by using another online tool “*Web VP v. 2.5 Classic*”. It was used to categorize words into four groups: K1 words (1-1000 General vocabulary), K2 words (1001-2000 General vocabulary), AWL (Academic), Off-list words (Technical vocabulary and Low frequency words). The results were presented in form of percentage and word frequency.

To identify connectors in each move of cosmetic science abstracts, the concordancing software “*WordSmith Tools Version 3.0*” was used. The guidelines on the connector analysis were based on “*Dictionary of Language and Linguistics*” written by Hartmann and Stork (1972) and “*Longman Grammar of Spoken and Written English*” written by Biber et al. (1999). The connectors in each move of abstracts were identified and grouped into six main types, i.e. enumeration and addition, summation, apposition, result/inference, contrast/concession, and transition. The results of connector analysis were presented in form of word frequency and percentage.

According to the statistical analysis of the corpus of cosmetic science abstracts, the whole corpus consists of 49,627 tokens and 6,792 word types. The ratio of word type to tokens of the whole corpus was 1:7. This means that each word was repeated 7 times on average throughout the corpus of cosmetic science abstracts.

The results of lexical vocabulary analysis in terms of nouns, verbs, adjectives, and adverbs showed that the noun ‘*skin*’ appeared at the highest frequency in every move of cosmetic science abstracts. For the purpose move, the noun ‘*aim*’ was quite often used to refer to the goal of the study. Notably, the word ‘*investigated*’ was the most frequent verb found in the purpose move. In terms of adjectives, ‘*cosmetic*’ was most found in the purpose move of cosmetic science abstracts. For adverbs, the word ‘*also*’ was the most frequent adverb found in the purpose move of cosmetic science abstracts.

Regarding the method move, the noun ‘*test*’ was quite frequently used to describe the procedures used in the experiment. Besides, the nouns, i.e. ‘*subjects*’, and ‘*volunteers*’ were quite often used for stating information about common demographic characteristics, selection and numbers. For verbs, the word ‘*used*’ was the most frequent verb for describing the procedures used in the experiment. In terms of adjectives, the word ‘*different*’ was the most frequent adjective in the method move. For adverbs, it is noticed that both ‘*also*’ and ‘*then*’ were the most frequent adverb found in the method move of cosmetic science abstracts.

For the result move, the word *'showed'* was the most frequent verb for describing the results. Interestingly, other forms of this verb appeared in the result move of cosmetic science abstracts, i.e. *'show'*, *'shown'*, and *'shows'*. Notably, comparative adjectives, e.g. *'more'*, *'higher'*, *'lower'*, *'less'*, *'highest'* were frequently used in summarizing the results. Especially, the word *'significant'* was the most frequent adjective found in the result move. Similar to other moves, the word *'also'* was the most frequent adverb in the result move of cosmetic science abstracts. Besides, the adverb *'significantly'* was quite often used in the result move.

For the conclusion move, the word *'suggest'* was the most frequent verb found for presenting the conclusions. Moreover, the verb *'conclude'* was quite frequently used in the conclusion move. In terms of adjectives, the word *'cosmetic'* occurred most frequently in the conclusion move of cosmetic science abstracts. Notably, adverbs, i.e. *'thus'*, *'therefore'*, and *'consequently'* appeared in the conclusion move of cosmetic science abstracts. Similar to other moves, the adverb *'also'* was found in the conclusion move.

Regarding types of vocabulary in this study, the results showed that the vocabulary in cosmetic science abstracts was highly technical when comparing to the general text. There were 68.28% of general vocabulary, 9.89% of academic vocabulary, and 21.83% of the words including technical and low frequency words. Technical terms in the corpus of cosmetic science abstracts are related to either chemistry or biology areas, e.g. *'vivo'*, *'vitro'*, *'axillary'*, *'emulsion'*, *'aqueous'*, *'corneum'*.

The results of connector analysis indicated that the most common types of linking adverbs in the corpus of cosmetic science abstracts were *enumeration and addition* (52.42%), followed by *contrast/concession* (24.43%), *result/inference* (14.50%), *apposition* (5.34%), *summation* (2.80%), and *transition* (0.51%), respectively. Notably, connectors were most commonly used in the result move of cosmetic science abstracts. Regarding four moves of abstracts, linking adverbs for *summation* and *result/inference* occurred most frequently in the conclusion move, whereas *addition* and *contrast/concession* were most frequently used in the result.

In conclusion, the analysis of English vocabulary in four moves of cosmetic science abstracts revealed that it is possible to extract patterns from scientific abstracts and groups of words which signal the type of each move. Especially, some of words seem to indicate reliably a certain type of each move. For example, the verb *'show'* appears usually in summarizing results of the study.

5.2 Implications for Scientific Abstract Education

There are two main implications for this study.

5.2.1 Implications for students and scientists

To be a guideline for students and scientists who have to write abstracts, it is possible to design the general templates for each move. For example:

Move 1: Introducing Purpose:

The	aim objective	of	this the	study research work	is/was	to.....
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Move 2: Describing Method:

The	test	was	conducted carried out performed
	method	was	used	

Move 3: Summarizing Result:

The	result (s) experiment (s)	show (ed)/(s) demonstrate (d)/(s) reveal (ed)/(s)	Noun Phrase that
It	was has been could be	shown	that	

Move 4: Presenting Conclusion:

The This These	result (s) finding (s)	suggest (s) conclude (s)/(d)	
It	is/was	concluded	that	

5.2.2 Implications for Teachers and Course Designers

Since the findings of this study derived from the authentic texts, they can be applied for teachers and course designers to help develop and evaluate vocabulary for the teaching and learning of a language. Interestingly, teachers can apply the general templates mentioned above as teacher materials for writing abstracts. It should be easier for students to learn how to write a well-organized abstracts after having good examples. This will hopefully lead to the development of appropriate learning materials to assist students or readers in gaining greater proficiency in reading and writing scientific abstracts.

5.3 Suggestions for Further Studies

From the findings of the present research, further studies should be carried out to gain a deeper understanding and applications. There are three suggestions derived from this study.

5.3.1 Further studies can be carried out in other disciplines of science such as biology, physics, political science and so on.

5.3.2 There should be an investigation of other lexical features such as the collocation of the key words in the corpus.

5.3.3 Further research of the sentence analysis in cosmetic science abstracts should be carried out, e.g. active and passive voice.

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APPENDICES

APPENDIX A

Word Frequency List in the Corpus of Cosmetic Science Abstracts

Rank	Word	Freq.	%
1	THE	3415	6.88
2	OF	2388	4.81
3	AND	1555	3.13
4	IN	1275	2.57
5	TO	1078	2.17
6	A	984	1.98
7	WAS	554	1.12
8	WITH	489	0.99
9	THAT	423	0.85
10	BY	414	0.83
11	SKIN	409	0.82
12	WERE	404	0.81
13	IS	392	0.79
14	FOR	386	0.78
15	ON	363	0.73
16	AS	343	0.69
17	HAIR	343	0.69
18	THIS	285	0.57
19	FROM	232	0.47
20	AN	212	0.43
21	STUDY	190	0.38
22	ARE	187	0.38
23	BE	187	0.38
24	AT	183	0.37
25	OR	166	0.33
26	RESULTS	143	0.29
27	THESE	142	0.29
28	USING	138	0.28
29	WE	136	0.27
30	IT	125	0.25
31	ACID	123	0.25

Rank	Word	Freq.	%
32	WHICH	118	0.24
33	TWO	117	0.24
34	USED	111	0.22
35	AFTER	107	0.22
36	BETWEEN	105	0.21
37	ALSO	104	0.21
38	THAN	104	0.21
39	COSMETIC	103	0.21
40	DIFFERENT	99	0.20
41	METHOD	96	0.19
42	TEST	96	0.19
43	NOT	94	0.19
44	HUMAN	93	0.19
45	PRODUCTS	91	0.18
46	HAVE	90	0.18
47	EFFECT	89	0.18
48	ITS	88	0.18
49	BOTH	86	0.17
50	MORE	83	0.17
51	SUCH	83	0.17
52	WATER	83	0.17
53	CAN	82	0.17
54	HAS	81	0.16
55	I	80	0.16
56	SURFACE	80	0.16
57	FORMULATIONS	79	0.16
58	INTO	79	0.16
59	SHOWED	79	0.16
60	FOUND	78	0.16
61	BEEN	76	0.15
62	OIL	75	0.15

Rank	Word	Freq.	%
63	THEIR	75	0.15
64	PROPERTIES	73	0.15
65	COMPARED	69	0.14
66	STUDIES	67	0.14
67	TREATMENT	67	0.14
68	VITRO	65	0.13
69	EFFECTS	64	0.13
70	2	63	0.13
71	OBTAINED	63	0.13
72	LIGHT	62	0.12
73	MODEL	62	0.12
74	EXTRACT	60	0.12
75	PRODUCT	60	0.12
76	CONTAINING	59	0.12
77	ONE	59	0.12
78	OTHER	59	0.12
79	PHASE	59	0.12
80	UV	58	0.12
81	ALL	57	0.11
82	ANALYSIS	57	0.11
83	CONCENTRATION	57	0.11
84	BUT	56	0.11
85	DATA	56	0.11
86	SC	56	0.11
87	ACTIVITY	55	0.11
88	SUBJECTS	55	0.11
89	TIME	55	0.11
90	APPLICATION	54	0.11
91	VIVO	54	0.11
92	DURING	53	0.11
93	EACH	53	0.11
94	HOWEVER	53	0.11
95	NEW	53	0.11
96	SIGNIFICANT	53	0.11

Rank	Word	Freq.	%
97	THREE	53	0.11
98	SYSTEM	52	0.10
99	CHANGES	51	0.10
100	FORMULATION	51	0.10
101	INCREASED	51	0.10
102	PH	51	0.10
103	EFFICACY	50	0.10
104	INVESTIGATED	49	0.10
105	MEASURED	49	0.10
106	MOST	49	0.10
107	OBSERVED	49	0.10
108	SIGNIFICANTLY	49	0.10
109	USE	49	0.10
110	NO	48	0.10
111	PARAMETERS	48	0.10
112	INCREASE	47	0.09
113	LIPIDS	47	0.09
114	WHEN	47	0.09
115	BASED	46	0.09
116	CONTROL	46	0.09
117	EXPOSURE	46	0.09
118	APPLIED	45	0.09
119	TESTED	45	0.09
120	HIGHER	44	0.09
121	METHODS	44	0.09
122	SHOW	44	0.09
123	CELLS	43	0.09
124	ONLY	43	0.09
125	PRESENT	43	0.09
126	THROUGH	43	0.09
127	WELL	43	0.09
128	CELL	42	0.08
129	COSMETICS	42	0.08
130	EMULSION	42	0.08

Rank	Word	Freq.	%
131	RELEASE	42	0.08
132	VARIOUS	42	0.08
133	AXILLARY	41	0.08
134	VALUES	41	0.08
135	LIPID	40	0.08
136	MAY	40	0.08
137	STABILITY	40	0.08
138	AGAINST	39	0.08
139	HIGH	39	0.08
140	REDUCED	39	0.08
141	FUNCTION	38	0.08
142	GROUP	38	0.08
143	LOSS	38	0.08
144	TYPES	38	0.08
145	COULD	37	0.07
146	FIRST	37	0.07
147	SOLUTION	37	0.07
148	STRATUM	37	0.07
149	ACIDS	36	0.07
150	ACTIVE	36	0.07
151	AIM	36	0.07
152	CORNEUM	36	0.07
153	DETERMINED	36	0.07
154	EVALUATED	36	0.07
155	VOLUNTEERS	36	0.07
156	AQUEOUS	35	0.07
157	PROTEINS	35	0.07
158	SAMPLES	35	0.07
159	THOSE	35	0.07
160	WOMEN	35	0.07
161	BARRIER	34	0.07
162	CREAM	34	0.07
163	PERFORMED	34	0.07
164	SUNSCREEN	34	0.07

Rank	Word	Freq.	%
165	SYSTEMS	34	0.07
166	THEY	34	0.07
167	TREATMENTS	34	0.07
168	UNDER	34	0.07
169	VITAMIN	34	0.07
170	COLOR	33	0.07
171	DID	33	0.07
172	EMULSIONS	33	0.07
173	EXTRACTS	33	0.07
174	FIBER	33	0.07
175	INGREDIENT	33	0.07
176	LOWER	33	0.07
177	PROCESS	33	0.07
178	RANGE	33	0.07
179	SHAMPOO	33	0.07
180	SUGGEST	33	0.07
181	SURFACTANT	33	0.07
182	CONCENTRATIONS	32	0.06
183	CONTENT	32	0.06
184	DECREASE	32	0.06
185	EFFECTIVE	32	0.06
186	HAD	32	0.06
187	IMPORTANT	32	0.06
188	IRRITATION	32	0.06
189	MEASUREMENTS	32	0.06
190	PREPARED	32	0.06
191	TOPICAL	32	0.06
192	TYPE	32	0.06
193	UVA	32	0.06
194	WORK	32	0.06
195	10	31	0.06
196	ADDITION	31	0.06
197	DEVELOPMENT	31	0.06
198	MELANIN	31	0.06

Rank	Word	Freq.	%
199	NATURAL	31	0.06
200	SAME	31	0.06
201	3	30	0.06
202	ACNE	30	0.06
203	DEVELOPED	30	0.06
204	DIFFERENCES	30	0.06
205	EVALUATE	30	0.06
206	GEL	30	0.06
207	GROUPS	30	0.06
208	NUMBER	30	0.06
209	PENETRATION	30	0.06
210	POTENTIAL	30	0.06
211	SODIUM	30	0.06
212	ALTHOUGH	29	0.06
213	FEMALES	29	0.06
214	INFLUENCE	29	0.06
215	KNOWN	29	0.06
216	ORDER	29	0.06
217	STUDIED	29	0.06
218	UP	29	0.06
219	5	28	0.06
220	BECAUSE	28	0.06
221	CLINICAL	28	0.06
222	COMPOUNDS	28	0.06
223	DAYS	28	0.06
224	E	28	0.06
225	IRRADIATION	28	0.06
226	LEVELS	28	0.06
227	PROTECTION	28	0.06
228	RATE	28	0.06
229	THERE	28	0.06
230	WHILE	28	0.06
231	AMOUNT	27	0.05
232	DELIVERY	27	0.05

Rank	Word	Freq.	%
233	FEMALE	27	0.05
234	FOLLOWING	27	0.05
235	IMPROVEMENT	27	0.05
236	NORMAL	27	0.05
237	REDUCTION	27	0.05
238	STANDARD	27	0.05
239	TEMPERATURE	27	0.05
240	THUS	27	0.05
241	ABILITY	26	0.05
242	AMONG	26	0.05
243	AREA	26	0.05
244	BEHAVIOR	26	0.05
245	CONDITIONS	26	0.05
246	CUTICLE	26	0.05
247	FIBERS	26	0.05
248	FORMATION	26	0.05
249	OBJECTIVE	26	0.05
250	OUT	26	0.05
251	P	26	0.05
252	PERMEATION	26	0.05
253	SHOWN	26	0.05
254	STABLE	26	0.05
255	TREATED	26	0.05
256	WITHIN	26	0.05
257	WITHOUT	26	0.05
258	BODY	25	0.05
259	CAUCASIAN	25	0.05
260	DAMAGE	25	0.05
261	DEMONSTRATED	25	0.05
262	FATTY	25	0.05
263	HEALTHY	25	0.05
264	INDUCED	25	0.05
265	LESS	25	0.05
266	LEVEL	25	0.05

APPENDIX B

Word Frequency List in the Purpose Move

Rank	Word	Freq.	%
1	THE	847	6.66
2	OF	703	5.52
3	AND	406	3.19
4	TO	349	2.74
5	IN	322	2.53
6	A	279	2.19
7	IS	182	1.43
8	SKIN	133	1.05
9	THIS	121	0.95
10	ON	109	0.86
11	HAIR	103	0.81
12	BY	98	0.77
13	WAS	98	0.77
14	STUDY	97	0.76
15	AS	95	0.75
16	FOR	95	0.75
17	ARE	83	0.65
18	THAT	77	0.61
19	WITH	72	0.57
20	AN	66	0.52
21	COSMETIC	55	0.43
22	WE	49	0.39
23	BE	47	0.37
24	OR	46	0.36
25	HAVE	45	0.35
26	BEEN	42	0.33
27	FROM	42	0.33
28	WERE	38	0.30
29	IT	37	0.29
30	PROPERTIES	37	0.29
31	HAS	36	0.28

Rank	Word	Freq.	%
32	ACID	35	0.28
33	AIM	35	0.28
34	CAN	35	0.28
35	PRODUCTS	35	0.28
36	SUCH	34	0.27
37	HUMAN	33	0.26
38	INVESTIGATED	33	0.26
39	USING	33	0.26
40	EFFECT	31	0.24
41	ITS	31	0.24
42	EFFECTS	30	0.24
43	DIFFERENT	29	0.23
44	METHOD	28	0.22
45	WHICH	28	0.22
46	THESE	27	0.21
47	HOWEVER	25	0.20
48	PRESENT	25	0.20
49	THEIR	25	0.20
50	VARIOUS	24	0.19
51	COSMETICS	23	0.18
52	ACTIVITY	22	0.17
53	ALSO	22	0.17
54	VITRO	22	0.17
55	WORK	22	0.17
56	NEW	21	0.17
57	USED	21	0.17
58	AXILLARY	20	0.16
59	IMPORTANT	20	0.16
60	INTO	20	0.16
61	MODEL	20	0.16
62	STUDIES	20	0.16

Rank	Word	Freq.	%
63	TWO	20	0.16
64	EVALUATE	19	0.15
65	MOST	19	0.15
66	NOT	19	0.15
67	OBJECTIVE	19	0.15
68	ONE	19	0.15
69	SURFACE	19	0.15
70	WATER	19	0.15
71	AT	18	0.14
72	CHANGES	18	0.14
73	KNOWN	18	0.14
74	MANY	18	0.14
75	MORE	18	0.14
76	STRATUM	18	0.14
77	ACTIVE	17	0.13
78	CORNEUM	17	0.13
79	FORMULATION	17	0.13
80	FORMULATIONS	17	0.13
81	NATURAL	17	0.13
82	TREATMENT	17	0.13
83	BETWEEN	16	0.13
84	DEVELOPED	16	0.13
85	PROCESS	16	0.13
86	RESEARCH	16	0.13
87	UV	16	0.13
88	BOTH	15	0.12
89	BUT	15	0.12
90	CELLS	15	0.12
91	EFFICACY	15	0.12
92	INGREDIENT	15	0.12
93	PROTEINS	15	0.12
94	STABILITY	15	0.12
95	AGAINST	14	0.11
96	ASSESS	14	0.11

Rank	Word	Freq.	%
97	CONTAINING	14	0.11
98	METHODS	14	0.11
99	RESULTS	14	0.11
100	VITAMIN	14	0.11
101	BASED	13	0.10
102	DETERMINE	13	0.10
103	DEVELOPMENT	13	0.10
104	FUNCTION	13	0.10
105	LIPID	13	0.10
106	OTHER	13	0.10
107	SC	13	0.10
108	STUDIED	13	0.10
109	SYSTEM	13	0.10
110	TEST	13	0.10
111	WHETHER	13	0.10
112	1	12	0.09
113	ABILITY	12	0.09
114	CELL	12	0.09
115	EMULSIONS	12	0.09
116	IRRITATION	12	0.09
117	LIGHT	12	0.09
118	MAIN	12	0.09
119	PHTHALATE	12	0.09
120	THAN	12	0.09
121	USE	12	0.09
122	ACIDS	11	0.09
123	ACNE	11	0.09
124	BARRIER	11	0.09
125	DAMAGE	11	0.09
126	EXPOSURE	11	0.09
127	FIBER	11	0.09
128	MAY	11	0.09
129	PAPER	11	0.09
130	PRODUCT	11	0.09

Rank	Word	Freq.	%
131	PURPOSE	11	0.09
132	REPORTED	11	0.09
133	SOME	11	0.09
134	SYSTEMS	11	0.09
135	THERE	11	0.09
136	THEY	11	0.09
137	THROUGH	11	0.09
138	TYPE	11	0.09
139	VIVO	11	0.09
140	AGENTS	10	0.08
141	BODY	10	0.08
142	COMPARED	10	0.08
143	CONDITIONS	10	0.08
144	DEVELOP	10	0.08
145	DURING	10	0.08
146	INVESTIGATE	10	0.08
147	LIPIDS	10	0.08
148	LIQUID	10	0.08
149	MEASURE	10	0.08
150	MECHANISM	10	0.08
151	OIL	10	0.08
152	ORDER	10	0.08
153	PHASE	10	0.08
154	POTENTIAL	10	0.08
155	RANGE	10	0.08
156	SUBSTANCES	10	0.08
157	SUNSCREEN	10	0.08
158	TOPICAL	10	0.08
159	APPLICATION	9	0.07
160	AVAILABLE	9	0.07
161	CHEMICAL	9	0.07
162	COLLAGEN	9	0.07
163	COMPARE	9	0.07

Rank	Word	Freq.	%
164	CUTANEOUS	9	0.07
165	EVALUATED	9	0.07
166	FORM	9	0.07
167	GROWTH	9	0.07
168	INCREASING	9	0.07
169	INDUSTRY	9	0.07
170	INGREDIENTS	9	0.07
171	LOSS	9	0.07
172	MOLECULES	9	0.07
173	NO	9	0.07
174	OFTEN	9	0.07
175	PRESENTED	9	0.07
176	REPORT	9	0.07
177	SEBUM	9	0.07
178	STABLE	9	0.07
179	STRUCTURE	9	0.07
180	TREATMENTS	9	0.07
181	UNDER	9	0.07
182	VOLATILE	9	0.07
183	WELL	9	0.07
184	2	8	0.06
185	AFTER	8	0.06
186	AGING	8	0.06
187	ALTHOUGH	8	0.06
188	AMONG	8	0.06
189	ANALYSIS	8	0.06
190	APPLIED	8	0.06
191	APPROACH	8	0.06
192	AQUEOUS	8	0.06
193	BACTERIA	8	0.06
194	COLOR	8	0.06
195	COMPONENTS	8	0.06
196	CUTICLE	8	0.06
197	DESIGNED	8	0.06

Rank	Word	Freq.	%
198	E	8	0.06
199	EXAMINED	8	0.06
200	EXTRACT	8	0.06
201	FACIAL	8	0.06
202	FACTOR	8	0.06
203	FATTY	8	0.06
204	HERE	8	0.06
205	HIGH	8	0.06
206	HOW	8	0.06
207	I.E	8	0.06
208	INFLUENCE	8	0.06
209	MATRIX	8	0.06
210	MOLECULE	8	0.06
211	PERMEATION	8	0.06
212	PH	8	0.06
213	PREVIOUS	8	0.06
214	PREVIOUSLY	8	0.06
215	RELEASE	8	0.06
216	SEVERAL	8	0.06
217	SURFACTANTS	8	0.06
218	TIME	8	0.06
219	ABOUT	7	0.06
220	ANTIOXIDANT	7	0.06
221	ASSAY	7	0.06
222	BEHAVIOR	7	0.06
223	COMMON	7	0.06
224	COMPOUNDS	7	0.06
225	CONTENT	7	0.06
226	CREAM	7	0.06
227	DATA	7	0.06
228	DESQUAMATION	7	0.06
229	DETERMINED	7	0.06
230	DNA	7	0.06
231	EXTRACTION	7	0.06

Rank	Word	Freq.	%
232	FIRST	7	0.06
233	FORMATION	7	0.06
234	FOUND	7	0.06
235	HYDRATION	7	0.06
236	INCLUDING	7	0.06
237	LESS	7	0.06
238	LITTLE	7	0.06
239	MAINLY	7	0.06
240	MAJOR	7	0.06
241	O/W	7	0.06
242	ODOR	7	0.06
243	PERFORMED	7	0.06
244	PHYSICAL	7	0.06
245	POSSIBLE	7	0.06
246	PREPARATIONS	7	0.06
247	PRODUCTION	7	0.06
248	PROTECTION	7	0.06
249	QUANTITATIVE	7	0.06
250	SHOULD	7	0.06
251	SINCE	7	0.06
252	THUS	7	0.06
253	TYROSINASE	7	0.06
254	UVA	7	0.06
255	WHEN	7	0.06
256	ADDITION	6	0.05
257	AGEING	6	0.05
258	AGENT	6	0.05
259	BACTERIAL	6	0.05
260	BLOND	6	0.05
261	CARE	6	0.05
262	CAUSED	6	0.05
263	CLINICAL	6	0.05
264	CONDITION	6	0.05
265	CONSUMERS	6	0.05

APPENDIX C

Word Frequency List in the Method Move

Rank	Word	Freq.	%
1	THE	800	6.15
2	OF	531	4.08
3	AND	465	3.57
4	IN	303	2.33
5	A	287	2.21
6	TO	232	1.78
7	WERE	232	1.78
8	WAS	209	1.61
9	WITH	156	1.20
10	BY	147	1.13
11	FOR	119	0.91
12	ON	106	0.81
13	SKIN	90	0.69
14	FROM	81	0.62
15	AS	78	0.60
16	USING	73	0.56
17	HAIR	65	0.50
18	AT	64	0.49
19	USED	58	0.45
20	THIS	55	0.42
21	AN	54	0.41
22	TWO	52	0.40
23	STUDY	51	0.39
24	TEST	51	0.39
25	IS	49	0.38
26	OR	47	0.36
27	AFTER	42	0.32
28	I	41	0.32
29	WE	38	0.29
30	DIFFERENT	35	0.27
31	METHOD	35	0.27

Rank	Word	Freq.	%
32	EACH	34	0.26
33	PHASE	32	0.25
34	WATER	32	0.25
35	WHICH	32	0.25
36	BETWEEN	31	0.24
37	ACID	30	0.23
38	SURFACE	30	0.23
39	MEASURED	29	0.22
40	SUBJECTS	29	0.22
41	ARE	26	0.20
42	PREPARED	26	0.20
43	THREE	26	0.20
44	ANALYSIS	25	0.19
45	APPLIED	25	0.19
46	BE	24	0.18
47	ONE	24	0.18
48	PERFORMED	24	0.18
49	PRODUCTS	24	0.18
50	THAT	24	0.18
51	FORMULATIONS	23	0.18
52	OBTAINED	23	0.18
53	PRODUCT	23	0.18
54	2	22	0.17
55	DETERMINED	22	0.17
56	EVALUATED	22	0.17
57	HUMAN	22	0.17
58	MEASUREMENTS	22	0.17
59	VOLUNTEERS	22	0.17
60	BOTH	21	0.16
61	MODEL	21	0.16
62	THEIR	21	0.16

Rank	Word	Freq.	%
63	COSMETIC	20	0.15
64	ITS	20	0.15
65	THESE	20	0.15
66	TYPES	20	0.15
67	DURING	19	0.15
68	METHODS	19	0.15
69	OIL	19	0.15
70	PARAMETERS	19	0.15
71	VALUES	19	0.15
72	BASED	18	0.14
73	CONTAINING	18	0.14
74	EMULSION	18	0.14
75	EXTRACT	18	0.14
76	FEMALE	18	0.14
77	GEL	18	0.14
78	VITRO	18	0.14
79	10	17	0.13
80	ALSO	17	0.13
81	APPLICATION	17	0.13
82	BEEN	17	0.13
83	COMPARED	17	0.13
84	INTO	17	0.13
85	THEN	17	0.13
86	CONTROL	16	0.12
87	HAVE	16	0.12
88	NM	16	0.12
89	OUT	16	0.12
90	PROPERTIES	16	0.12
91	SUCH	16	0.12
92	TIME	16	0.12
93	ALL	15	0.12
94	ASSESSED	15	0.12
95	CARRIED	15	0.12
96	CREAM	15	0.12

Rank	Word	Freq.	%
97	GROUPS	15	0.12
98	HEALTHY	15	0.12
99	SAMPLES	15	0.12
100	VIVO	15	0.12
101	WEEKS	15	0.12
102	YEARS	15	0.12
103	3	14	0.11
104	CONDUCTED	14	0.11
105	DATA	14	0.11
106	EFFECT	14	0.11
107	GROUP	14	0.11
108	ORDER	14	0.11
109	SAME	14	0.11
110	SYSTEM	14	0.11
111	TESTED	14	0.11
112	WOMEN	14	0.11
113	DAYS	13	0.10
114	EXTRACTS	13	0.10
115	IT	13	0.10
116	LIPIDS	13	0.10
117	SOLUTION	13	0.10
118	STUDIES	13	0.10
119	UNDER	13	0.10
120	VARIOUS	13	0.10
121	20	12	0.09
122	30	12	0.09
123	ANALYZED	12	0.09
124	CELL	12	0.09
125	FIRST	12	0.09
126	INVESTIGATED	12	0.09
127	SPF	12	0.09
128	STUDIED	12	0.09
129	TECHNIQUE	12	0.09
130	5	11	0.08

Rank	Word	Freq.	%
131	AQUEOUS	11	0.08
132	CALCULATED	11	0.08
133	CLINICAL	11	0.08
134	DIFFUSION	11	0.08
135	EFFECTS	11	0.08
136	FLOW	11	0.08
137	FORMULATION	11	0.08
138	FOUR	11	0.08
139	H	11	0.08
140	LIGHT	11	0.08
141	NUMBER	11	0.08
142	PERIOD	11	0.08
143	SECOND	11	0.08
144	SODIUM	11	0.08
145	STANDARD	11	0.08
146	STEP	11	0.08
147	=	10	0.08
148	4	10	0.08
149	ACCORDING	10	0.08
150	AREA	10	0.08
151	C	10	0.08
152	COLOR	10	0.08
153	DETECTION	10	0.08
154	DETERMINATION	10	0.08
155	DRY	10	0.08
156	EFFICACY	10	0.08
157	EXPERIMENTS	10	0.08
158	FEMALES	10	0.08
159	FILM	10	0.08
160	FOLLOWING	10	0.08
161	HAD	10	0.08
162	HPLC	10	0.08
163	IDENTIFIED	10	0.08
164	IMAGE	10	0.08

Rank	Word	Freq.	%
165	JAPANESE	10	0.08
166	MORPHOLOGY	10	0.08
167	RESULTS	10	0.08
168	SIZE	10	0.08
169	SUNSCREEN	10	0.08
170	TEMPERATURE	10	0.08
171	TOTAL	10	0.08
172	TREATED	10	0.08
173	TREATMENTS	10	0.08
174	UV	10	0.08
175	UVA	10	0.08
176	WITHOUT	10	0.08
177	40	9	0.07
178	B	9	0.07
179	BLOOD	9	0.07
180	CAN	9	0.07
181	DAILY	9	0.07
182	DESIGN	9	0.07
183	DEVELOPED	9	0.07
184	EMULSIONS	9	0.07
185	ETHANOL	9	0.07
186	EXAMINED	9	0.07
187	FIBER	9	0.07
188	FIBERS	9	0.07
189	FIVE	9	0.07
190	FOREARM	9	0.07
191	HAS	9	0.07
192	INFLUENCE	9	0.07
193	MICROSCOPY	9	0.07
194	MOBILE	9	0.07
195	NEW	9	0.07
196	NOT	9	0.07
197	OILS	9	0.07
198	OVER	9	0.07

Rank	Word	Freq.	%
199	PH	9	0.07
200	SPECTROSCOPY	9	0.07
201	STABILITY	9	0.07
202	THROUGH	9	0.07
203	TREATMENT	9	0.07
204	UP	9	0.07
205	12	8	0.06
206	ABSORPTION	8	0.06
207	ADDITION	8	0.06
208	AMOUNT	8	0.06
209	CAUCASIAN	8	0.06
210	CELLS	8	0.06
211	CHANGES	8	0.06
212	CHROMATOGRAPHY	8	0.06
213	COMPARISON	8	0.06
214	CONCENTRATIONS	8	0.06
215	FORCE	8	0.06
216	FORMULATED	8	0.06
217	LENGTH	8	0.06
218	LOSS	8	0.06
219	M	8	0.06
220	MADE	8	0.06
221	MONTHS	8	0.06
222	MORE	8	0.06
223	MULTIPLE	8	0.06
224	ONLY	8	0.06
225	OTHER	8	0.06
226	POLYMER	8	0.06
227	QUANTIFIED	8	0.06
228	RANDOMIZED	8	0.06
229	RECEIVED	8	0.06
230	RELEASE	8	0.06
231	SELECTED	8	0.06
232	TWICE	8	0.06

Rank	Word	Freq.	%
233	W/W	8	0.06
234	WRINKLES	8	0.06
235	–	7	0.05
236	100	7	0.05
237	24	7	0.05
238	25	7	0.05
239	45	7	0.05
240	ACIDS	7	0.05
241	ACTIVE	7	0.05
242	ACTIVITY	7	0.05
243	AGE	7	0.05
244	AXILLARY	7	0.05
245	CHEMICAL	7	0.05
246	COMPONENTS	7	0.05
247	COMPOUNDS	7	0.05
248	CONCENTRATION	7	0.05
249	CONDITIONS	7	0.05
250	CONTENT	7	0.05
251	CORNEUM	7	0.05
252	COSMETICS	7	0.05
253	DISTRIBUTION	7	0.05
254	E	7	0.05
255	EITHER	7	0.05
256	EVALUATION	7	0.05
257	EXTRACTED	7	0.05
258	FACIAL	7	0.05
259	FILTER	7	0.05
260	HAIRS	7	0.05
261	INGREDIENT	7	0.05
262	IRRITATION	7	0.05
263	MEMBRANE	7	0.05
264	MOISTURIZER	7	0.05
265	PATIENTS	7	0.05
266	PER	7	0.05

Rank	Word	Freq.	%
267	PRESENT	7	0.05
268	PRESENTED	7	0.05
269	QUANTITATIVE	7	0.05
270	RANGE	7	0.05
271	SC	7	0.05
272	SEBUM	7	0.05
273	SENSORY	7	0.05
274	SEPARATED	7	0.05
275	SOLUTIONS	7	0.05
276	STRATUM	7	0.05
277	SUN	7	0.05
278	SUNLIGHT	7	0.05
279	TAKEN	7	0.05
280	TEN	7	0.05
281	THEY	7	0.05
282	THOSE	7	0.05
283	ULTRAVIOLET	7	0.05
284	USE	7	0.05
285	VITAMIN	7	0.05
286	15	6	0.05
287	50	6	0.05
288	60	6	0.05
289	8	6	0.05
290	ACNE	6	0.05
291	AGAINST	6	0.05
292	AGED	6	0.05
293	BECAUSE	6	0.05
294	BEFORE	6	0.05
295	CHEEK	6	0.05
296	COLLECTED	6	0.05
297	CONSIDERED	6	0.05
298	COULD	6	0.05
299	CREAMS	6	0.05
300	DANDRUFF	6	0.05

Rank	Word	Freq.	%
301	DAY	6	0.05
302	DEFORMATION	6	0.05
303	DENSITY	6	0.05
304	DIAMETER	6	0.05
305	DISPERSIONS	6	0.05
306	DISSOLVED	6	0.05
307	DNA	6	0.05
308	DOUBLE-BLIND	6	0.05
309	EMPLOYED	6	0.05
310	END	6	0.05
311	ERYTHEMAL	6	0.05
312	ETHYL	6	0.05
313	EVALUATE	6	0.05
314	FOLLOWED	6	0.05
315	FRANZ	6	0.05
316	FUNCTION	6	0.05
317	G	6	0.05
318	HIGH	6	0.05
319	INCLUDING	6	0.05
320	INFORMATION	6	0.05
321	ISOLATED	6	0.05
322	LAYERS	6	0.05
323	LIPID	6	0.05
324	LIQUID	6	0.05
325	MAJOR	6	0.05
326	MEAN	6	0.05
327	MEASURING	6	0.05
328	MEDIUM	6	0.05
329	MICROORGANISMS	6	0.05
330	ML	6	0.05
331	MODIFIED	6	0.05
332	N	6	0.05
333	NATURAL	6	0.05
334	PATCH	6	0.05

APPENDIX D

Word Frequency List in the Result Move

Rank	Word	Freq.	%
1	THE	1355	7.38
2	OF	867	4.72
3	AND	539	2.94
4	IN	488	2.66
5	TO	348	1.90
6	A	312	1.70
7	WAS	227	1.24
8	WITH	223	1.22
9	THAT	215	1.17
10	BY	137	0.75
11	SKIN	131	0.71
12	HAIR	129	0.70
13	WERE	128	0.70
14	AS	125	0.68
15	ON	118	0.64
16	FOR	114	0.62
17	IS	90	0.49
18	AT	84	0.46
19	FROM	83	0.45
20	THAN	77	0.42
21	RESULTS	70	0.38
22	SHOWED	67	0.37
23	AN	66	0.36
24	FOUND	65	0.35
25	OR	65	0.35
26	THIS	63	0.34
27	BE	61	0.33
28	ARE	60	0.33
29	ALSO	57	0.31
30	NOT	53	0.29
31	AFTER	52	0.28

Rank	Word	Freq.	%
32	ACID	50	0.27
33	IT	50	0.27
34	BETWEEN	48	0.26
35	SIGNIFICANT	46	0.25
36	CONCENTRATION	45	0.25
37	MORE	45	0.25
38	SIGNIFICANTLY	45	0.25
39	WHICH	45	0.25
40	BOTH	44	0.24
41	COMPARED	40	0.22
42	INCREASED	40	0.22
43	THESE	40	0.22
44	OBSERVED	39	0.21
45	EFFECT	38	0.21
46	INCREASE	36	0.20
47	TWO	36	0.20
48	OIL	35	0.19
49	ALL	34	0.19
50	HIGHER	34	0.19
51	OTHER	34	0.19
52	TREATMENT	34	0.19
53	PH	33	0.18
54	LIGHT	32	0.17
55	SHOW	32	0.17
56	2	31	0.17
57	BUT	31	0.17
58	INTO	31	0.17
59	NO	30	0.16
60	HUMAN	29	0.16
61	FORMULATIONS	28	0.15
62	WHEN	28	0.15

Rank	Word	Freq.	%
63	CONTAINING	27	0.15
64	EXTRACT	27	0.15
65	OBTAINED	27	0.15
66	ONLY	27	0.15
67	USING	27	0.15
68	REDUCED	26	0.14
69	SC	26	0.14
70	STUDY	26	0.14
71	TEST	26	0.14
72	1	25	0.14
73	DID	25	0.14
74	ITS	25	0.14
75	SURFACE	25	0.14
76	TESTED	25	0.14
77	WATER	25	0.14
78	WE	25	0.14
79	DIFFERENT	24	0.13
80	LEVELS	24	0.13
81	RELEASE	24	0.13
82	CONTROL	23	0.13
83	LOWER	23	0.13
84	PRODUCTS	23	0.13
85	SHAMPOO	23	0.13
86	THEIR	23	0.13
87	TIME	23	0.13
88	WELL	23	0.13
89	ANALYSIS	22	0.12
90	APPLICATION	22	0.12
91	DECREASE	22	0.12
92	HAS	22	0.12
93	MOST	22	0.12
94	VITRO	22	0.12
95	VIVO	22	0.12
96	ACTIVITY	21	0.11

Rank	Word	Freq.	%
97	HOWEVER	21	0.11
98	P	21	0.11
99	SOLUTION	21	0.11
100	SUCH	21	0.11
101	USED	21	0.11
102	UV	21	0.11
103	CAN	20	0.11
104	DATA	20	0.11
105	EXPOSURE	20	0.11
106	HAVE	20	0.11
107	HIGH	20	0.11
108	PARAMETERS	20	0.11
109	REVEALED	20	0.11
110	SURFACTANT	20	0.11
111	SYSTEM	20	0.11
112	CHANGES	19	0.10
113	CONCENTRATIONS	19	0.10
114	EFFICACY	19	0.10
115	HAD	19	0.10
116	IRRADIATION	19	0.10
117	LIPID	19	0.10
118	MELANIN	19	0.10
119	MODEL	19	0.10
120	SIMILAR	19	0.10
121	STUDIES	19	0.10
122	THOSE	19	0.10
123	THREE	19	0.10
124	THROUGH	19	0.10
125	VALUES	19	0.10
126	WHILE	19	0.10
127	CELL	18	0.10
128	CELLS	18	0.10
129	DEMONSTRATED	18	0.10
130	GROUP	18	0.10

Rank	Word	Freq.	%
131	MEASURED	18	0.10
132	PRODUCT	18	0.10
133	SAMPLES	18	0.10
134	SHOWN	18	0.10
135	DURING	17	0.09
136	EFFECTIVE	17	0.09
137	LESS	17	0.09
138	LOSS	17	0.09
139	USE	17	0.09
140	5	16	0.09
141	ACIDS	16	0.09
142	ALTHOUGH	16	0.09
143	AMONG	16	0.09
144	BEEN	16	0.09
145	CORRELATION	16	0.09
146	FORMULATION	16	0.09
147	IMPROVEMENT	16	0.09
148	METHOD	16	0.09
149	PHASE	16	0.09
150	PROPERTIES	16	0.09
151	RATE	16	0.09
152	REDUCTION	16	0.09
153	VISCOSITY	16	0.09
154	<	15	0.08
155	0.5	15	0.08
156	3	15	0.08
157	ADDITION	15	0.08
158	AQUEOUS	15	0.08
159	CONTENT	15	0.08
160	CONTRAST	15	0.08
161	COULD	15	0.08
162	DECREASED	15	0.08
163	EMULSION	15	0.08
164	INDUCED	15	0.08

Rank	Word	Freq.	%
165	LIPIDS	15	0.08
166	MAXIMUM	15	0.08
167	RESULTED	15	0.08
168	SALT	15	0.08
169	STABILITY	15	0.08
170	SYSTEMS	15	0.08
171	TREATED	15	0.08
172	UP	15	0.08
173	UVA	15	0.08
174	W/W	15	0.08
175	ABOUT	14	0.08
176	AGAINST	14	0.08
177	DELIVERY	14	0.08
178	EACH	14	0.08
179	HIGHEST	14	0.08
180	NUMBER	14	0.08
181	RANGE	14	0.08
182	RESPECTIVELY	14	0.08
183	WITHIN	14	0.08
184	10	13	0.07
185	AMOUNT	13	0.07
186	BEHAVIOR	13	0.07
187	COLOR	13	0.07
188	COSMETIC	13	0.07
189	CUTICLE	13	0.07
190	DAYS	13	0.07
191	DIFFERENCES	13	0.07
192	DUE	13	0.07
193	EPIDERMIS	13	0.07
194	FIRST	13	0.07
195	FORMATION	13	0.07
196	LEVEL	13	0.07
197	LOW	13	0.07
198	M	13	0.07

Rank	Word	Freq.	%
199	ONE	13	0.07
200	SAME	13	0.07
201	SHOWS	13	0.07
202	SODIUM	13	0.07
203	THERE	13	0.07
204	THEY	13	0.07
205	UVB	13	0.07
206	4	12	0.07
207	AMOUNTS	12	0.07
208	BASED	12	0.07
209	FATTY	12	0.07
210	FEMALES	12	0.07
211	GOOD	12	0.07
212	GROUPS	12	0.07
213	INCREASING	12	0.07
214	MOISTURE	12	0.07
215	PENETRATION	12	0.07
216	PRESENCE	12	0.07
217	SENSITIVE	12	0.07
218	TEMPERATURE	12	0.07
219	TEWL	12	0.07
220	WHEREAS	12	0.07
221	50	11	0.06
222	ACTIVE	11	0.06
223	AXILLARY	11	0.06
224	BASIL	11	0.06
225	CAUCASIAN	11	0.06
226	CHEEK	11	0.06
227	CREAM	11	0.06
228	DS	11	0.06
229	EITHER	11	0.06
230	EMULSIONS	11	0.06
231	FIBER	11	0.06
232	FURTHER	11	0.06

Rank	Word	Freq.	%
233	FURTHERMORE	11	0.06
234	GRANULES	11	0.06
235	HAND	11	0.06
236	IDENTIFIED	11	0.06
237	INDICATE	11	0.06
238	IRRITATION	11	0.06
239	MAY	11	0.06
240	STANDARD	11	0.06
241	SUBJECTS	11	0.06
242	SUGGESTING	11	0.06
243	TOTAL	11	0.06
244	TREATMENTS	11	0.06
245	>	10	0.05
246	APPARENT	10	0.05
247	AVERAGE	10	0.05
248	BARRIER	10	0.05
249	BECAUSE	10	0.05
250	CHANGE	10	0.05
251	COEFFICIENTS	10	0.05
252	EFFECTS	10	0.05
253	FIBERS	10	0.05
254	FOLLOWING	10	0.05
255	INDICATED	10	0.05
256	MATURATION	10	0.05
257	MOISTURIZER	10	0.05
258	MOREOVER	10	0.05
259	NEW	10	0.05
260	NORMAL	10	0.05
261	OUR	10	0.05
262	POSSIBLE	10	0.05
263	PROTECTION	10	0.05
264	PROTEIN	10	0.05
265	ROOT	10	0.05
266	SOME	10	0.05

APPENDIX E

Word Frequency List in the Conclusion Move

Rank	Word	Freq.	%
1	THE	413	7.46
2	OF	287	5.18
3	IN	162	2.92
4	TO	149	2.69
5	AND	145	2.62
6	THAT	107	1.93
7	A	106	1.91
8	IS	71	1.28
9	FOR	58	1.05
10	BE	55	0.99
11	SKIN	55	0.99
12	THESE	55	0.99
13	RESULTS	49	0.88
14	HAIR	46	0.83
15	THIS	46	0.83
16	AS	45	0.81
17	WITH	38	0.69
18	BY	32	0.58
19	SUGGEST	31	0.56
20	ON	30	0.54
21	AN	26	0.47
22	FROM	26	0.47
23	IT	25	0.45
24	WE	24	0.43
25	WAS	20	0.36
26	ARE	18	0.32
27	CAN	18	0.32
28	AT	17	0.31
29	METHOD	17	0.31
30	MAY	16	0.29
31	STUDY	16	0.29

Rank	Word	Freq.	%
32	COSMETIC	15	0.27
33	DATA	15	0.27
34	DEVELOPMENT	15	0.27
35	STUDIES	15	0.27
36	HAS	14	0.25
37	EFFECTS	13	0.23
38	NEW	13	0.23
39	NOT	13	0.23
40	SHOULD	13	0.23
41	USE	13	0.23
42	WHICH	13	0.23
43	CONCLUSION	12	0.22
44	COULD	12	0.22
45	ITS	12	0.22
46	MORE	12	0.22
47	SUCH	12	0.22
48	CONCLUDE	11	0.20
49	DIFFERENT	11	0.20
50	FORMULATIONS	11	0.20
51	INTO	11	0.20
52	OIL	11	0.20
53	USED	11	0.20
54	USEFUL	11	0.20
55	UV	11	0.20
56	BETWEEN	10	0.18
57	DIFFERENCES	10	0.18
58	EFFECTIVE	10	0.18
59	EXPOSURE	10	0.18
60	FUNCTION	10	0.18
61	POTENTIAL	10	0.18
62	SC	10	0.18

Rank	Word	Freq.	%
63	SDS	10	0.18
64	FINDINGS	9	0.16
65	HAVE	9	0.16
66	HUMAN	9	0.16
67	LIPIDS	9	0.16
68	PRODUCTS	9	0.16
69	SUBJECTS	9	0.16
70	THAN	9	0.16
71	THUS	9	0.16
72	TWO	9	0.16
73	WHEN	9	0.16
74	WRINKLES	9	0.16
75	ACID	8	0.14
76	ALSO	8	0.14
77	BARRIER	8	0.14
78	BUT	8	0.14
79	CONCLUDED	8	0.14
80	COSMETICS	8	0.14
81	FACE	8	0.14
82	OR	8	0.14
83	PRODUCT	8	0.14
84	THEREFORE	8	0.14
85	TIME	8	0.14
86	WILL	8	0.14
87	ABLE	7	0.13
88	AGENT	7	0.13
89	ANTIOXIDANT	7	0.13
90	BECAUSE	7	0.13
91	CARE	7	0.13
92	DURING	7	0.13
93	EXTRACT	7	0.13
94	FORMULATION	7	0.13
95	LIGHT	7	0.13
96	NO	7	0.13

Rank	Word	Freq.	%
97	OBTAINED	7	0.13
98	PROCESS	7	0.13
99	PROTEINS	7	0.13
100	TOPICAL	7	0.13
101	TREATMENT	7	0.13
102	WATER	7	0.13
103	ACNE	6	0.11
104	APPLICATION	6	0.11
105	BOTH	6	0.11
106	CHANGES	6	0.11
107	COMBINATION	6	0.11
108	DELIVERY	6	0.11
109	DUE	6	0.11
110	EFFECT	6	0.11
111	EFFICACY	6	0.11
112	FORMATION	6	0.11
113	IMPORTANT	6	0.11
114	INCREASE	6	0.11
115	INCREASED	6	0.11
116	MICELLES	6	0.11
117	MIGHT	6	0.11
118	NORMAL	6	0.11
119	OUR	6	0.11
120	PENETRATE	6	0.11
121	PENETRATION	6	0.11
122	PRESENCE	6	0.11
123	PROVIDE	6	0.11
124	REDUCED	6	0.11
125	REDUCTION	6	0.11
126	ROLE	6	0.11
127	STRUCTURE	6	0.11
128	SUGGESTS	6	0.11
129	SUPPORT	6	0.11
130	SURFACE	6	0.11

Rank	Word	Freq.	%
131	TEST	6	0.11
132	THEIR	6	0.11
133	TOGETHER	6	0.11
134	TYPE	6	0.11
135	VIVO	6	0.11
136	WERE	6	0.11
137	ACTIVITY	5	0.09
138	AFTER	5	0.09
139	AGAINST	5	0.09
140	ALL	5	0.09
141	ALONG	5	0.09
142	ANDROSTENONE	5	0.09
143	ANTI-AGING	5	0.09
144	BENEFITS	5	0.09
145	CAUCASIAN	5	0.09
146	COMPOUNDS	5	0.09
147	CONSEQUENTLY	5	0.09
148	DAMAGE	5	0.09
149	ENDOGENOUS	5	0.09
150	EPIDERMAL	5	0.09
151	EXTRACTS	5	0.09
152	FIRST	5	0.09
153	FOLLOWING	5	0.09
154	HERE	5	0.09
155	HIGH	5	0.09
156	HOWEVER	5	0.09
157	INDICATE	5	0.09
158	INGREDIENT	5	0.09
159	MALE	5	0.09
160	MARKED	5	0.09
161	MILD	5	0.09
162	O3	5	0.09
163	ONLY	5	0.09
164	OXIDATIVE	5	0.09

Rank	Word	Freq.	%
165	PROTECTION	5	0.09
166	REPORTED	5	0.09
167	SENSITIVE	5	0.09
168	SHOWED	5	0.09
169	SIGNIFICANT	5	0.09
170	STABLE	5	0.09
171	STRESS	5	0.09
172	SUITABLE	5	0.09
173	SYSTEM	5	0.09
174	TESTS	5	0.09
175	THOSE	5	0.09
176	USING	5	0.09
177	WELL	5	0.09
178	WHILE	5	0.09
179	WOMEN	5	0.09
180	ABSORPTION	4	0.07
181	AFFECTED	4	0.07
182	ALTHOUGH	4	0.07
183	APPEARS	4	0.07
184	APPROACH	4	0.07
185	AREA	4	0.07
186	ASSESSMENT	4	0.07
187	BETTER	4	0.07
188	BONDS	4	0.07
189	CAPACITY	4	0.07
190	CAUSE	4	0.07
191	CMC	4	0.07
192	COMPONENTS	4	0.07
193	CONSIDERED	4	0.07
194	DECREASE	4	0.07
195	DEMONSTRATE	4	0.07
196	DEODORANT	4	0.07
197	DIFFERENCE	4	0.07
198	E	4	0.07

Rank	Word	Freq.	%
199	EASY	4	0.07
200	EMULSION	4	0.07
201	ESPECIALLY	4	0.07
202	EVALUATE	4	0.07
203	EVEN	4	0.07
204	FEMALE	4	0.07
205	FEMALES	4	0.07
206	FOLLICULAR	4	0.07
207	FOUND	4	0.07
208	FURTHER	4	0.07
209	GROUP	4	0.07
210	HIGHER	4	0.07
211	INCLUDING	4	0.07
212	INFLUENCE	4	0.07
213	LEAD	4	0.07
214	LEADS	4	0.07
215	LIKELY	4	0.07
216	LOSS	4	0.07
217	MELANIN	4	0.07
218	OBSERVED	4	0.07
219	OPTIMAL	4	0.07
220	OTHER	4	0.07
221	OUT	4	0.07
222	POTENT	4	0.07
223	PROMISING	4	0.07
224	PROPERTIES	4	0.07
225	QUANTITATIVE	4	0.07
226	QUICK	4	0.07
227	SCALE	4	0.07
228	SEEMS	4	0.07
229	SHOW	4	0.07
230	STRONG	4	0.07
231	SUNSCREEN	4	0.07
232	SYSTEMS	4	0.07

Rank	Word	Freq.	%
233	TAKEN	4	0.07
234	THREE	4	0.07
235	THROUGH	4	0.07
236	TREATMENTS	4	0.07
237	UNDERSTANDING	4	0.07
238	US	4	0.07
239	VEHICLE	4	0.07
240	VITAMIN	4	0.07
241	WITHOUT	4	0.07
242	20	3	0.05
243	ABOUT	3	0.05
244	ABSORBED	3	0.05
245	ACTION	3	0.05
246	ADHESION	3	0.05
247	ADVANTAGE	3	0.05
248	AGE	3	0.05
249	AGENTS	3	0.05
250	AGREEMENT	3	0.05
251	ALLOWS	3	0.05
252	APPLIED	3	0.05
253	AREAS	3	0.05
254	AVAILABLE	3	0.05
255	AXILLARY	3	0.05
256	B	3	0.05
257	BASED	3	0.05
258	BEING	3	0.05
259	BENEFIT	3	0.05
260	BODY	3	0.05
261	CAPILLARY	3	0.05
262	CELLULAR	3	0.05
263	CLINICAL	3	0.05
264	COLLAGEN	3	0.05
265	CONCENTRATION	3	0.05
266	CONCLUSIONS	3	0.05


Rank	Word	Freq.	%
267	CONDITIONS	3	0.05
268	CONTENT	3	0.05
269	CONTRIBUTE	3	0.05
270	CONTROL	3	0.05
271	CONVEX	3	0.05
272	CORNEUM	3	0.05
273	DEPENDS	3	0.05
274	DETECTION	3	0.05
275	DEVELOPED	3	0.05
276	DEVICE	3	0.05
277	DID	3	0.05
278	DOES	3	0.05
279	DOSES	3	0.05
280	DRUGS	3	0.05
281	DRY	3	0.05
282	DYNAMIC	3	0.05
283	EASILY	3	0.05
284	ENHANCED	3	0.05
285	EXPRESSION	3	0.05
286	EXTENT	3	0.05
287	FATIGUE	3	0.05
288	FATTY	3	0.05
289	FINE	3	0.05
290	FREE	3	0.05
291	GLA	3	0.05
292	GOOD	3	0.05
293	HELP	3	0.05
294	HYDROGEN	3	0.05
295	IMPROVE	3	0.05
296	IMPROVEMENT	3	0.05
297	INDIVIDUAL	3	0.05
298	INDUCE	3	0.05
299	INFLAMMATORY	3	0.05
300	ION	3	0.05

Rank	Word	Freq.	%
301	IRON	3	0.05
302	LARGE	3	0.05
303	LENGTH	3	0.05
304	LEVEL	3	0.05
305	LIMITED	3	0.05
306	LOW	3	0.05
307	LOWER	3	0.05
308	MATURATION	3	0.05
309	MECHANISM	3	0.05
310	MECHANISMS	3	0.05
311	MEMBRANE	3	0.05
312	METHODS	3	0.05
313	MMP-1	3	0.05
314	MOREOVER	3	0.05
315	MOST	3	0.05
316	NOVEL	3	0.05
317	ONE	3	0.05
318	ORDER	3	0.05
319	PARAMETERS	3	0.05
320	PATHWAY	3	0.05
321	PERCEIVED	3	0.05
322	PERFORMANCE	3	0.05
323	PERMEATION	3	0.05
324	POINT	3	0.05
325	POSSIBILITY	3	0.05
326	PRESENT	3	0.05
327	PROBABLY	3	0.05
328	PRODUCE	3	0.05
329	PROTECTIVE	3	0.05
330	PROTEIN	3	0.05
331	PROVEN	3	0.05
332	RAPID	3	0.05
333	REACTION	3	0.05
334	RED	3	0.05

APPENDIX F

Examples of Cosmetic Science Abstracts

“Journal of Cosmetic Science”

Vol. 35, No. 1 January 1984		
JOURNAL OF COSMETIC SCIENCE The Official Journal of the Society of Cosmetic Chemists		
		
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115-120	Synthesis of new fragrances from 2-substituted furan <i>John Worsfold and John Lee</i>	117
121-126	Synthesis of new fragrances from 2-substituted furan <i>John Worsfold and John Lee</i>	122
127-132	Analysis by colorimetric methods <i>David J. Worsfold</i>	128
133-138	Report compiled by the annual General Assembly of the Society of Cosmetic Chemists <i>London, 18-20 September 1983 - Executive Report</i>	133

Examples of Abstracts from “*Journal of Cosmetic Science*”

Group 1: Hair Care

Various aspects of Asian and Caucasian hairs were investigated and compared. We started by studying their cuticle structures—the number of cuticle layers, width of the cuticle cells, degree of their inclination, and the interval between surface cuticle edges. As a result of this study, on about two hundred subjects for each race, it was shown that there were statistically meaningful differences between all these attributes for the two hair types. Asian hair has more cuticle layers and wider cuticle cells than Caucasian hair, and the cuticular inclination of Asian hair is steeper and its cuticular interval is narrower than in Caucasian hair. In addition, it was also found that there are differences in how cuticle cells begin to fail. Under extension stress, Asian hair cuticles fail as large pieces while keeping their original shape. On the other hand, Caucasian hair cuticles tend to collapse to form small fragments. AFM measurements revealed that Caucasian cuticles are indeed more fragile than Asian cuticles. These results suggest that the strength of cuticular subcomponents is different between Asian and Caucasian hair and that the weakest point, where stress is first absorbed, differs between races. It was proven that the cuticles of Asian hair are more easily peeled off than Caucasian hair cuticles during daily grooming. This can be attributed to the difference in how stress is absorbed.

Group 2: Make Up

Preservative efficacy testing is based on a sample inoculation using a microbial suspension with a determined amount of colony-forming units (CFU). After that, the number of survivors is investigated by periodic evaluations, and the results are compared with specifications. When liquid cosmetics are evaluated, it is easy to obtain homogeneity between the inoculum and the sample, but for a powder sample it cannot be guaranteed. In this context, freeze-dried microorganisms could be used to help the homogenization. In this research, the preservative efficacy is evaluated using a powdered eye shadow. The microorganisms used were *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Candida albicans*, and *Aspergillus niger*. The challenge tests were performed in samples with (P) or without (NP) added preservative. The methods used to evaluate the results were the ones described in the official compendia and in the cosmetics guides of international associations, also using linear regression in calculating the D-value. The results showed that it is possible to use freeze-dried microorganisms instead of suspension to evaluate the preservative efficacy of cosmetic solids. The microorganism stability was verified by the determination of the microbial load and the minimum inhibitory concentration after freeze-drying and during the following six months.

Group 3: Skin Care

Hydroxy acids have been extensively used in cosmetic and dermatologic formulations because of their satisfactory results in terms of maintaining a young and healthy skin and in recovering aged skin. The purpose of the present study was to examine whether treatment with glycolic acid, lactic acid, a fruit acids mixture, malic acid ester, or salicylic esters of lipophilic acid produces different cosmetic results and produces changes in hairless mice epidermis. Histopathologic, morphometric, and stereologic studies were carried out to investigate the possible alterations caused by formulations containing hydroxy acids or derivatives. Statistical analysis from the results indicate that, under present experimental conditions, formulations containing glycolic acid or lactic acid or a fruit acids mixture or malic acid ester acted on the epidermis, causing a thickening of the epithelium where the basal and spinous layers also showed increased thickness. The cells reached the largest volume, and the nuclei were also more voluminous. The results demonstrate that cosmetic benefits from the use of hydroxy acids are caused by modification of the skin surface, the epidermis. The hydroxy acids were more effective when compared with the control and their derivatives in a mouse model.

Group 4: Others

The objectives of the study were to explore the effects of using the water-soluble mucilage of *Monostroma nitidum* to replace the humectant and half of the thickening agent on the rheological properties, color, storage stability, water-holding capacity, and film formation time of moisture masks thus prepared. Results showed that moisture masks containing water-soluble mucilage were pseudoplastic fluids. The apparent viscosity of these moisture masks decreased with increasing shear rate but increased with increasing concentration of the aqueous extracts used. The water-holding capacity of moisture masks containing 1% aqueous extracts and 1% hydroxyethyl cellulose (HEC) were similar to those containing 2% HEC and 5% 1-3 butadiene (humectant) but better than those containing 2% methyl cellulose (MC) and 5% humectant. The film formation time of moisture masks containing different concentrations of aqueous extracts decreased with increasing concentration of the aqueous extract used. The storage stability of a moisture mask containing 1% aqueous extract and 1% HEC was similar to that containing 2% HEC and 5% humectant and better than those containing 2% MC and 5% humectant. The safety test resulted in no erythema based on the Draize score test. The pH was between 7.1 and 7.5 for all moisture masks studied.

Examples of Abstracts from “*International Journal of Cosmetic Science*”

Group 1: Hair Care

Tactile properties of cosmetic products constitute weak stimuli and thus can be expected to be easily modified by mental images. In order to enhance an intended positive-emotion-inducing effect of such a product, its experience can be embedded in a certain 'world' that generates a positive emotional imagination. The present study investigated such an influence in 12 males and 12 females, half of each being laymen and experts in sensory assessment. Two product worlds (emotional and technical) and three different hair samples, two of them treated with different shampoos and an untreated one as control, were presented to each subject in counter-balanced order of all six combinations. An objective emotional assessment using a psychophysiological technique developed in an earlier study was applied and compared with a traditional sensory assessment. Among the physiological measures, peripheral blood volume and facial muscular activity were the most sensitive in revealing effects of and interactions between the product worlds and hair samples. A multivariate evaluation of the physiological data revealed three discriminant functions that explained 78.4% of the total variance and enabled a re-classification considerably better than chance. The first discriminant function clearly separated the treated from the untreated hair samples which was not possible by subjective ratings or traditional sensory assessment. The two other discriminant functions comprised a hedonistic and a product world factor. The emotional product world exerted the largest influence in case of the weakest tactile differences between the hair samples, and its influence was larger on laymen than on experts. Gender effects were most prominent in the subjective domain. In conclusion, multivariate psychophysiological methodology is superior to traditional sensory assessment in revealing subtle differences in the tactile perception of cosmetic products.

Group 2: Make Up

The majority of adverse effects of cosmetics have been attributed to soaps in Dutch and English studies, but to eye makeup in a recent Swedish study. The reactions may be caused by irritants or by sensitizing substances. The aim of the present study was to evaluate the irritation potential of commercially available mascaras. The mascaras were exposed to the skin in aluminium chambers. The skin reaction was evaluated using both visual assessments of erythema and non-invasive measurements of the skin reaction. Seven mascaras were tested on 15 healthy individuals in a randomized and blinded fashion. Two of the seven tested mascaras induced pronounced skin inflammation, when applied to normal skin under occlusion. These two mascaras were based on volatile petroleum distillate, in contrast to the other five mascaras that were conventional emulsions with stearate as the main emulsifier. The findings suggest that solvent-based mascaras might induce contact dermatitis due to its content of irritating substances.

Group 3: Skin Care

Background: Evidence suggests that signs of skin ageing such as wrinkling, ragging and actinic lentiginosities, may be connected to cumulative oxidative damage incurred throughout our lifetimes. To counteract this oxidative injury, skin is equipped with a network of enzymatic and non-enzymatic antioxidant systems, such as tocopherols, ascorbate polyphenols. All these compounds administered topically by cosmetics or by oral route by diet supplements, have been shown to exert an antioxidant/protective effect in skin or skin cells. **Objective:** The object of this study was to evaluate both *in vitro* and *in vivo* the activity performed by different topical antioxidants and nutritional supplements. **Methods:** A randomized double-blind placebo-controlled study was carried out for 8 weeks on 30 dry-skinned elderly volunteers, women aged between 48 and 59 years, with moderate xerosis and photoageing. Surface skin lipids, skin hydration and MDA determination were topically detected by 3C System. ROS was evaluated on the blood serum and on IL-3 stimulated human leukocytes by ROS Meter System at 505 nm. All the subjects applied twice a day for 2 months a nanocolloidal gel and/or take a diet supplement by oral route at the quantity of two capsules per day. All the formulations used were antioxidant-enriched (ascorbic acid, tocopherol, alpha-lipoic acid, melatonin, emblica). **Results:** Oxidative stress and consequently lipids peroxidation decreased from 30 to 40% ($P < 0.005$) in blood serum of all the subjects treated with antioxidant compounds topically and by oral route. Both free radicals recovered in blood serum and on skin (*in vivo*) and ROS induced by irradiation of leukocytes with UVB light (*in vitro*), appear sensibly lower in subjects antioxidant-treated. **Conclusions:** From the obtained data, it seems possible to conclude that all the compounds used play interesting role as topical and systemic photoprotectants, thanks to their interesting

Group 4: Others

Dental plaque develops when early bacterial colonizers adhere to the acquired pellicle (saliva-derived proteinous coating on the tooth surface) followed by adhesion of late interspecies colonizers to form this type of biofilm (coaggregation). In developing a D-tagatose-based toothpaste, we examined 15 oral isolates, including both early colonizers (*Streptococcus* and *Actinomyces*) and late colonizers (*Fusobacterium*, *Porphyromonas*, *Prevotella*, *Veillonella*, *Capnocytophaga*, and *Actinobacillus*), and tested them for their ability to coaggregate with each other. We then tested the ability of D-tagatose to reverse any such coaggregations. Coaggregation was examined visually and scored by using a system ranging from 0, for no visible coaggregation to 4, for maximum coaggregation. D-Tagatose, at a concentration of less than 750 mM, completely reversed the coaggregation of 17 (60%) of 28 strongly coaggregating pairs (coaggregation score = 2 or higher) tested. In contrast, D-sorbitol had little reversal effect. D-Tagatose-sensitive coaggregations were D-galactose-reversible as well. D-Tagatose acted on both early and late colonizers; both groups, especially the late colonizers, were frequently involved in periodontal diseases. Thus, D-tagatose has the potential for preventing and removing plaque development and for altering the subgingival microbiota. These effective qualities offer conservative control of gingival and periodontal disease.

BIOGRAPHY

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