

The Use of Traditional Nutritional Wisdom in Modern Nutrition Research – Thoughts on Some Important Sources of Information for Nutritional Epidemiology

Ulrich Oltersdorf

Überarbeiteter Vortrag, Heidelberg 24.–27.3.93, XI. Int. Fachkonferenz Ethnomedizin / 2. Europ. Kolloquium
Ethnopharmakologie: Heilmittel und Nahrungsmittel aus ethnopharmakologischer Sicht

Summary

Nutrition research looks for answers to questions like "Why we eat, what we eat, when we eat, and what will be effects on our functions and to our health?". Since everybody has to eat daily several times, there are countless daily nutritional experiments. Mankind had to select rather carefully what could be edible in order to survive and to develop. There is a natural sense of neophobia; but men's capabilities for inventions and their curiosity increase the potential and to spread into all ecological zones. Man can eat almost all plants and animals and there are very different human food habits. Research which evaluates traditional food habits and makes use of the experiences of such indigenous nutritional experiments is still scanty. The potential benefits of such modern nutrition epidemiology research are shown by some examples.

Zusammenfassung

Die Ernährungswissenschaft versucht Fragen wie "Warum essen wir was wir essen, wenn wir essen, und welche Wirkungen zeigt dies hinsichtlich unserer Funktionen und unserer Gesundheit?", zu beantworten. Da jeder Mensch täglich mehrmals isst, gibt es zahllose alltägliche Ernährungsexperimente. Die Menschheit mußte ziemlich sorgfältig Edibles auswählen, um überleben und sich entwickeln zu können. Es gibt eine natürliche Angst vor Neuem (Neophobie), doch Menschen haben auch Erfindungsgabe und Neugier; diese Eigenschaften vergrößern das Lebenspotential und die Ausbreitung in alle ökologischen Zonen. Menschen sind fähig, beinahe alle vorkommenden Pflanzen und Tiere als Nahrung zu nutzen, es gibt sehr viele verschiedene Ernährungsgewohnheiten. Forschungen, die die traditionellen Ernährungsgewohnheiten evaluieren und die somit die Erfahrungen aus den alltäglichen natürlichen Ernährungsexperimenten nutzbar machen, gibt es bisher nur recht selten. Das Potential, das durch moderne Ernährungsepidemiologie-Forschung zu erschließen ist, wird anhand einiger Beispiele umrissen.

What is the interest of a food habit researcher in the topic of traditional nutritional wisdom? The answer is related to a general task of nutrition research to ask: "Why we eat, what we eat, when we eat and what will be the effects on our functions and to our health?". Since everybody has to eat daily several times, there are countless daily nutritional experiments, and this occurred during the whole evolution of mankind. Everybody might have 1.000 meals per year accumulating close to 100.000 during lifetime. Obviously there is less use of these ordinary daily experiences.

It can be taken for granted that everybody has to watch rather carefully what he can eat, because eating means ingesting of exogenous material and thus it is risky in principle. During former times the empowered were anxious about it and introduced food quality control measurements by human experiments, they employed "King's Tasters" (Vorkoster). Therefore on one hand men try

to avoid new food, thus neophobia is a strategy to reduce the risk. On the other hand we are aware, men are very curious. The neophilia enables our potential to survive and to spread all over the world. Humans can eat almost all plants and animals; humans are living in all geographical and climatic regions. Overall there are very different food habits amongst the world population, but in specific living situations and specific ecological habitats, one can observe rather stable food habits.

These considerations lead to thoughts on indigenous experiences on food quality. Food quality is not an entity; it appears as a diverse topic (Fig.1). Regarding some aspects of it the "eating human" is able to perceive rather short range experiences and evaluations, e.g. the organoleptic sensoric properties, the economical value, the time usage, the handling of foods and even their wholesomeness. Here men's own experiences are valid, but these individual evaluations change during life

time; e.g. what tastes ugly, bitter and hot for a child, might be preferred as an adult. It is remarkable that sweet sensation is in human the primary taste. Sweetness is important for the selection of easy available energy. Simple sugars in ripe, sweet fruits are absorbed quickly. In contrast bitter (and sour) taste can be recognized as common warning signals for toxic substances.

Other values of food quality (Fig.1), like the relation to health and longevity, or the ecological value, cannot be gathered by individual experiences. They are given externally to the society as norms by scientists and experts.

Why is it worth looking onto traditional food habits? Obviously our ancestors were at least able to survive, otherwise mankind would have been extincted already. What are the mechanisms of proper food selection? Is there an instinct in food selection?

It is interesting to recognize, that despite of different food habits the nutrient intakes in most human population groups are rather similar, as the examples of nutrient intakes of vegetarians and non-vegetarians are illustrating (Fig. 2). The human evolution shows different distinct types of food selections. The early ancestors collected

foods as hunters and gatherers. They ate a huge variety of plants and animals, which lead to an equal distribution of risks. After the neolithic revolution humans concentrated their food efforts on certain species, which promised to them a good balance of positive constituents (the nutrients), whereas the secondary substances (allelochemicals) especially the toxicants should be reduced. This lead to the domestication of crops and animals. In every society knowledge on food and nutrition accumulated, which was transmitted from one generation to the next mainly by oral communications.

During the third step of evolution, the industrialization, the concentration on fewer food staples progressed. Today we have an impressive variety of few basic food products; in Germany two thirds of total food intake is derived of five commodities, that are wheat, sugar, cow's milk, pig and potato. There is a very impressive accumulation of expert knowledge on these foods and their nutrients. Nowadays the external multi-disciplinary recommendations on food quality are manifold and diverse. There is a kind of "Fordism" in dietary guidelines and rules on food quality given by the different scientific disciplines

Fig. 1: The scientific disciplines involved in human nutrition research and their different evaluation standards

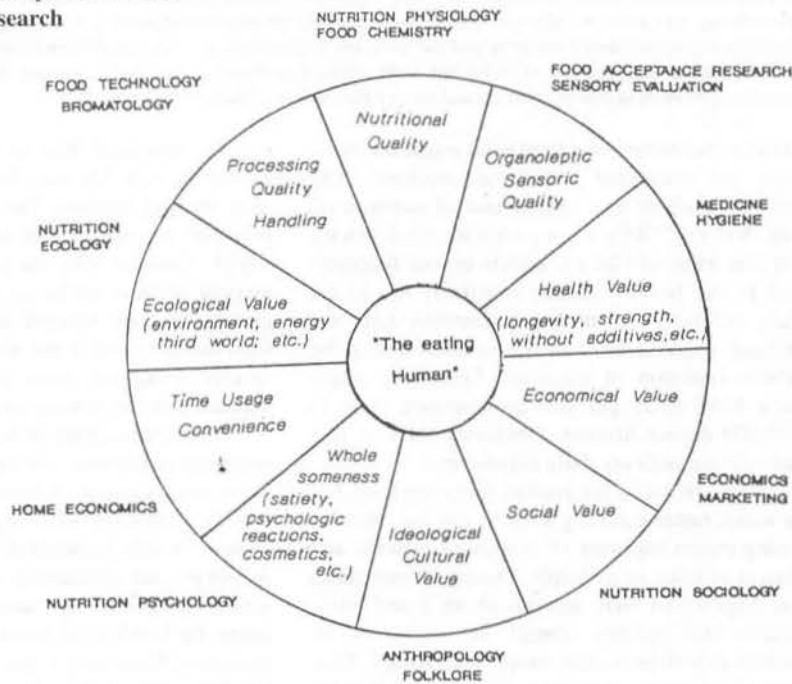
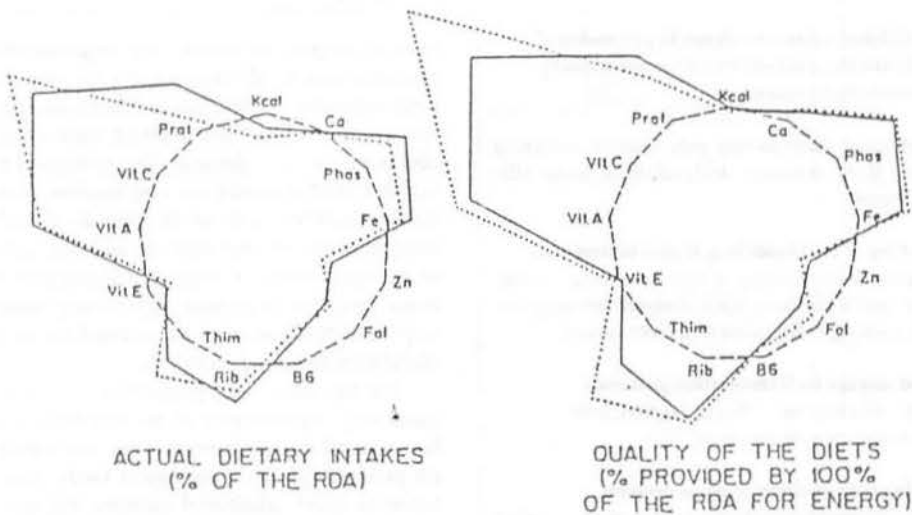


Fig. 2: Examples of the similarity of nutrient intakes of vegetarians and non-vegetarians

Berlin Vegetarian Study

	Vegetarian	Non-Vegetarian
	(in percent of total caloric intake)	
Fat	38,2	38,4
Carbohydrate	47,0	42,5
Protein	12,8	14,2
Alcohol	1,9	4,9

Seventh Day Adventists in the U.S.A.



Reported 24-h dietary intakes of vegetarians and omnivores.
 --- RDA, ··· 24-h dietary intakes of vegetarian women, and ———
 24-h dietary intakes of omnivorous women.

involved (Fig. 1). They are overwhelming men's own internal experiences; if there is still left a kind of food instinct, today its influence has diminished completely. The distance between the individual human and its foods is steadily increasing leading to a considerable loss of internal experiences of the "Eating Human". The development of nutrition research lead to the attitude old experiences are useless or even wrong. The few examples of comparison of traditional dietary guidelines with modern ones, show their similarity. In Fig. 3 there are examples for beneficial traditional food habits which has been proven by modern nutritional sciences. It has to be pointed out that this is a positive selection; in all areas of the world there are also negative food habits. One should be aware, even a scientist can draw wrong conclusions.

Other interesting research topics are related to the traditional mechanisms of dealing with (environmental) food toxins (Fig. 4). The already above mentioned strategies in food selections have

Fig. 3
Examples for beneficial traditional food habits
(proven by modern nutritional sciences)

– **Breastfeeding**

– **traditional Asian techniques in processing of soybeans** (removal of toxic constituents by microbiological processes)

– **cooking of maize in clay pots** (calcium-containing waters) (Latin America: liberation of bound vitamin niacin)

– **cooking of acid foods (e.g. fruits) in iron pots** (increased bioavailability of iron – in Africa; similar: "rusty" nail in apples – North America; referring calcium: cooking of fish (bones) in green leaves)

– **food storage by fermentation processes** (in all world regions; – cheese, yoghurt, kefir, ... ↓ Sauerkraut; brewing processes, etc.)

– **eating combinations of plant proteins** (increased biological values: cereals – are lysine-poor and methionine-rich, legumes – are lysine-rich and methionine-poor; essential amino acids;) **maize-beans-dishes in Latin America** **rice-beans-dishes in Asia.**

Fig. 4
Traditional mechanisms of dealing with environmental and food toxins

Physiological:

- chemical senses: gustation, taste, olfaction, allergic reactions
- detoxifying enzymes (in liver, gastro-intestinal tract; includes – microbiological flora; protective substances in food)
- vomiting, diarrhoe

Behavioral:

- neophobia
- sensoric-specific mechanism (chemical senses; geophagy; instinct?)
- conditioned responses (cultural norm; disgust)

Technological (food processing):

- heating (cooking, boiling, roasting, frying)
- soaking (solution)
- absorption (dietary fiber, clay, charcoal)
- pH changes (acid)
- drying
- mechanical (peeling, pounding, grinding)
- fermentation

Biological:

- domestication
- selection
- breeding

twofold targets, to increase the bioavailability of nutrients and to decrease, even to remove, the toxic substances. These last for the human harmful substances are from the point of view of species necessary for their defense. The biological meaning of a seed is related to continuation of life of the own species, and not in using as a feed or a food. If mankind decreased the internal resistance of the food species in order to increase their nutritional qualities, it became increasingly important to protect the food crops by external use of artificial chemicals (e.g. pesticides).

The traditional food preparations are in several cases very sophisticated as modern food research has verified. Good examples one can identify in the processes of fermentations of foods, which are found in many traditional cultures. Fermentation of milk (cheeses, yoghurt, kefir, etc.) are not only preserving the food, but also increasing protective substances. Another array of such examples are the traditional soybean processing methods in

Fig. 5

Examples of research areas for nutritional sciences using traditional food habits

- **variations in human food intake**
(“novel food”/ edible vs. non-edible biological matter; detoxification, food safety)
- **variations in human nutritional requirements**
(biochemical individuality)
- **potential of human adaptation, relation of (inadequate) food habits to**
 - physical and mental functions
 - e.g. (food) energy deficiency in relation to
 - working efficiency,
 - fertility,
 - utilization of undigestible carbohydrates.
- **protein deficiency in relation to**
 - adaptation of intestinal microflora,
 - infections,
 - mental functions.
- **gaining of hypothesis in nutritional disorders (nutritional epidemiology), e.g.**
 - assessment of nutritional deficiencies
 - hypothesis in nutrition and cancer
(Mycotoxins; dietary fiber; lipids)

Asian households. Again preservation, removing of toxic substances, improving digestion and bio-availability of nutrients (e.g. providing vitamin B12 in traditional vegetarian diets) are the results of such traditional food preparations. It is still a miracle how efficient people could develop such good food practices.

These few hints should lead finally to some further thoughts on the possible research areas for nutritional sciences by making more thorough use of traditional food habits (Fig. 5). This research can only be done by interdisciplinary studies. The investigations have to be carried out within the society. The appropriate methods are developed in the field of nutrition epidemiology; this empirical discipline is emerging and tries to collect informations of the myriad of daily nutritional experiments of humans. This is in the sense of a traditional Chinese proverb: “Start with that, what the people already know. Base on that, what they already possess.”

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Keywords: Nutrition research, traditional nutritional wisdom, food habits, epidemiology

Schlagwörter: Ernährungswissenschaft, traditionelle Ernährungsweise, Ernährungsgewohnheiten, Epidemiologie