A REVIEW

PROGRESS IN SENSORY ANALYSIS AND CONSUMER STUDIES OF FOOD

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The review shows recent dynamics and direct ons of methodological development in multidisciplinary area of sensory analysis of food interfaced with consumer preferences and acceptance measurements. Impact of increasing knowledge of physiology and psychology of sensory perception as well as availability of advanced multivariate statistical techniques for data processing has been stressed. Applicability of the achievements in product development and in implementation of health-promoting diet is discussed.

INTRODUCTION

Food quality is a complex phenomenon, comprising safety, nutritive and sensory aspects. Sensory perception is recognized as most important determinant in food choice behaviour [Tuorila & Pangborn, 1988] and subsequent food intake, with its all consequences for consumer health and psychological satisfaction. Therefore sensory quality of food is of interest for food scientists, nutritionists as well as for food producers, marketing researchers and practitioners.

Among analytical methods applied in evaluation of food quality, sensory methods occupy a unique position. Whereas physical, chemical or microbiological methods deliver information about respective properties of foodstuff itself, sensory methods inform about how these properties are perceived by human senses. Other words, by instrumental analysis we might be informed about sensory stimuli in food — but not about sensory quality which, by definition, is human sen-

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Sory response to those stimuli and cannot be considered apart of human sensory apparatus. An implication of above is that sensory analysis is complementary to physical, chemical or microbiological analyses in describing overall food quality — but it cannot be replaced by them.

Historically, sensory analysis is a relatively young branch of food analysis. First sensory methods (discrimination tests, scoring systems) have been developed and applied in late forties for quality control in the food and beverage industries [Helm & Trolle, 1946; Plank, 1948].

It shall be noticed that Poland had its remarkable contribution in the early development of sensory analysis due to pioneering work of professor Damazy Tilgner. His book on organoleptic (sensory) analysis of food [Tilgner, 1957] is listed as a first textbook on this topic. Among his over 200 scientific papers about one third concerned various aspects of sensory analysis and its applications. The contribution of professor Tilgner to the development of sensory science was appreciated by dedicating to him the IUFoST Symposium and the book entitled “Food Acceptance and Nutrition” [Selms et al. (eds.), 1987].

Since that time sensory methodology and the area of industrial and scientific application of sensory analysis extended greatly, including beside quality control or quality assurance of foods the research and development of new products (and re-modelling of existing ones) according to recent consumer’s needs and expectancies. Together with consumer research, sensory analysis is now a powerful and widely applied analytical tool to successful marketing of foods in strong competitive environment.

Parallelly with above practical application, sensory methods became widely used in food science for studying the effects of various raw materials and processes, storage and packaging factors on the sensory quality of products or model systems. Important role in this development had the basic experimental and theoretical research on physiology, psychophysics and psychology of human sensory perception and cognitive processes, contributing to better understanding and building sound basis for methodological development.

Another important factor influencing the development of sensory methods in the last decade was wide application of multivariate statistical methods for analysis of sensory data (they got common name “Sensometrics”) facilitated by computing capacity. Since sensory phenomena are complex and multidimensional by their nature, it provided opportunities for deeper insight into processes of human perception and cognition of foods and finally for better understanding the factors which affect food choice and food consumption.

The purpose of this paper was to show recent status and trends in sensory-based methods and approaches both product-oriented (sensory analysis) and human-oriented (consumer research) separately and in their interaction. It was not the intention of the authors to give an exhaustive review; rather to point main streams of research and applications and main directions of future development in sensory science.
UNDERSTANDING PROCESSES BEHIND SENSORY JUDGEMENT

Sensory perception is a natural way of communication between human being and environment, and is spontaneous. However it is quite complex process consisting of several stages, going on from the sensory receptor level up to the central nervous system. Evaluation of sensory quality of any object (including foods) is a part of this general ability. It is required to be done in a controlled and reproducible way; therefore understanding the main features of the process is important for a sound methodological approach in sensory analysis.


It is no place here to go into details of physiology and psychology of sensory perception; however one shall bear in mind the main processes going behind sensory evaluation. According to Frijters [1993], the sensory judgement is a four-stage process:

Physical
stimulus | Perceived | Coded | Overt
concentration sensation sensation response

The physical stimulus (e.g. taste substance solution or food) stimulates one (or more) senses. The signal is transduced in the receptor cell and conducted by afferent nerves resulting in neural activity in the brain. The “raw” output from the sensory system is called “perceived sensation”, with the relationship between the physical stimulus and perceived sensation referred to as the psychophysical function.

In the encoding process, the coupling of the perceived sensation to cognitive information yields an internal representation – “coded sensation”. Since interpretation (encoding) is a necessary condition for overt response (expressed sensory evaluation), only coded sensations can be determined through sensory analysis. The coded sensations result from cognitive interpretation of sensory output, usually related to earlier experience. When the subject is asked to judge what he/she experiences sensorically, coded sensation must be translated into a response on response scale.

The system is called “judgement function” or “response output function” [Green & Swets, 1966; Anderson, 1981]. Once the sensation get coded (got some meaning), an information can be stored in the memory as a specific structure (called “knowledge structure” or “schemata”). Schemata are a kind of associative
networks around an object (product, person etc.), based mainly—but not exclusively—on sensory experience (Olson, 1981).

Interferences from external product cues (as advertising, nutritional information, brand name or usage context) can also contribute to the associative network (Van Trijp & Schifferstein, 1995). Both types of associations, direct (sensory) and indirect (non-sensory) can in turn affect the encoding process, when the subject is confronted with a similar stimulus (food product) once again.

Memory-stored information and associative networks concept plays an important role in sensory responses. Training of subjects for sensory evaluation panel (e.g. for descriptive analysis) depends in its major part on extending memory-stored sensory information and making it possibly uniform (by using reference samples, discussion etc.)—although some individuality remains as an inherent feature of human sensory system.

Apart from the above cognitive processes, affective aspects also play a role in sensory perception and sensory evaluation. For analytical sensory methods, panelists are trained to separate them and to focus on cognitive aspects. In consumer sensory evaluation affective judgment remain dominant.

DEVELOPMENT AND EVOLUTION OF SENSORY METHODS

Evaluating progress and recent status of sensory methodology, one shall notice that the concepts of recently used methods, such as difference tests (Helm & Trolle, 1946; Boggs & Hanson, 1949), scaling methods (Plank, 1948; Ekman & Sjoberg, 1955), profiling (descriptive) methods (Cairncross & Sjöström, 1950; Caul, 1957) and time-intensity procedure (Neilson, 1957)—were developed fifty or fourty years ago. Not all however were extensively used since that time.

Their further development was related, on the one hand, to the progress in physiology and psychology of sensory perception, and on the other hand—to the application of advanced, sophisticated mathematical and statistical models and methods for processing the sensory data. The former contributed to better understanding of sensory processes going on behind sensory evaluation of certain type; the latter helped to get better insight into the structure and interrelation of mostly multidimensional sensory data. As a result, more information can be extracted from the data matrix.

DIFFERENCE TESTS. Univariate sensory methods, such as difference tests required less complicated statistical interpretation. Therefore they were developed far before “computer era”. Generally, difference tests are used to detect fine sensory differences in food samples; alternatively, they may be applied for screening and training of sensory panelists [ISO Standard No 4120, 1993].
Difference methods found quite early practical application in quality control of foods and beverages, to detect deviations from the fixed standard. Human senses were used here as discriminating device, complementing other quality control procedures, e.g. chemical or physical measurement [Gridgeman, 1967]. Various difference tests are classified and described in details in many textbooks on sensory analysis [e.g. Amerine et al., 1965; Barylko-Pikielna, 1975; Piggott, 1984; Meilgaard et al., 1991].

They are commonly thought as conceptually simple and quick to perform, requiring little training of judges and having clear and stable criterion for statistical interpretation of the results. “Classical” and most common statistical approach is based on force-choice strategy (where a subject is forced to choose a sample according to the instruction even if he/she is not certain to perceive the difference) [e.g. Filipello, 1956; ASTM, 1968].

Newer studies on difference tests [e.g. Frijters, 1979; Ennis, 1990; O'Mahony, 1989; O'Mahony et al., 1994] show that they are not as simple as they were first thought. On the example of triangle test and 3-alternative forced-choice (3-AFC) test, O'Mahony [1995] discussed the effects of change in cognitive strategy, response bias and the sequence of tasting as well as application of various theoretical approaches, warning for possible dangers of pitfalls and misinterpretation of obtained results.

A new proposal of application of difference testing is a focus difference testing approach [Barbary et al., 1993]. According to the authors focus difference testing can be considered as an alternative for descriptive analysis, where series of difference tests are focused on various sensory-perceived attributes. The advantage is that less training of panelists is required. The criticism for this approach is that by such separate “narrow band” tests important information about the attributes’ interrelation is not available. It is serious shortcoming of “narrow band” approach compared with “broad band” descriptive analysis methods.

DESCRIPTIVE METHODS. In contrast to difference tests which are focused on differences in one particular attribute and thus produce univariate data, descriptive methods (syn. profiling methods) describe all sensations perceived when evaluating a product sample. Each of sensory properties, i.e. appearance, aroma, texture or flavour is described by several descriptors, which are then quantitatively measured with an appropriate scale. The resulting descriptive analysis gives a multidimensional sensory “image” of the product, descriptors being the dimensions of this structure.

There are two critical stages in the development and performance of descriptive test: (1) establishing most appropriate attributes (descriptors) for the product under consideration and (2) providing quantitative measurement of each of them. “Most appropriate attributes” are defined in part by the nature of problem to be solved, in part — by product characteristics [Aström, 1996]. According to
the problem under consideration, attributes can cover all product characteristics resulting in “overall sensory profile”, or only flavour, odour or texture giving “partial sensory profile”. The latter approach shall be applied with a caution, since inter-sensory effects are possible (e.g. some changes in textural characteristics may influence perception of flavour or odour ones).

Descriptors can be identified and established in different ways. In consensus profiling [Caul, 1957] assessors develop descriptors on the open panel session, discussing them with the panel leader who finally decides about the fixed set of descriptors for further product analysis. In Quantitative Descriptive Analysis (QDA) [Stone et al., 1974] the development of descriptors is more formalized, consisting of several steps: first each panelist individually develops own descriptors, then on open session descriptors are discussed for common understanding of their meaning, possibly in comparison to reference samples. Final set of descriptors is formed as a result of preliminary testing sessions on which discrimination power of descriptors is checked on the samples of various qualities. The precise use of language in descriptive analysis is very important, otherwise it might be a source of discrepancies especially when descriptors are translated into another language [Risvik et al., 1992]. Therefore in some version of descriptive tests, e.g. in quantitative flavour profiling (QFP) each descriptor has its precisely defined reference [Stampanoni-Koeferli et al., 1996]. The reference samples are helpful in panel training and monitoring, important for accreditation requirements [Randell, 1996].

The above semantic problems are avoided in another approach to descriptive analysis — free choice profiling (FCP) [Williams & Langron, 1984]. In this procedure, the training of panelists is not required; each subject uses his/her own descriptors and mark their intensities. Subsequent processing of resulted data by a proper multivariate technique (most frequently by General Procrustes Analysis — GPA) constructs lower-dimensional maps identifying the groupings of individual descriptors which commonly discriminate and characterize the investigated samples [e.g. Raats & Shepherd, 1992].

QDA and other multidimensional sensory methods produce large amount of data in which much information is hidden together with some (unknown) portion of “noise”. Extraction of this information concerning both the material being investigated (samples) and the tool (subjects, panel members) and their interrelation is possible only by the application of multivariate statistics, now available in a large variety with no barrier in computing capacity.

To get good understanding of the voluminous information, its reduction to reasonable size is necessary. In QDA data matrix of 15–20 attributes for each sample is usual, sometime more. Most of them are interrelated, some overlapping and some may be unique. Reduction of this information is usually performed by one of the multidimensional data analysis methods. Principal Component Analysis (PCA) is here an example. It is widely used as it fits very well for sensory profiling data and at the same time illustrates some more fundamental concepts involved in the analysis [Risvik, 1996].
Many other statistical procedures as Multidimensional Scaling (MDS), Partial Least Squares (PLS), General Procrustes Analysis (GPA), Cluster Analysis (CA) and their modifications are used as well. Their application generally leads to similar conclusions for most of them are based on the same abstract model of multi-dimensional Euclidean space [Matuszewska et al., 1991/92].

**Comparability of Profiling Results.** Recent development of sensory methods and procedures and statistical multivariate techniques to process and compare different sets of sensory results, make possible to study the question of comparability of the results obtained by different sensory panels (sometime in different countries) when the same samples are analysed. Of a special interest are results of descriptive (profiling) analysis as they are very complex, based on verbal descriptors which might be differently understood, thus — exposed to potential variation more than simple tests (e.g. difference ones).

There are only few studies on inter-comparison of profiling data from different panels. In the study reported by Heymann [1994] descriptive analysis of vanilla samples was performed by two independently trained panels. GPA was used to fit the two data spaces; it showed considerable overlapping for similar descriptive tests. In another study, profiles of five chocolates were established by two panels located in Norway and UK [Risvik et al., 1992]. Principal Component Analysis and General Procrustes Analysis were performed on two sets of the data and sample spaces derived from each laboratory, compared. Partial least square (PLS) regression was applied for inter-calibration of the data in two laboratories, against each other. Results indicated that the sample spaces for both panels were similar.

The results of large interlaboratory study on descriptive analysis of 16 ground coffee samples performed by 11 laboratories in 8 European countries has just been published [ESN, 1996]. The study was initiated and performed by the members of European Sensory Network. It has been concluded that in terms of sample structure the common European vocabulary based on thirteen attributes shows good similarity to the individual panel results. These attributes reflect key information from the European coffee profiles and have significant discrimination power [Schlich, 1995].

**Time-Intensity Measurements.** Among the sensory methods, time-intensity (T-I) procedure occupies a special position: it is the only one which allows for quantitative measurement of intensity changes of a given sensory characteristic due to time. The concept of T-I is founded on the assumption that intensity and time are two independent dimensions of sensory space. Thus, by tracing the changes in the intensity of sensation with time one can much better characterize it than just by measuring its maximum intensity, being the case of other sensory methods.
The T-1 curve allows to read the following data: (1) time to appearing the measurable sensation — “lag time”, (2) time to reach the maximum intensity, (3) rate of appearance, (4) the maximum intensity, (5) rate of extinction, (6) total duration of the sensation, (7) area under the curve (informing about the “body” or “volume” of the sensation).

Of course, all these information are to be extracted after completing T-1 evaluation. During T-1 measurement, the panelist (subject) focuses his/her attention entirely to tracing the sensation intensity and its possibly precise recording. Special training of judges is needed to develop their instant reflex to coordinate perceived intensity of sensation with a hand movement along the scale. One should remember that in most cases the whole sensation time is less than 1 minute.

With the development of computerized systems for data collection T-1 method got excellent facilities to perform and became to be more widely used. The experience was gained in its application to study the sensory phenomena in model systems and in foods and beverages. The experience has shown the potential of the method — but also pointed out its weak points and difficulties to obtain reliable and meaningful information.

One of the serious difficulties in T-1 measurements is inter-person variability of panelists, expressed both by differences in the shape and magnitude of individual curves. Even after training, individual T-1 curves remain different (although internally repeatable), being kind of “finger print” of the individual. The problem of individuality of T-1 recordings was studied by many authors. Issanchou and Porcherot [1992] calculating noise/signal ratio in all T-1 parameters concluded that T-1 evaluation is very difficult for subjects, even after intensive training. Panelist’s recording reflects not only intensity changes in the attribute of question but also his/her personality.

This individual variability has risen a question about its background. One of possible sources could be the testing procedure, not standardized enough. Many factors may contribute to the variability (sample volume, sample temperature, duration of the sample contact with the receptors area, swallowing or expectorating etc.). Therefore, thoroughly standardized procedure of testing is required to obtain reliable output [Matuszewska & Barylko-Pikielna, 1995].

Averaging of individual curves in T-1 recordings is another problem. It was studied in details by several authors. The preliminary proposal of averaging [Overbosch, 1986] was then improved and advanced [Liu & MacFie, 1990; Van Buuren, 1992].

Despite some methodological difficulties, T-1 method may provide very useful information not available by any other sensory method. There are quite many examples in the literature of application of T-1 method to analyse fluid samples [e.g. Birch & Ogunmoyela, 1980; Van Buuren, 1992] as well as solid foods [e.g. Barylko-Pikielna et al., 1990; Hellemann et al., 1990a]. All they contribute in gaining more experience in this unique method, as yet not fully explored.
METHODS AND APPROACHES IN CONSUMER STUDIES

The presented sensory methodology has its counterpart in consumer (affec­tive) methods. As it has already been mentioned, these methods are human-orien­ted, delivering information about the reaction of consumers on particular food­stuffs or their group and about factors behind this reaction (consumer evalua­tion).

The results of many studies [Schutz & Wahl, 1981; Tuorila, 1987; Tuorila & Pangborn, 1988; Matuszewska & Issanchou, 1995; Uramowska-Żyto et al., 1996; Kulczycka, 1996] show that sensory quality of food is a main decisive factor in food choice and food consumption. Consumer evaluates it in affective terms and makes the decision. Understanding and prediction of consumer behaviour towards food on the basis of specific consumer tests is an area of interest for nutritionists, marketing people and developers of new food products.

Among the methods applied in consumer studies of food, several methods of various objectives should be mentioned. They fall into two groups.

To the first group belong the methods that measure the consumer preferences, acceptance and degree of liking in different conditions (laboratory tests, central location tests, home-use tests). In these methods consumers express their opinion (in affective terms) based on the evaluation of food samples of interest in certain conditions. The information about the requirements for representative consumer groups, testing conditions and detailed testing procedures, the reader can find elsewhere [e.g. Meilgaard et al., 1991; Matuszewska, 1992].

In general, two types of methods are used for these purposes: (a) difference testing based on preferences (Questions: “Which sample do you prefer?” “Which sample do you like better?”); perceived difference in “liking” is here a criterion, and (b) degree of liking tested with the hedonic scale [Peryam & Pilgrim, 1957; Amerine et al., 1965], when consumer categorises his/her degree of liking usually on 9-point category scale, or marks it on linear scale anchored on extremes “dis­like very much” and “like very much”. By using the latter scale, semantic difficulties in describing each score are avoided. It is important, especially when interna­tional consumer studies are carried out [ESN, 1996]. A modification of classic hedonic scale is “relative-to-ideal” hedonic differentia­tion scale, used quite frequently by some authors [McBride, 1982; Shepherd et al., 1988a, 1989a].

A different approach to the estimation of degree of liking or searching for “ide­ally liked” sample represents “ad libitum mixing” method, when the subject manipulates the sample by adding a critical component (e.g. salt to the bullion or fat to the milk) to obtain maximal liking degree [Pangborn et al., 1985; Tuorila et al., 1990].

In studies on consumer preferences, degree of liking or acceptance, the above methods are usually accompanied by a short questionnaire with the questions on demography, food consumption frequency and “pleasantness by name” [e.g. Hellemann et al., 1990], where consumers rate their degree of liking for products
and brand names listed on the sheet. The same hedonic scales as for product evaluation are applied.

The second group comprises the methods that measure the consumer motivation, beliefs, attitudes and behaviour related to food. For nutritionists trying to implement health-promoting diet and for marketers trying to predict the product success on the market, it is important to have not only an information about the behaviour in food choice and eating but also — or maybe primarily — about the motives behind this behaviour.

Many factors related to consumer as an individual, food, and context (purpose or situation in which food is going to be consumed) may affect individual choice and acceptance of food. In the last decade many methods and models used in sociopsychology have been adapted to investigate them separately and in interaction [Shepherd, 1989]. Among them Fishbein and Ajzen model is most widely used [Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980]. The model incorporates the measures of such components as beliefs, attitudes, behavioural intention and behaviour. In the case of food choice such behaviour means buying or eating particular foods or types of foods. According to the theory of reasoned action of Fishbein and Ajzen [1975], a person’s behavioural intention can be predicted from his/her attitude towards the behaviour on the one hand, and from his/her subjective norm, i.e. the perceived pressure from important reference groups, on the other [Tuorila, 1990a]. The Fishbein and Ajzen model has shown a good prediction of behavioural intention from the attitude and subjective norm components. The attitude to behaviour component has generally been found to have greater predictive power than the subjective norm [Shepherd & Stockley, 1987; Shepherd & Farleigh, 1986; Tuorila, 1990a].

In the studies on the role of beliefs, attitudes and behaviour in food choice special questionnaires based on the components of Fishbein and Ajzen model [1975] are used. The questionnaires contain questions (statements) assigned to the individual components of the model. The respondents (consumers) evaluate the statements on 5, 7 or 9-point scale suitably anchored. Multiple and simple correlations between the individual components of the model and calculated correlation coefficients allow to answer the question whether and to what extent individual consumer’s beliefs and attitudes predict behavioural intentions and a behaviour itself.

In the last decade Fishbein and Ajzen model has been used in several studies on food choice, especially on low-fat foods [e.g. Shepherd & Stockley, 1985; Shepherd, 1988; Tuorila, 1987; Tuorila & Pangborn, 1988a; Daillant & Issanchou, 1993; Aaron et al., 1994; Matuszewska et al., 1996].

Stafleu et al. [1991/92] reviewed other than Fishbein and Ajzen sociopsychological models that have been used to explain human dietary behaviour (associated with fat and cholesterol intake). Most often used models and theories are: health belief model [Becker et al., 1977], social learning theory and social cognitive theory, locus of control and Triandis’ model.

Four basic components of the social learning theory utilised in the prediction
of behaviour are behavioural potential, expectancy, reinforcement value and psychological situation [Rotter et al., 1972]. Bandura re-named social learning theory to a social cognitive theory [Bandura, 1986]. Lewis et al., [1989] applied a social cognitive model for studying the frequency of food consumption. Path analysis or structural regression was used for data analysis.

Locus of control is an important aspect in Rotter's social learning theory. The health locus of control theory suggests that some people tend to place the primary responsibility (locus of control) of the health outcomes of their behaviour within themselves, while other people tend to believe that their health is caused primarily by external circumstances or people outside their own control [Contento & Murphy, 1990]. Three loci of control orientations have been identified [Wallston et al., 1978] and described by Eden et al. [1984]. There are: (a) internal locus of control, (b) external locus of control by “powerful others”, and (c) external locus of control by chance. Locus of control theory has been used in some studies connected with acceptance of food [e.g. Tuorila & Pangborn, 1988a; Hellemann et al., 1990].

The model of Triandis has the same principles as that of Fishbein and Ajzen [1975]. The most striking difference is the inclusion of habit and facilitating conditions. Facilitating conditions regulate the impact of habit and intention [Tuorila & Pangborn, 1988, 1988a].

Common techniques used for the quantification of attitudes include the registration of physiological responses, verbal scales/items and observation of overt behaviour. Typical and most useful is the verbal measurement. In food-related literature the most common is technique described by Likert [1932]. In this technique, respondents evaluate in special questionnaires (on 5- or 7-point scale from disagree to agree) verbal statements, which are a measure of their attitudes.

Food selection, like any other human behaviour, is complex. Most likely, simple models cannot describe such complex processes. Therefore, interaction models, such as the social cognitive model, seem promising. The eating context (other foods and situational factors) should be also considered in future models [Tuorila, 1990a]. Variety of quantitative and qualitative (e.g. focussed group interview) methods and approaches shall be used to get better insight into these complex psychological phenomena [Tuorila, 1990a].

Summarizing, the last years research on the relationship between attitudes, preferences and food choice has made substantial progress. New approaches and models have improved our understanding of the role of attitudes in food selection. However, it is admitted that studies of the subject are still at the early stage [Tuorila, 1990a]. Food choice models tell us something about what is currently influencing people's choices of food; their usefulness in affecting changes in food choices and dietary behaviour toward health-promoting one remain to be investigated [Shepherd, 1995].
CORRELATING SENSORY RESULTS WITH CONSUMER PREFERENCE DATA

Having on one side sensory results for certain products (product(s) of interest accompanied by market counterpart ones, including the best “number one” product) from quantitative descriptive analysis (QDA), analysed by one of multivariate statistical technique (e.g. PCA) and on the other side consumer preference data (e.g. from central-location test) for the same products processed and displayed as preference map [Greenhoff & MacFie, 1994; Schlich, 1995] — the first set of data (from QDA) can be superimposed on the preference space of the second. It shows position of each analysed product against the area of highest preference or segmented preferences and attributes most important for consumers degree of liking [MacFie et al., 1995]. Reasonable conclusions can be drawn about sensory target quality of the product of interest to be obtained by its reformulation or new development. This approach is though as new and more efficient direction of common R&D and marketing research, based on scientifically justified methods and approaches of high predictive value [Bomio, 1995].

It is also important for nutritionists to develop strategy for successful implementation of health-promoting foods and whole diet.

Concluding, the review showed recent dynamic progress of multidisciplinary field: sensory analysis of food interfaced with methods of consumer preference and acceptance of this food. Its scientific and practical application in the development of new foods, satisfying consumer expectances and nutritional needs is on its beginning. It certainly will advance in the near future.

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POSTĘP W ANALIZIE SENSORYCZNEJ I BADANIACH KONSUMENCKICH ŹYWNOCI

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Analiza sensoryczna zajmuje wśród metod analizy żywności szczególne miejsce, ponieważ analizuje jakość żywności poprzez percepcję jej atrybutów przez człowieka. Przedstawiono przegląd głównych grup analitycznych metod sensorycznych oraz metod konsumenckich i ich zastosowań, oraz ich rozwoju, w szczególności w ostatniej dekadzie. Głównymi wyznacznikami tego rozwoju jest lepsze zrozumienie fizjologicznych i psychologicznych podstaw tych metod, oparte o rozwój badań podstawowych oraz zastosowanie zaawansowanych wielowymiarowych metod statystycznych do analizy i interpretacji wyników. Dzięki tym ostatnim możliwe jest „nakładanie” wyników analizy opisowej (profilowej) na mapy preferencji konsumenckich, co stanowi ważne analityczne narzędzie prognozyczne przy opracowywaniu nowych produktów, w tym produktów pozwalających realizować prozdrowotny model żywienia.