SINO-GERMAN WORKSHOP ON FOOD AND NUTRITION – STRATEGIES AND RESEARCH
中德食物营养研讨会
BEIJING, NOV. 30 – DEC. 01, 2017

Final report compiled and edited by Dr. Marco Roelcke, DCZ
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Executive summary

- On Nov. 30 and Dec. 01, 2017, the German-Chinese Agricultural Center (DCZ) conducted a “Sino-German Workshop on Food and Nutrition – Strategies and Research” at the Chinese Academy of Agricultural Sciences (CAAS).
- The Workshop was a major event during the “3rd Sino-German Agricultural Week” (Nov. 27 – Dec. 01, 2017) and the second major activity of the DCZ under the broad topic of food and nutrition.
- The Workshop was jointly organized by the Foreign Economic Cooperation Center (FECC) of the Chinese Ministry of Agriculture (MOA), the Department of International Cooperation of Chinese Academy of Sciences (CAAS) and the Institute of Food and Nutrition Development (IFND) of MOA, CAAS, in cooperation with the German-Sino Agricultural Science & Technology Cooperation Platform.
- It was sponsored by the Department of International Cooperation of MOA and the German-Chinese Agricultural Center (DCZ).
- Eight German and ten Chinese invited speakers from different German and Chinese institutions gave presentations and altogether 110 persons attended the 1½ day workshop.
- Two keynote-presentations dealt with an Overview of the Max Rubner-Institute (MRI) and the Importance of fruits and vegetables in healthy nutrition, and with a Profile of Food and Nutrition Development in China – Achievements and Outlook.
- On Day 2 of the Workshop (Dec. 01), a structured discussion took place at the IFND of MOA, CAAS, first as plenary session, then split into four different groups, with the aim of developing new ideas/options for future joint bilateral research collaborations and finding corresponding partners.
- The Workshop has strengthened the mutual awareness of scientists and officials from both countries about the tasks facing each side which in many cases necessitate joint approaches in tackling similar issues.
English language report

Background

During the G20 Agricultural Ministers Summit on January 22, 2017 in Berlin, the Chinese Agricultural Minister, Mr. Han Changfu brought forward to his German counterpart, Dr. Christian Schmidt, the idea to carry out a joint workshop emphasizing “nutritional issues” (Nährwert). Both Ministries assigned the task of organizing the Workshop to the German-Chinese Agricultural Center (DCZ) later in the year 2017.

With advances in China’s development, great changes in China’s agriculture and food production and the emergence of a middle class with diversified consumption habits, new challenges in the field of food and nutrition have emerged in recent years. These include an increase in so-called lifestyle diseases (obesity, diabetes, cardiovascular diseases, poor physical fitness, etc.), an increasing number of food scandals (contamination, false labelling, etc.), as well as very high proportions of food loss and waste. Germany and China are increasingly dealing with similar issues regarding consumer health protection in the nutritional sector. Globalized trade of food products is forcing trade partners to harmonize their standards and labelling. As a reaction, amongst various initiatives, both China and Germany have recently set up new institutions specializing in this field. Chinese agricultural policies are addressing these and other issues under the overall umbrella of “Supply-side structural reform”.

Scope of workshop

Beginning in May 2017, during preparatory meetings between the Foreign Economic Cooperation Center (FECC) of the Chinese Ministry of Agriculture (MoA), the Institute of Food and Nutrition Development (IFND) of MOA at the Chinese Academy of Agricultural Sciences (CAAS), as well as the Counsellor for Food and Agriculture at the Embassy of the Federal Republic of Germany in Beijing, the main theme of the proposed workshop was defined as: “A strategy for ensuring the development of nutritional agriculture and food safety”. Under this theme, four topics were outlined by the Chinese side (FECC and IFND of MOA, CAAS):

(i) Food nutrition management-administrative framework and policy perspective
(ii) The changes in food nutrition consumption trends and agricultural structure
(iii) Agro-food nutrition quality assessment and functional evaluation
(iv) Nutrient-sensitive agricultural development.

Based on the theme and topics suggested by the Chinese side, the German Ministry of Food and Agriculture (BMEL) elaborated an outline on the German side for a workshop focusing on “Strategies of Nutrition Policies”, highlighting a range of topics under two sections (see below). The aim was to bring specialized institutions, researchers and policy makers of both countries together and to exchange on their focal topics and views. As a result of the exchange further in-depth cooperation in this field would be discussed.

Partners

On the Chinese side, the FECC, jointly with the IFND of MOA, CAAS, were put in charge of organizing the Workshop on the Chinese side, in close communication with Division of Bilateral Partnership, Department of International Cooperation of CAAS. On the German side,
the Science Advisor at the German-Sino Agricultural S&T Cooperation Platform of DCZ was designated by the BMEL as person in charge of preparing this workshop. Among the German institutions, the Max Rubner-Institute (MRI) and the Federal Centre of Nutrition (BZfE) were expected to contribute substantial parts of the expertise. A consensus was reached by both Chinese and German sides on the overall goal and four main topics to be dealt with at the Workshop.

**Overall goal**

The overall goal of the Sino-German workshop was “Improving Food Quality” and “Strengthening Nutrition Competence”.

**Specific Goals and outputs**

- Scientists and policy makers of both countries obtain a good mutual understanding of the respective policies, instruments and scientific approaches.
- Options for research cooperation are identified and formulated for further consideration.
- A draft policy brief is formulated summarizing the findings for higher level policy makers.

**Sections and Topics**

**Section 1: Administrative Framework and Policy Perspectives**

**Topic 1:** Food and Nutrition Policies and their implementation in Germany and China

Main aim of Nutrition Policies is to promote a health-oriented “Life- and nutrition style” by targeting consumers at their nutrition behavior and fostering changes. This topic was to be closely related to several BMEL initiatives put in place in providing food information, fostering education and knowledge transfer about nutrition and food preparation and motivation. For Topic 1, the newly-founded Federal Centre of Nutrition (Bundeszentrum für Ernährung, BZfE) was to be closely involved for the selection of speakers on the German side.

**Section 2: Scientific Exchange**

Here the focus was to lie on information exchange on “Food Quality”, covering a number of relevant issues related to the huge area of Food Supply, Nutrition, Health, Labeling, etc. The Max Rubner-Institute (MRI), one of the German Federal Research Institutes under the auspices of BMEL with the focus on nutrition and food research in the light of consumer health protection in the nutrition sector, would be in lead for identifying speakers on the German side for Topics 2-4. These topics also constituted areas of specific interest by the German side for cooperation and information exchange.

**Topic 2:** Nutrition content/evaluation of agro-products and food, including nutrition criteria and labelling issues

**Topic 3:** Food quality aspects, stability testing along the entire food value chain, and shelf life

**Topic 4:** Authenticity and traceability of food and beverages - a global challenge.
Timing

By September 30, 2017, each side (Chinese/German) would identify suitable speakers on their side for the above-mentioned topics. These were then jointly agreed upon.

The workshop was held over a two-day period (Nov. 30 - Dec. 01, 2017) in the framework of the 3rd Sino-German Agricultural Week (Nov. 27 - Dec. 01, 2017) in Beijing.

Financial aspects

The Workshop was jointly sponsored by Department of International Cooperation of MOA and DCZ. Each side covered its own experts (international/national travel costs, accommodation in Beijing). Joint costs were evenly split between the German (DCZ-GIZ) and the Chinese (FECC) sides.

Persons involved during Workshop preparation and organization

The following persons were involved or acted as contact persons during the preparation phase of the workshop:

Foreign Economic Cooperation Center (FECC):
Mr. Tang Zhishao, DCZ Director Chinese side;
Mr. Xie Dongsheng; Ms. Zhang Tianyu

Division of Bilateral Partnership, Department of International Cooperation, CAAS:
Dr. Chen Tianjin, Deputy Director

Institute of Food and Nutrition Development (IFND) of MOA, CAAS:
Assoc. Prof. Dr. Huang Jiazhang, Director of Research Management Department;
Dr. Tang Zhenchuang; Dr. Zhu Hong; Dr. Lu Shijun

BMEL Division 212 Nutritional Prevention, Nutritional Information:
Mr. Eric Jürgensen

Federal Centre of Nutrition (BZfE):
Dr. Hanns-Christoph Eiden, President of the Federal Office for Agriculture and Food (BLE)
Max Rubner-Institute (MRI) (Federal Research Institute of Nutrition and Food):
Dr. Sara Kranz, Research Coordinator;
Dr. Bernhard Trienweiler, Department of Safety and Quality of Fruit and Vegetables.

German-Sino Agricultural Science & Technology Cooperation Platform:
Dr. Marco Roelcke, Science advisor German side;
Prof. Dr. Zhang Bin, Science advisor Chinese side

Workshop Programme

Due to an uneven distribution of the presentation topics submitted by the German and Chinese participants, it was decided during programme preparation to abandon the original concept mentioned above consisting of the four topical blocks. Instead, a generally alternating order between Chinese and German presentations was arranged. For the detailed schedule, please consult the Workshop Programme in the Annex to this report.
Day 1 of Workshop (November 30, 2017)

Morning Plenary Session: Opening statements, group photo, coffee break

On the first day, the Workshop was held in the Main Building Meeting Hall of CAAS. The Opening Statements were chaired by Prof. Dr. Wang Dongyang, Deputy Director of the Institute of Food and Nutrition Development (IFND of MOA, CAAS). Four opening statements of five minutes each were delivered by Prof. Dr. Wu Kongming, Vice president of Chinese Academy of Agricultural Sciences (CAAS), by Mr. Li Bo, Deputy Director-General (DDG) of Department of Science, Technology and Education, MOA, by Mr. Friedrich Wacker, DDG, Department of International Cooperation, BMEL, and by Mr. Hu Yan’an, DDG, Foreign Economic Cooperation Center (FECC) of MOA.

According to Mr. Wu Kongming, nutrition has attracted high attention and concerns of governments and residents from different countries. It is significant for China and Germany to improve nutrition in the two countries by jointly discussing development strategy of food nutrition and exchanging experience on the management and research of food nutrition. He also hoped that Chinese and German experts could take advantage of the workshop, establish a tighter strategic partnership and make contributions to nutrition development in China and Germany. Mr. Li Bo pointed out that China and Germany were strongly complementary to each other in terms of agricultural development and the two sides enjoyed a good cooperation foundation of agricultural science and technology. Since the establishment of the Sino-German Working Group on Agricultural Cooperation in Science and Technology between MOA and BMEL in 1981, many outstanding scientific payoffs have been achieved, a long-term cooperation mechanism has been established and a classical model of agricultural cooperation in science and technology between China and foreign countries has been made.
Fig. 2: Opening statement by Mr. Li Bo, DDG, Dept. of Science and Education, MOA, Photo: DCZ.

Fig. 3: Mr. Friedrich Wacker, DDG, Department of International Cooperation, BMEL, delivering opening statement. Photo: DCZ.
Mr. Wacker mentioned that nutrition is an essential condition of human life. However, despite very high standards regarding food safety applying in Germany, consumers frequently felt unsure about the quality of their food. Nutrition is therefore a highly political issue in Germany. Germany and China are now increasingly dealing with similar issues regarding consumer health protection in the nutritional sector, and, as a reaction, both China and Germany have recently set up new institutions specializing in the field of nutrition. According to Mr. Hu Yan’an, maintaining food safety and nutrition improvement is the basic task of social and economic development as well as a big event related to people’s livelihood. Food safety and nutrition improvement face a severe situation and their influencing factors are more complicated and changeable. Hence, it is necessary for different countries to implement some pragmatic and effective measures according to their national realities, and international cooperation in various areas is also required.

Following the group photo (see cover page), the coffee break allowed for exchanges between officials from the two Ministries, scientists and attendees. A new idea for a joint Sino-German event in 2018 regarding soil in the framework of the G20 agricultural events in Argentina was proposed.

All following presentations were simultaneously translated by a team of two interpreters from CAAS. In addition, many of the Chinese presentations were shown as double on the split LED-screen, with a Chinese version and an English version next to each other and moving simultaneously. Abstracts of the presentations by the seven German speakers who were present at the workshop are collected in an extra Chapter of this report (page 21).

**Keynote Presentations**

The two Keynote Presentations touched on broader topics related to nutrition. The presentation by Ms. Dr. Daniela Graf, Department of Physiology and Biochemistry of Nutrition, MRI, began with a general overview of the MRI and its role as an interface in food and nutrition research. She then focused on the “Importance of fruits and vegetables in healthy nutrition”, including the 10 guidelines of the German Nutrition Society (DGE) for a wholesome diet as well as medicinal evidence on the health-promoting effects of vegetable and fruit consumption. In his presentation “Profile of Food and Nutrition Development in China - Achievements and outlook”, Prof. Dr. Wang Xiaohu, Director-General of IFND of MOA, CAAS, made a comprehensive review on the development and achievements of food nutrition in China, analyzed its opportunities and challenges in a systematic way and proposed development ideas for food nutrition industry in the future. He pointed out that a new situation in food processing capability has been created and initial processing industry clusters of agricultural products have been established. People’s nutrition and health have been evidently improved and food nutrition structure has been further optimized. With the improvement of plans, laws and regulations on food nutrition, food safety in China has boasted guarantee policies and action guides. Mr. Wang also introduced the concept of “Nutrition-oriented consumption and consumer-directed production” as well as strengthening nutrition monitoring and guidance for key population sectors.
Fig. 4: Keynote presentation by Ms. Dr. Daniela Graf (MRI) on Day 1 of Workshop. Photo: DCZ.

Fig. 5: Keynote presentation by Prof. Dr. Wang Xuaohu (IFND), on Day 1 of Workshop. Photo: DCZ.
The following presentation by Ms. Dr. Anika Reinbott (BZfE) on “German Federal Centre for Nutrition (BZfE) – Activities for Improved Nutrition in Germany” was shown as a professionally pre-recorded video, since she herself personally was unable to attend. In her presentation, Dr. Reinbott introduced the recently-founded BZfE, its mission, role and structure. She then gave examples of the BZfE’s units and activities, including the “Healthy Start – Young Family Network”, the “National Quality Centre for Nutrition in Preschools and Schools”, “Nutrition Communication”, “Strategies for Healthy Diets and Sustainable Consumption” and the “German Food Code Commission”. Finally, she introduced current projects, as well as campaigns under the header of “Looking for Ideas how to Create Healthy Food and Drink Environments”. The slides of the presentation accompanying the video of Ms. Dr. Reinbott had Chinese characters added to the English contents and were shown in parallel on the left-hand side of the split LED-screen. No technical problems occurred during the screening of the video, and this contribution obtained a very positive resonance.

Due to the availability of one of the speakers, Prof. Dr. Ding Gangqiang’s and Prof. Dr. Ma Guansheng’s presentations were switched around between the morning and afternoon sessions. In his presentation “Nutrition Solutions through Understanding Food, Eating Behavior, and Culture”, Dr. Ma Guansheng (School of Public Health, Peking University) nicely depicted the Definition of Food, the influence of Belief and Tradition on Food Choice, the Social Function of Food, as well as Eating Behavior and Health, including different Chinese cooking methods and changes in dietary patterns. Prof. Dr. Wang Dongyang (IFND of MOA, CAAS) presented “Research on per capita food demand of Full-scale Well-off China”, discussing China’s food security issues such as China’s grain output, import and supply vs. grain consumption, as well as comparing Food Intake among China, U.S. and Japan.
Fig. 7: "Jigsaw picture" of all 16 speakers (except for keynote speakers) during Day 1 of Food and Nutrition Workshop. Picture by CAAS. From left to right, top to bottom: Dr. Fredi Schwäglele, Prof. Dr. Wang Dongyang, Prof. Dr. Ma Guansheng, Dr. Chen Yan; Dr. Manfred Stoyke, Ms. Dr. Guo Yanzhi, Prof. Dr. Ding Gangqiang, Ms. Dr. Anika Reinbott; Dr. Bernhard Trierweiler, Ms. Dr. Zhou Lin, Prof. Dr. Wang Jing, Dr. Chen Ailiang; Dr. Li Dong, Dr. Klaus Vosmann, Ms. Svenja Ackermann, Dr. Georg Langenkämper.

Afternoon Plenary Session

The afternoon session on Day 1 consisted of two blocks of seven presentations each. In the first block, Dr. Chen Yan from the Institute for Nutritional Sciences, Shanghai Institutes for Biological Sciences (SIBS) Chinese Academy of Sciences (CAS) gave a highly scientific presentation “From Precision Medicine to Precision Health and Precision Nutrition”, including studies carried out by his institute on the Prevalence of Metabolic Disorders (such as overweight, obesity, hypertension, diabetes) in Chinese population. Dr. Manfred Stoyke, Head of Division in Department 5: Method Standardization, Reference Laboratories, Resistance to Antibiotics of the German Federal Office of Consumer Protection and Food Safety (BVL), gave a detailed overview over the structure of his institution and its various tasks. Dr. Li Dong of Beijing Research Institute for Nutritional Resources talked about “Application of System Nutrition in Nutrition and Health Research”, also presenting the advanced analytical laboratory facilities in his institute for investigating food components and value-giving substances. In his presentation on “Hygienic status of mixed salads and sprouts” Dr. Bernhard Trierweiler, from the Department of Safety and Quality of Fruit and Vegetables, MRI, showed the German Association of Hygiene and Microbiology (DGHM) guidelines and warning data for mixed salads. In storage trials with prepacked mix vegetable salads, a multiplication of microorganisms independent of storage temperatures was observed. Ms. Dr.
Guo Yanzhi (IFND of MOA, CAAS) explained “The Evolution and Development of China’s [three] Food and Nutrition Outlines” (1990s, 2001-2010, 2014-2020), a Data analysis on food intake and nutrition situation of Chinese residents, as well as Thoughts on the preparation of China’s next food and nutrition outline (2020-2030). Ms. Svenja Ackermann from the Chemical and Veterinary Investigation Office (CVUA) in Karlsruhe gave a presentation on the Application of NMR (Nuclear magnetic resonance) in Official Food Control in Germany. This is a cutting-edge technology, allowing, as an example, the clear differentiation between Arabica and Robusta coffee beans in mixed lots in just two hours of sample preparation, compared to the Official Method, taking five days. The presentation by Ms. Dr. Zhou Lin (IFND of MOA, CAAS) gave an in-depth analysis of “Losses in Meat Supply Chain and the Effective Meat Supply in China”. She mentioned the great disparity between meat production and consumption data in China, estimated the Losses and edible coefficients of the meat supply chain, and then derived the effective Supply and demand of meat in China.

Following the tea break, Prof. Ding Gangqiang of the National Institute for Nutrition and Health, Chinese Center for Disease Control and Prevention, gave an excellent overview on “Chinese Residents' Nutrition Status and Intervention Strategies”. He introduced the “National Nutrition Surveillance System” (1959-2017), showed the Improvement of diet and nutrition status among Chinese residents, the Trends in diet structure among Chinese residents (2002-2012), etc., and then explained Global and Chinese Nutrition Targets and Strategies and the National Nutrition Plan (2017-2030). Next, Dr. Klaus Vosmann of the MRI Working Group for Lipid Research in Detmold, gave a presentation on “Oxidative Stability of Edible Oils – Chemistry & Measurement”, introducing Different types of reactions leading to deterioration of fats and oils, including during frying, and introduced various Oxidative Stability Tests. Next, Prof. Dr. Wang Jing (IFND of MOA, CAAS) presented “A prospective clinical study to evaluate the efficacy of nutritional intervention using dual protein for leukemia patients”. He introduced the “Dual Protein Project with Chinese Characteristics” (DPPC), including animal experiments and clinical experiments with leukemia patients. In his presentation, Dr. Georg Langenkämper of MRI Department of Safety and Quality of Cereals in Detmold, talked about “High-quality bread wheat – new insights”. A harvest survey and statistical evaluation of yield and quality data over 20 and 32 years, respectively, showed a large gain in grain yield, a moderate decrease in protein content, but an improvement in baking protein quality. Dr. Chen Ailiang, Institute of Quality Standard and Testing Technology for Agroproducts (IQSTAP), CAAS, presented “Researches on Food Authenticity and Traceability”. Their Food authentication methods use DNA Analysis, Metabolomics, Proteomics, Optical spectrum, Stable isotope and Elemental analysis to determine species, quality and geographical origin. In November 2016, DCZ and IQSTAP had jointly organized the “Sino-German Workshop on Traceability and Food Metabolomics”. In the final presentation of Day 1, Dr. Fredi Schwägele, MRI Department of Safety and Quality of Meat, Kulmbach, showed the “Non-declared addition of foreign proteins and protein-hydrolysates to meat products”. He demonstrated 1) the Identification and detection of foreign proteins, and 2) the Analysis of hydrolysates, introducing different advances detection methods.

Summarizing Day 1, the presentations touched on all four topics that had been outlined by both Ministries during the preparation phase of the Workshop. Generally speaking, Section 1: „Administrative framework and policy perspectives“, with Topic 1) “Food and Nutrition Policies” was mainly covered by the Chinese contributions, with the exception of the Ms. Dr. Reinbott of BZfE, and partly Dr. Stoyke of BVL. In contrast, most presentations by the
German scientists focused on the more natural science-related Topics 2) “Nutrient content/evaluation of agro-products”, 3) “Food quality along the entire value chain/stability testing”, and 4) “Authenticity, traceability of food and beverages”. Though many of the topics did not match those of their respective counterparts 1:1, the presentations given during Day 1 in their entirety provided quite a broad picture of food-related issues in both countries.

Fig. 8: From right to left: Dr. Manfred Stoyke, Dr. Bernhard Trierweiler, Dr. Fredi Schwägele, Ms. Svenja Ackermann, Ms. Dr. Daniela Graf, Dr. Klaus Vosmann, Dr. Georg Langenkämper, Dr. Marco Roelcke at the end of Day 1 of Workshop on Food and Nutrition. Photo: DCZ.

Day 2 of Workshop (December 01, 2017)

On the second day of the Workshop, the meeting took place in a meeting room at the Institute of Food and Nutrition Development (IFND of MOA), CAAS, and was chaired by Prof. Dr. Sun Junmao, Deputy Director of the Institute of Food and Nutrition Development and Dr. Marco Roelcke (DCZ). About 35 persons attended, including the seven invited speakers from Germany who attended personally. On the Chinese side, in some cases co-workers or assistants attended on behalf of institute directors that had given presentations on the first day. Some new participants only attended on the second day.

First, Assoc. Prof. Dr. Huang Jiazhang, Director of Research Management Department, IFND, gave a small summary of the Day 1 of the workshop, and Dr. Marco Roelcke (DCZ) welcomed the participants on behalf of the German side and mentioned the agenda for Day 2. Then Prof. Dr. Sun Junmao introduced the IFND via a PPT presentation. He also mentioned that in China, the IFND plus four other institutes study nutrition, all of which were present at this workshop. This was followed by a presentation by Dr. Marco Roelcke on possible research funding for joint cooperation work in future (from both German and Chinese sources). On Day 2, consecutive English-Chinese/Chinese-English translation was provided by the DCZ intern Mr. Guo Chengkuan.
Thereafter, a round of self-presentations took place, with each person also mentioning his/her work and research field, as well as his/her specific interest in cooperating with counterparts from the other country. Importantly, Dr. Manfred Stoyke of the German Federal Office of Consumer Protection and Food Safety (BVL) informed the participants that in July 2018 an advanced training course with the topic „Food Safety and Risk Management“ would be organized by his institution (BVL), immediately following the “Summer Academy” organized annually by the German Federal Institute for Risk Assessment (BfR).
Following coffee break and group picture, the participants spit up into four different groups for detailed group discussions, with the aim of developing new ideas/options for further cooperation and finding joint bilateral partners: 1) Food Safety Group, 2) Nutrition Group, 3) Meat Group, 4) Cereals and Plant Group.

![Fig. 11 a-d: Detailed group discussions on Day 2 of Workshop. Photo: IFND.](image)

At 12:30 PM, a rapporteur for each of the groups summarized his/her group’s main findings. In the “Food Safety Group”, joint interests were identified regarding the authenticity of products, but the scientists from each side did not fully match regarding their detailed work areas. Therefore, the German scientists mentioned that they would talk to their respective colleagues after their return to Germany, to see for possibilities for cooperation. As topics, method standardization and species analyses were mentioned. In the “Nutrition Group” it was mentioned that the German scientists had experience in basic theory research, including analytical equipment, while the Chinese institutes had more experience in applied (or practical) research. In the “Meat Group”, the reality of the meat situation in China, including hot spots, was discussed, and opinions regarding the function of meat in human nutrition, and whether it was carcinogenic or not, were exchanged. A Chinese scientist said she would provide contacts to some other experts from her institute, for possible collaboration. In the “Cereals and Plant Group”, the Chinese “potato strategy” (i.e., growing more potatoes as staple food) was mentioned, and processing methods, as well as consumer reactions to changes in market prices in cereals and potatoes were amongst the topics touched upon.

The 1½ -day Workshop officially ended on Dec. 01, 2017 at 14:00 h. On Dec. 02, Dr. Stoyke (BVL) met with a former Chinese guest scientist of his in Beijing, while the MRI and CVUA scientists, accompanied by Dr. Roelcke, undertook a sightseeing visit in Beijing.
Workshop – Lessons learnt

Altogether, the Workshop was attended by 110 persons (20 German and 90 Chinese), including the invited speakers. The Meeting Hall at the main Building of CAAS can accommodate 130 persons. Reasons why the number of participants was not higher were: The Chinese notifications and the German detailed programme draft were both sent out relatively late. The main reason for less attendance on the German side was the parallel Annual Technical Cattle Symposium of the Sino-German Cooperation Project on Animal Breeding in China taking place in parallel, as well as the “China Jiangsu Modern Agricultural Science and Technology Conference” which took place in Nanjing Dec. 01-02, 2017. Many of the German participants attended the former event; others had to leave in the afternoon of Nov. 30 to travel to Nanjing by train. In future, a closer coordination with other events of the German-Chinese Agricultural Week would be recommended.

The Institute of Food and Nutrition Development (IFND) of MOA, CAAS, is formally half a grade higher in the Chinese administrative ranking compared to other CAAS institutes. This was reflected in the fact the high-level representatives from the four major Chinese institutions (mainly institute directors, etc.) attended the Workshop, giving it a high visibility. This was especially noticeable when comparing it to the “Sino-German Workshop on Traceability and Food Metabolomics”, co-organized by DCZ and the Institute of Quality Standards and Testing Technology for Agro-Products (IQSTAP) of CAAS in November 2016, which was more represented on the technical-scientific level, also due to its more specific theme, with less speakers invited from external Chinese institutions.

Two of the German scientists equally noted that the institutions on the Chinese side from outside the IFND were represented by higher-level persons compared to the German side which consisted mostly of regular scientists, with the exception of Dr. Stoyke, Head of Division at the BVL. It was suggested that during future similar events, one or two Heads of Institutes of the German institutions (MRI, etc.) should be attending as well. The Heads of Institutes are all scientists at the MRI.

During the group discussions on Day 2, although joint interests were identified, in many cases the scientists from each side did not fully match regarding their detailed work areas. Generally, it was noted that the German scientists had experience in basic theory research, while the Chinese institutes had more experience in applied (or practical) research. This could, however, also be complimentary. Moreover, as mentioned by the IFND, a personal attendance of a member of the German Federal Centre for Nutrition (BZfE) would have been very welcome to better cover the food and nutrition policy and strategy aspects on the German side. Both institutes have been founded relatively recently and are dealing with similar issues.

Follow up activities

During a feedback meeting on March 09, 2018 on the cooperation between DCZ and CAAS (incl. the Science and Technology Platform) at the end of the First Phase of DCZ, Assoc. Prof. Dr. Huang Jiazhang of IFND, co-organizer of the Food and Nutrition Workshop on the Chinese side, mentioned that their institute had benefited from the Workshop. Their institute was relatively new, had been existing for five years, and had via the workshop increased its
communication with scientists, including contacts with the German BZfE (equally newly-founded), the MRI, other Chinese institutes, etc. For the future, they expected practical cooperations, and said they would like to visit BZfE and possibly BVL in the near future.

On December 14, 2017, the Institute of Food and Nutrition Development (IFND) of CAAS held a joint workshop together with the FAO on “Nutrition-sensitive agriculture”, thereby drawing on some experiences from the Sino-German Workshop on Food and Nutrition. Link to article on CAAS-FAO Workshop on CAAS website (in Chinese).

On the German side, following the Workshop on Food and Nutrition, colleagues from the Max Rubner-Institute (MRI) expressed their wish to receive an overview on the research institutions and administrative bodies in the field of food and nutrition in China. This overview (in German) was then prepared by Dr. Marco Roelcke, with input from the Agricultural Counsellor at the German Embassy in Beijing, a DCZ colleague, as well as from the research coordinator at the MRI, and submitted to the MRI on April 09, 2018.

However, a large-scale institutional restructuring of ministries and ministerial-level commissions in China was decided after the first session of the 13th National People’s Congress (NPC) in March 2018. This included a combining of functions of the former General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and the China Food and Drug Administration (CFDA), whose bodies would be dismantled, as well as many other changes. The overview would therefore need to be updated.
On November 29th, 2017, the third „Open Day“ of the German-Sino Agricultural Center (DCZ) took place at the Zhong Ou Hotel in Beijing, where the DCZ is located. At this event the activities of the DCZ for an agricultural policy dialogue and its status as a platform for science and technology, as well as other Sino-German bilateral cooperation projects (BMEL-MOA), activities and initiatives and the Chinese cooperation institutions were presented. The German Ministry of Food and Agriculture (BMEL) was represented by Mr. Friedrich Wacker, Deputy Director General, Department 62 (International Cooperation, Global Food Policy). On behalf of the German scientific delegation, Dr. Trierweiler of the MRI delivered a brief lecture introducing the MRI and giving a preview on the presentations by the German scientists intended for the Workshop on “Food and Nutrition – Strategies and Research” during the following two days.

The Sino-German Workshop on Food and Nutrition – Strategies and Research then took place from November 30th to December 1st 2017 at the Chinese Academy of Agricultural Sciences (CAAS) in Beijing, China. Scientists from various institutions in China and from Germany presented recent developments and research around the above mentioned topic. A total of 16 presentations and two keynote presentations were given. About 110 participants attended the plenary sessions of the first day. Researchers got together at the following day to discuss the common interests in this field and split up into small groups for bilateral talks on specific topics.

During the first day of the Sino-German workshop a broad spectrum of topics was presented by Chinese and German scientists; however, Chinese and German scientific interests appeared slightly different. The Chinese scientists focused mainly on policy making, standardization, and food strategies. This also included the presentation of surveys on food consumption per capita followed by conclusions and advises for agricultural production. The presentations of the German scientists reflected the wide field of research of the involved institutes, comprising Federal Office of Consumer Protection and Food Safety (BVL), Chemical and Veterinary Investigation Office (CVUA), German Federal Centre for Nutrition (BZfE), and the Max Rubner-Institut (MRI) concerning healthy nutrition, quality and safety of food, and the structure of reference laboratories, especially in the food area in Germany. The Chinese workshop participants showed a high interest in the subjects presented by the German scientists, who focused on the importance of the consumption of fruit and vegetables in a healthy diet, quality and safety of bread wheat, oxidation of plant oils, quality of packed mixed salads, nuclear magnetic resonance spectroscopy to determine the authenticity of food, and non-declared addition of foreign proteins and protein-hydrolysates to meat products. Furthermore, the structure of food control in Germany and the organization of reference laboratories were presented.

On the second day, scientists met for small group discussions on the topics of cereals and plant food, meat, nutrition, food safety and the authenticity of food. The discussions on the different topics proved to be somewhat difficult because of the divergent interests of the partners and the different structure of departmental research in China and Germany. The
Chinese partner institutes emphasized a great interest in research co-operations on the above mentioned topics but also in product development to gain money out of their research work. German institutes expressed their interest in co-operations but also mentioned that they are not allowed to develop and sell products because of their tasks as governmental Federal Research Institutes, which need to be independent in order to fulfil their tasks as advisory board in all aspects of nutrition, quality and safety of food as well as in controlling of feed and food. Food authenticity was emphasized as an important mutual research field with the intent to establish collaborations on this field.

Some possible future projects are listed below:

- Collaboration for the development of common standards regarding the authenticity of food (Federal Office of Consumer Protection and Food Safety (BVL), Chemical and Veterinary Office (CVUA) and the Institute of Quality Standard & Testing Technology for Agro-products (IQSTAP), Chinese Academy of Agricultural Sciences (CAAS).
- Collaboration on the field of pesticide residues on plant food and determination of maximum residues level (MRL) (Federal Office of Consumer Protection and Food Safety (BVL), Chemical and Veterinary Office (CVUA) and the Institute of Quality Standard & Testing Technology for Agro-products (IQSTAP), Chinese Academy of Agricultural Sciences (CAAS).
- Collaboration in the field of carcass classification, meat standards, and meat quality (Department of Safety and Quality of Meat, MRI Kulmbach; Institute of Food and Nutrition Development (IFND) of Ministry of Agriculture, CAAS; Institute of Quality Standard & Testing Technology for Agro-products (IQSTAP), Chinese Academy of Agricultural Sciences (CAAS).
Abstracts of presentations by invited German speakers

Application of NMR in Official Food Control in Germany

Svenja Ackermann

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The “Chemical and Veterinary Investigation Office” (CVUA) in Karlsruhe is part of the official food control in Germany. Around 200 employees specialized in different fields work in seven diverse departments, which cover the analyses and assessment of a broad range of available foodstuffs in Germany. For instance it comprises the analysis of beverages (alcoholic/non-alcoholic), plant based foods, animal based foods, cosmetics, medicinal products, residues of veterinary drugs and diagnostics of animal diseases.

Nuclear magnetic resonance (NMR) spectroscopy is a primary ratio method, non-destructive with a high reliability. For application in official food control, it can be used either for target or non-target analysis. Target analysis means that analytes are known before starting the analysis single or multiple analytes can be exactly identified and quantified. The aim of non-target analysis is to look after deviations in the constitution of a sample compared to a large amount of samples from the same kind.

Examples for the use of target analysis are the purity check of reference standards and the differentiation between Arabica and Robusta Coffee based on 16-O-Methylcafestol. The Soft Drink Screener is an example for a target-multi-analysis. 16 analytes of different substance classes can be quantified simultaneously. The easy sample preparation and the automated data evaluation makes it an easy and fast analytical method in routine analysis.

The non-target analysis is suitable for proof of origin, adulteration and authenticity. Examples for the non-target approach in official food control are honey, spirits, beers and chicken eggs. For the differentiation of honey varieties (acacia, rapeseed, honeydew and heather honey), around 120 samples (at least 30 of each variety) were measured with 1H NMR and evaluated with multivariate data analysis (MVDA). The result showed that all honey varieties were correctly classified. Another example is the Spirit-Profiling, approx. 300 illegally produced spirits were collected from all over the world. After MVDA some outliers were identified and extra analysis showed that they contained high amounts of ethylcarbamate and denaturant substances. An example for determination of origin is the analysis of around 150 beer samples. Nearly half of the samples were produced in Baden-Wuerttemberg (BW, federal state of Germany), the others were produced elsewhere. The MVDA showed that 86% of the samples were classified right as beer from Baden-Wuerttemberg. The investigation of 268 chicken egg samples from different husbandry systems (organic, free-range and barn) showed after MVDA a 91 % right classification of organic chicken eggs.

NMR is a convenient method for the analysis of complex matrices especially in combination with automated analysis systems, transcription errors can be avoided and a large number of samples can be analysed simultaneously. The CVUA in Karlsruhe has developed and is still developing many NMR applications for use in official food control.
The importance of fruits and vegetables in healthy nutrition

Daniela Graf

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Food-based dietary guidelines around the world emphasize the importance of fruits and vegetables in healthy nutrition. Results of a systematic review on the preventive potential of fruits and vegetables for several chronic diseases came to the conclusion that there is convincing evidence that fruits and vegetables can reduce the risk for stroke, hypertension and coronary heart disease. (Boeing et al 2012). Furthermore, there is evidence that their consumption can probably reduce the risk for cancer. Despite the health benefits associated with fruits and vegetables, consumers neither in Germany nor in China meet the recommendations of five portions per day. In China dietary habits amongst other things is in a transition phase. The development is a bit worrying, as a steady decline in the intake of fruits and vegetables is observed.

In order to understand the health-promoting potential of fruits and vegetables, it is important to have a look at their constituents, especially dietary fiber and phytochemicals e.g. polyphenols. The importance of dietary fiber for human health has come into focus during the last couple of years, with the increased interest in the gut microbiota. Fermentable dietary fibers are substrates for bacterial metabolism in the colon. Short-chain fatty acids, which are products of microbial fermentation, have been associated with a variety of health effects, e.g. anticarcinogenic potential. Similar to dietary fiber, phytochemicals are a very diverse group of substances that can promote various health-promoting effects such as anticarcinogenic, antioxidative or cholesterol-lowering.

The anticarcinogenic potential of a phytochemical- and fiber-rich cloudy apple juice, compared to clear apple juice, that contained less fiber or water has been investigated in a colon cancer model using rats at MRI. Rats receiving the cloudy apple juice had lower levels of DNA damage and reduced size of aberrant crypt foci compared to both water and clear apple juice, indicating an anticarcinogenic potential of the cloudy apple juice. These results have been confirmed in a human intervention study, where participants ate one kilogram of apples and DNA damage in peripheral mononuclear blood cells was assessed. Consumption of apples reduced oxidation of pyrimidines and prevented iron chloride induced DNA strand brakes, indicating a better protection of DNA damage. In Summary the results of both studies indicate a protective effect of regular apple or apple juice consumption for DNA damage and cancer.

Collectively, there is convincing evidence that regular consumption of fruits and vegetables plays a pivotal role in disease prevention. Therefore ways to increase fruit and vegetable intake in China and Germany are need to be found.

Literature:

In Germany arable land comprises approximately 12 million hectares, where winter wheat was grown on 3.1 million hectares in the 2017 season, yielding a total harvest of 24.2 million tons of wheat. This figure is very close to the six year average yield of 24.3 million tons of winter wheat obtained in the seasons from 2011 to 2016. Approximately 30 %, i.e. 7.2 million tons, of the total wheat harvest is milled for baking purposes. The per-capita consumption of bread and fine baked goods amounts to 84 kg/year.

In Germany wheat varieties are graded according to baking performance in elite wheat (E class), blending wheat (A class), bread wheat (B class), EU varieties and varieties, not suitable to produce leavened bread, but fit for production of biscuits (C class). Examination of wheat quality in trade and food science is based on numerous parameters, comprising sensorial, physical, chemical and rheological characteristics. Total crude protein content and sedimentation value according to Zeleny are relatively easy to obtain parameters, allowing to predict the baking performance of a wheat variety to a certain degree. However, to establish baking performance with high accuracy, it is necessary to perform a standardised baking test. The most commonly used standardised baking test in Germany is called Rapid-Mix-Test.

Long-term evaluation of indirect baking quality parameters of wheat is obtained within a representative analysis of the yearly German wheat harvest, the so called Specific Determination of Crop and Quality (BEE). Analyses of BEE data show that crude protein content and sedimentation value of wheat increased in parallel during the years from 1965 to 1992. From 1992 onwards until present, crude protein content has reached a plateau, whereas an increase in sedimentation value was still observable. These results indicate that in recent years newly bred wheat varieties might have been able to realise a higher baking performance at stable crude protein content.

Analyses of baking parameters of newly bred wheat varieties are available in great detail from German official variety trials. Here, selected data are presented, originating from a statistical evaluation of performance data of altogether 316 approved wheat varieties spanning the years from 1983 to 2014. Key results were a strong increase in grain yield, a moderate decrease in crude protein content and almost stable results for loaf volume, as obtained with the Rapid-Mix-Test. Strong to very strong relations were found for protein content, sedimentation value and loaf volume. Further, the two parameters indicating baking performance, sedimentation value and loaf volume, were strongly influenced by genotype, in other words environmental effects had relatively less influence on baking performance. Taken together, these data indicate that breeding efforts in wheat has made significant progress in yield parameters, while at the same time maintaining baking performance. The strong genetic influence on the baking parameters sedimentation value and loaf volume is seen as an advantage for further breeding efforts with the aim of maintaining baking performance and yield at lower fertilisation levels. Reduction of nitrogen based fertilizers is
an urgent task in Germany, because contamination of drinking water reservoirs and groundwater by nitrogen fertilizers from agriculture is causing serious environmental and health concerns.

For further details regarding the presented results of German official variety trials the reader is referred to the following publication (Laidig et al., 2017).

Literature:

Non-declared addition of foreign proteins and protein-hydrolysates to meat products


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There is a wide range of potential foreign protein sources which could be used in meat products to substitute meat protein. The worldwide production quantities as well as the protein contents were taken as a basis for a categorization of those foreign protein sources. Additionally, all substances that may cause allergies or intolerances were highlighted. For those substances, a lower detection limit is necessary. To circumvent health problems, a correct declaration is mandatory and, therefore, surveillance systems are necessary. Due to the high grade of processing, especially emulsion-type sausages are likely to be adulterated. Consumers are no longer able to identify such protein substitutions visually. Therefore, analytical techniques are required. One possibility is the detection of the deoxyribonucleic acid (DNA) of the foreign protein sources as each species has their unique genome. The method of choice is quantitative real-time polymerase chain reaction (qPCR).

In the following, it is exemplarily shown for six cereals how to establish two triplex qPCR systems. Barley, wheat, oat and rye contain gluten and therefore, they can cause allergies or intolerances. In the European Union, for gluten-free food the limit is set at 20 mg/kg. Therefore, a low detection limit (< 20 mg/kg) is necessary. Additionally, maize and rice were chosen due to their high production rate. First, the theoretical detection of the mentioned cereals can be performed by using bioinformatic tools like gene databases. However, since not all existing plants are fully sequenced, those gene databases are incomplete. Therefore, DNA has to be isolated from those plants of interest and from closely related plants. The creation of a DNA library allows to test practically the specificity of the chosen qPCR systems. If no cross similarity is detected, the single qPCR systems can be combined to multiplex qPCR systems. And then again it is checked for false positive signals. In the last step, emulsion-type sausages spiked with plant protein were produced and analyzed. It was possible to establish two triplex qPCR systems for the simultaneous detection in the ppm-range in emulsion-type sausages. The first one is for barley, oat and rye and the second one for wheat, maize and rice. In the future, both systems have to be validated and the influence of processing on detectability will be tested. Additionally, new multiplex qPCR systems will be designed for further foreign protein sources.

Another possibility to detect grain proteins in meat products is the direct detection using High Performance Liquid Chromatography (HPLC) in combination with Tandem Mass Spectrometry (MS/MS). Here, a sensitive HPLC-MS/MS-method for the simultaneous detection of the six main grain species barley, maize, oat, rice, rye and wheat was developed. After protein extraction and tryptic digestion, 3 to 4 characteristic marker peptides for each grain species were selected and measured by HPLC-MS/MS. The uniqueness of the marker peptides was checked by BLAST search using protein data bases as well as by analyzing common ingredients of meat products. For each marker peptide, three intensive mass transitions were detected. The limits of detection (LODs) of the method were in the range of about 5 to 10 mg/kg in emulsion-type sausages and consequently below the limit of 20 mg gluten/kg food, which is established in the European Union as a limit for “gluten free”
food. Furthermore, good correlations between the peak areas of the marker peptides and the contents of the grain proteins in the analyzed meat products were determined.

A special case of potential food fraud is the use of substances which are already included in other ingredients of sausages. An example of this type of adulteration is the addition of blood plasma, which is always present in meat due to the occurrence of residual blood. Consequently, the qualitative detection of blood plasma is no evidence of food fraud in meat products. Another problem in this case is the fact that the content of residual blood in meat/sausages is strongly varying. Therefore, an important aim of this project is to find analytical tools to be able to prove a possible addition of blood plasma to meat products.

Protein hydrolysates, like proteins, can be added to meat or meat products. Protein hydrolysates are chemically or enzymatically hydrolyzed proteins. This results in amino acids and peptides. The degree of hydrolysis is described as the relative ratio between amino acids and peptides, i.e. the proportion of hydrolyzed peptide bonds of the protein in percent. A distinction is basically made between protein hydrolysates containing amino acids and peptides and those consisting only of amino acids. The former are usually produced by the use of proteases (enzymes), the latter usually cost-effectively by chemical hydrolysis. They generally have a higher solubility in water than the corresponding proteins and are therefore easier to use in the product. In contrast to proteins, protein hydrolysates are generally not harmful to health according to current knowledge.

Turkey meat was used to establish a method to detect the non-declared addition of protein hydrolysates since it has a high absorption capacity of water. Due to a low profit margin it is especially susceptible to manipulation. Pork gelatin hydrolysates at about 15 % by weight were added to the fresh meat. Contents of free amino acids were analyzed by cation exchange chromatography. Free amino acids patterns in fresh turkey meat containing protein hydrolysates were compared to untreated samples, which were used as reference data sets. The contents of 19 of the 20 proteinogenic amino acids (L-tryptophan is acid labile) were determined repeatedly during 99 h after slaughter as amino acid levels increase over time caused by endogenous proteases in the meat. The variation of free amino acid contents as a result of the addition of protein hydrolysates with high degrees of hydrolysis was well above the natural variations and could thus be detected reliably.

Since other protein hydrolysates with high degrees of hydrolysis (bovine casein, wheat gluten) could also be detected, it is assumed, that the analytical method developed is suitable to prove the addition of such protein hydrolysates reliably in meat. For this, however, the reference data sets need to be extended. Additionally, the analysis of the peptide pattern was carried out in order to determine the addition of protein hydrolysates with low degrees of hydrolysis. This requires an extensive sample preparation. Finally meat products need to be taken into consideration.
The BVL and its laboratory coordination and NRL activities

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Official food control authorities are responsible for supervising the adherence to national and European legislation. The analyses necessary for this purpose are carried out by official laboratories on a national and European level.

The system for the analysis of residues and contaminants is structured into several levels. There are more than 40 European Union Reference Laboratories with different fields of responsibility, as well as a future reference centre. In addition, every EU Member State runs the corresponding National Reference Laboratories as well as official laboratories, which carry out the continuous control work. The EU Reference Laboratories (EURL) are responsible for aligning the proficiencies of the official laboratories in the EU in such a way that they produce comparable results of a consistently high quality. The EURLs' function in this context is to coordinate and to give advice to the Member States. Together with the EU Reference Laboratories, the National Reference Laboratories form a European-wide network.

The laboratory network actively contributes to the further reinforcement of consumer protection and supports domestic as well as cross-border trade by the unification of standards.

The Department of Method Standardisation, Reference Laboratories and Resistance to Antibiotics at the BVL hosts one European Union and eight National Reference Laboratories. The EU Reference Laboratories coordinate and support the National Reference Laboratories, who in turn coordinate and support the official control laboratories in the respective countries. This includes the provision of test methods, reference materials and standard substances.

Aside from substances utilised purposefully, the controls also focus on contaminants, which may enter the food accidentally via the environment or through the production process (process contaminants). Depending on the aim of the tests, different types of samples are treated at the laboratory, e.g. sample materials of animal origin (like meat, milk, hair or urine), food of plant origin or feed.

The reference laboratories at the BVL elaborate new standards for validation, quality assurance and the optimisation and further development of methods, and make them available to the official routine laboratories. Moreover, the reference laboratories initiate projects on current questions. The reference laboratories collect information on the proficiencies of the methods employed by the laboratories, e.g. by regularly organising proficiency tests according to ISO 17043, and provide recommendations on the implementation of Community legislation.

The standardisation and normalisation of methods are further instruments to harmonise the proficiencies of the laboratories in (official) food and feed control. On the basis of § 64
“Lebensmittel- und Futtermittelgesetzbuch” (LFGB) (German Food and Feed Act), §38 “Tabakerzeugnisgesetz” (TabakerzG) (Act on Tobacco Products) and §28b Gentechnikgesetz (GenTG) (Act on Genetic Engineering), the BVL publishes an Official Collection of Methods of Analysis and Sampling. The BVL also hosts the coordination office for the implementation of these laws, which is responsible for supporting the control laboratories in ensuring a consistent implementation of the existing legislation and a consistent, high quality of official controls. Through the intensive collaboration in national (DIN), European (CEN) and international (ISO) organisations for standardisation, the BVL promotes the standardisation and normalisation of methods and thus contributes to the reduction of national and international trade barriers.
Hygienic status of mixed salads and sprouts

Biserka Becker and Bernhard Trierweiler

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The quality of food is determined by the sum of properties of food, so called quality criteria. Four quality groups can be distinguished: biological and physiological quality, sensory quality, value of suitability, and psychological quality. The four quality groups are determined by type of cultivation, yield and waste, harvest quality, nutritious value, appearance, storability, and the absence of undesirable contaminants and residues e.g. mycotoxins and pesticides. Fruit and vegetables are generally considered as healthy foods. However, as they are often consumed raw, they harbour microbiological risks. Microbial contaminations cannot be completely avoided. Processing steps like cutting, washing, spinning, and mixing of different salads are important parameters for the microbial status of mixed salads and sprouts. Raw vegetable salads and sprouts can be contaminated by natural microbiological contaminated fertilizers, soil, water, and air. Additional contamination can take place during production, packaging, transport, and retail.

Investigations of 114 samples of mixed salads at our institute showed that the microbial status of commercially available mixed salads accounted to a mean value of 7.8 log cfu/g and 35.3% of the products were higher than the guidelines (7.7 log cfu/g) of the DGHM (German Society for Hygiene and Microbiology) for the total aerobic mesophilic counts (TAC). In 3 samples (2.6%) Salmonella enterica serovar Enteritidis was detected. After biochemical and molecular identification Listeria innocua was detected in 5 samples and pathogenic L. monocytogenes in 3 samples. Storage trials (4°C, 7°C, 12°C) of prepacked mix vegetable salads for 7 days indicated a multiplication of microorganisms independent of the above mentioned storage temperatures. Even the type of cultivation – conventional or organic - had no significant influence on the hygienic status. Salads of both production types possessed similar TAC as well as the microbial numbers of Enterobacteriaceae and pseudomonads.

The sprouts had higher TAC values than the mixed salads, the mean value of 50 tested samples was 9.0 log10 cfu/g. The Enterobacteriaceae and Pseudomonads were the predominant groups and their counts ranged between 7.2 and 10.2 log cfu/g. Salmonella sp. could not be detected in any sample. L. monocytogenes was detected in only one sample. Comparable results were observed for commercially purchased and home-grown mung bean sprouts during storage trials at different temperatures (5°C and 8°C) independent if seeds were surface decontaminated or not. Furthermore, treatments with 2.0% citric acid or 1.5% Tween 20 and sodium hypochlorite (200 ppm and 1000 ppm) achieved a reduction of TAC of 0.5 log and 1.5 log cfu/g respectively, directly after treatments. After storage of treated sprouts for 6 days at both temperatures no significant reduction of microorganisms was observed.
There are differences between thermal and oxidative degradation of fats and oils during storage and food processing. Different types of reactions lead to deterioration of fats and oils. At room temperature or moderate temperature three different reaction types have to be taken into consideration. The main reaction pathway for oxidation reactions follows a radical chain reaction between unsaturated fatty acids and oxygen that is called autoxidation. The extent of autoxidation depends on different factors and especially the fatty acid composition and the presence of antioxidants are important. Much faster than autoxidation is the photo-oxidation which is initiated by light that either activates a sensitizer like riboflavin or that is transferred to activate singulet oxygen by a sensitizer like chlorophyll. Enzymatic oxidation is catalysed by enzymes like lipoxygenase that lowers the activation energy for the abstraction of a hydrogen atom from the unsaturated fatty acid. Thermal oxidation takes place at higher temperature when the energy that is necessary for the abstraction of the hydrogen atom is supplied in form of thermal energy. The position of the hydrogen atom in the fatty acid molecule is decisive for the formation of free radicals and the reaction rate. Especially for fatty acids with two or more double bonds the energy necessary for the removal of the hydrogen atom is quite low and therefore the reaction rate in comparison to saturated fatty acids is much higher. That is the reason why oils with higher amounts of unsaturated fatty acid are much more susceptible to oxidation reactions.

During deep-fat frying the frying medium is exposed to temperatures between 160 and 180°C depending on the product being fried. This results in a number of chemical reactions, including oxidation and polymerisation of unsaturated fatty acids and a huge number of reaction products like volatile chain-scission products, non-volatile oxidized derivatives and dimeric, polymeric, or cyclic substances are formed. These products differ from those produced at room temperature. At 30°C dimers are formed from peroxy and alkoxy radicals to a very low extent since other reactions of the autoxidation are more predominant forming smaller reaction products. On the other side at higher temperature dimers are predominately formed by alkyl radicals that result in COC linkages. In the frying process volatile and non-volatile compounds are formed. The volatile products mainly consist of short-chain hydrocarbons, aldehydes, ketones, alcohols or carboxylic acid as degradation products from fatty acids. The non-volatile compounds account for the greatest part of the degradation products with di- and trimers but also high molecular compounds or polar components.

During the frying process the composition and the properties of the frying medium change. Physical parameters give some indication on the deterioration of the oil during frying, but they are influenced by the type of oil, so that the significance of these parameters to assess oil quality is only limited. Also chemical parameters change during frying, but there are two parameters, the content of polar compounds and di- and oligomer triacylglycerols, that describe the oil quality independent on the type of fat.

There are a number of analytical methods that are routinely used to monitor lipid oxidation in foods systems, but there is no analytical method for detecting all oxidative changes in all
food and to predict exactly the storage life or heat stability of frying oil because of the
different reaction pathways for the degradation of fats and oils under different conditions
such as temperature or accessibility to oxygen.

For measuring the oxidative stability different methods are available that base either on the
measurement of the oxygen consumption or on the amount of generated oxidation products.
Examples are the Oxygen Bomb or Oxidograph that consider the oxygen consumption or the
Schaal Oven or Shift test with the peroxide value as endpoint. The recommended standard
methods for the measurements of the oxidative stability are the Oil Stability Index (OSI) or
the Rancimat method that use the conductivity as measure for the endpoint.

The principle of the Rancimat test is that oil is heat-treated at higher temperature whereas air
is purged through the oil. This air steam transfers volatile products from the oil to a
measuring vessel filled with demineralized water. With progressing degradation of the oil
increasing amounts of short-chain acids such as formic acid are formed which results in a
drastically increase of the conductivity in the vessel. During the measurement the
conductivity is recorded against the measuring time and the induction period or oxidation
time is calculated by determining the inflection point of the resulting curve. For the prediction
of the frying stability or the applicability of antioxidants under frying condition the method has
two drawbacks. First, the temperature is low in comparison to the frying process and second
the surplus of oxygen by the constant purging with air is not comparable to the frying
process.

In a comparison, different types of oil were treated at 170°C for 8 h to simulate the frying
process and then different parameters were measured by NIR spectroscopy. The results
show no correlation between the induction period measured by the Rancimat and the content
of polar compounds, polymer triacylglycerols and the anisidine value of the oils after heat-
treatment, while a good correlation was found between the three parameters measured in
the oil after heat-treatment.
2017 年 11 月 30 日—12 月 1 日，由中国、德国两国农业部国际合作司主办，农业部食物与营养发展研究所与农业部对外经合中心、中国农科院国际合作局、中德农业科技合作平台共同承办的“中德食物营养研讨会”在北京隆重召开。中国农业科学院副院长吴孔明院士、中国农业部科教司李波副司长、德国农业部国际合作司副司长 Friedrich WACKER 先生、中国农业部对外经济合作中心副主任胡延安等领导出席开幕式并致辞，我所王小虎所长应邀做会议主旨报告。来自中德两国食物营养届的 100 余名专家学者参加此次研讨会，围绕食物与营养的主题，进行了广泛而深入的学术交流和探讨。会议由王东阳副所长主持。

吴孔明指出，营养是人类维持生命、生长发育和健康的重要物质基础，国民营养事关国民素质提高和经济社会发展。食物是提供人类营养需求的基本物质和根本保障。当前，营养问题已成为各国政府和居民高度关注和关心的问题。中德双方共同探讨食物营养发展战略，交流分享各自在食物营养管理和研究的经验，对推动两国营养改善具有重要意义。希望中德两国科学家以此次研讨会为契机，建立更加紧密的战略合作伙伴关系，为中德两国乃至世界食物营养事业发展贡献力量。

李波指出，中德两国的农业发展具有很强的互补性，农业科技合作基础良好。自 1981 年中德农业科技合作组成立以来，取得了显著的科研成果，形成了长效的合作机制，形成了中外农业科技合作的典范。当前，中国农业和农业科技进入到了新的发展阶段，已经从“吃饱”向“吃好”转变，对质量安全、食物营养提出了更高要求。可以预见，中德农业科技仍然具有非常广阔的合作空间，必将能够取得更为显著的合作成果。

Friedrich WACKER 先生回顾了近年来中德两国农业合作的项目与进展。他指出，营养是人类生活的重要基础条件，在食物质量与营养等方面，中德两国均面临着类似的问题和挑战。非常高兴的看到，中德两国政府近年来都成立食物营养领域的专门机构，其中，德国联邦食品与农业部成立了德国联邦营养中心(BzFE)，中国农业部成立了食物与营养发展研究所。他表示，作为中德农业周的重要活动，此次研讨会为中德两国建立牢固互信的农业合作具有深远意义，也是推进中德农业合作长远发展的有力证明。

胡延安指出，保障食物安全与营养改善，是经济社会发展的基本任务，是关系民生福祉的大事。当前，全球粮食等主要食物产量不断增加，但仍不能满足人们日益增长的需求，食物安全和营养改善面临的形势仍然严峻，影响因素更加复杂多变，迫切需要各国从实际出发采取切实有力的措施，也需要加强在各领域的国际合作。

会上，农业部食物与营养发展研究所所长王小虎和德国马克斯-鲁布纳研究所(MRI)Daniela Graf 博士分别作了“中国食物营养发展——成就与展望”和“蔬菜水果健康营养的重要性”的主旨报告。
王小虎全面回顾了中国食物营养发展的成就，系统分析了中国食物营养发展的机遇与挑战，提出了未来食物营养产业的发展思路。他指出，新世纪以来，我国食物供给能力实现新突破，主要农产品量质齐升；食物加工能力开创新局面，初步形成了农产品加工产业聚集区；居民营养与健康明显改善，食物营养结构不断优化，营养缺乏性疾病逐渐降低，居民人均寿命持续提高；食物营养规划与法律法规不断完善，为中国食物安全提供了政策保障和行动指南。

他强调，新时期食物营养发展正面临着前所未有的新机遇，一是经济发展利好环境前所未有，二是食物营养发展的基础前所未有，三是居民食物营养改善的迫切需求前所未有，未来 20-30 年将是我国食物营养产业发展的黄金机遇期。但同时新时期食物营养发展面临着食物生产与消费需求不平衡、食物消费与营养摄入结构不平衡、农产品产后损耗浪费与食物消费增长不平衡、食物加工营养目标与居民食物营养需求不平衡、城乡区域之间营养不平衡等五个方面的新挑战。

他呼吁，进入新时代，顺应人民对美好生活的新期盼，食物营养发展需要着眼满足人民“吃的营养、吃的健康”的新需求，把“确保食物供给更加有效、消费结构更加合理、营养摄入更加均衡”，作为中国食物营养中长期发展重要任务，以食物生产转型为前提，以科普宣传为要点，以营养监测指导为关键，以法律法规和标准建设为保障，切实解决现阶段食物营养内部、食物与营养之间发展不平衡、不充分的问题。

我所王东阳副所长、郭燕枝研究员、王靖研究员、周琳副研究员也分别作了专题报告，分享了我所近年来在食物营养领域的最新研究进展和成果。来自德国的马克斯·鲁布纳研究所（MRI）、联邦营养中心（BzFE）、化学品和兽药调查办公室（CVUA）、联邦消费者保护与食品安全办公室（BVL）和中科院上海营养科学研究所、中国疾控中心营养与健康所、北京大学公共卫生学院、北京市营养源研究所、中国农科院质标所等食物营养相关研究机构的知名专家，围绕食物营养管理、农产品营养品质评价、食品质量与全价值链营养保持技术、食品真实性和可追溯性等方面做了专题报告，深入交流了两国在食物营养管理和研究领域的做法经验和最新进展，并针对营养管理、质量安全、肉类和谷薯类产品生产和消费等领域进行了分组讨论与合作洽谈，双方科学家均表示会后要继续就下一步合作的领域、内容、方式等进行了详细洽谈，争取开展实质性合作。

此次会议的顺利召开为保障国家食物安全供给、优化食物结构、强化居民营养改善、促进食物生产消费营养协调发展、提高国民素质和健康水平提供了决策支持，为加强中德双方在食物与营养领域的交流合作搭建了良好的平台，对推动两国营养改善具有重要意义，同时对提升我所在国内外食物营养研究领域的学术影响力、拓展国际合作渠道具有重要的推动作用。

Link to original article on CAAS website
Coverage in Chinese news media

The Sino-German Workshop on Food and Nutrition was well-covered in Chinese news media. The IFND and the FECC had contacted a total of nine print and online news media which sent journalists during Day 1 of the Workshop. Below is a list of the news media with links to the corresponding articles on their websites or on the WeChat platform:

**Farmers Daily**
A scan of the print article from Farmers Daily plus English translation is included in Annex.
Online paper:
WeChat (link expired):
https://mp.weixin.qq.com/s?__biz=MzUyNjEyNTEyNQ==&mid=2247484013&idx=1&sn=f55640acc754fada77ff1871cf24044&chksm=fa12d347cd655a512fd7e53d1e8b523e99277ddef2f088bac1431799db12c65cc3589ae68a9d&mpshare=1&scene=1&srcid=12043qCuokZmO8GCrl6hyJhC&pass_ticket=cKLrjVx3giaQGqfRcon6d3t8y%2BGk4fDSLq4qSA2ckjboowt4ZPrznqYgEur5WhQe#rd

**China Food Daily**
http://old.cnfood.cn/n/2017/1205/118039.html?from=singlemessage

**Life Times**

**Health Times**
WeChat:

**China Food Safety Daily**
http://www.cfsn.cn/industry/2017-12/02/content_288733.htm?from=timeline

**Health Newspaper**

**China Rural Science and Technology**
Online paper:
WeChat:
https://mp.weixin.qq.com/s?__biz=MjIyM5NjY5Njc1Mw==&mid=2680257687&idx=2&sn=5cc44ddc3f45c02994b44212cee96b&chksm=bdcd09b498ba7125f15392270b85aaefc77069f90a03b06f385c9357e5182ef4d15284750025&mpshare=1&scene=1&srcid=12062SdaCjAcR7MUQLdx8L2y&pass_ticket=r4N%2F6N77xhqmKN%2B%2FDSkAfxtZLV2FexmF577jDi2MkbaJmwe%2F6TBUDGKNKtwb#rd

**China Economic Network**
http://www.ce.cn/cysc/sp/info/2017/12/02/t20171202_2707268.shtml
Annexes:

Farmers Daily article of Dec. 04, 2017 + English translation (by Mr. Guo Chengkuan)

Workshop programme
中德食物营养研讨会在北京召开

中德两国农业发展具有区域的互补性，中国与德国在农业合作领域具有巨大的合作潜力。德国农业部和中国农业部于2017年12月在北京召开了“中德食物营养研讨会”，旨在探讨两国在食物营养安全、食品安全和健康促进等方面的合作。研讨会吸引了来自中德两国的专家、学者和相关机构的代表参加。与会代表就食物营养安全、食品安全和健康促进等议题进行了深入的交流和讨论。研讨会的成功召开，为中德两国在农业领域的深入合作奠定了坚实的基础。
Sino-German Workshop on Food and Nutrition Held in Beijing

( Correspondent Lu Jing) In order to discuss food nutrition development strategy and exchange experience on food nutrition management and research, the Sino-German Workshop on Food and Nutrition was recently held at the Chinese Academy of Agricultural Sciences(CAAS). 16 Chinese and German food nutrition experts gave oral presentations under themes such as food nutrition management, quality evaluation of agricultural products, food quality and nutrition preservation technology during the full value chain, food authenticity and traceability and so on. At the same time, they also discuss the fields, themes and methods of cooperation between China and Germany in next year.

As far as the participants are concerned, it is the fundamental task for socioeconomic development to maintain food safety and improve nutrition. It also receives so much concern and attention from all governments and people around the world. At present, although global grain output, especially of major crops, is increasing, the ever-growing needs still can not be satisfied. Some serious problems still exit in food safety and nutrition improvement. Therefore, all countries need to adopt practical and efficient policies in accordance with their own national realities. Meanwhile, international cooperation in many fields should be enhanced.

The Sino-German Workshop on Food and Nutrition offered decision support to maintain supply of safe food, optimize food structure and promote food production consumption and nutrition coordination. It also established a good platform for strengthening Sino-German exchanges and cooperation on food and nutrition. In conclusion, it played an important role in promoting Sino-German nutrition improvement.

The participants highlighted that China and Germany can complement each other in agricultural development. Since Agreement regarding Scientific and Technological Cooperation in the field of Agricultural Research was signed in 1981, many projects have been jointly implemented by the two countries. At the same time, we realized many outstanding scientific achievements and established a long-term cooperation mechanism on biotechnology, food safety, plant and animal genetics and breeding, plant protection and biomass energy.

DCZ was jointly established by Ministry of Agriculture(MOA) of the People’s Republic of China and Federal Ministry of Food and Agriculture(BMEL) in Germany in March 2015. As a bilateral organization, it aims to enhance agricultural exchanges and cooperation between China and Germany. Since the establishment of DCZ, it has positively implemented the strategic consensus reached by the Chinese President and the German Chancellor. A series of fruitful and successful cooperation projects have been made on policy dialogue, farmer vocational training and enterprises exchanges. The center build up a mutually beneficial exchange platform for government departments, scientific research institutions and agricultural enterprises.

As an event during the Sino-German Agricultural Week, the Workshop was sponsored by MOA and BMEL, organized by Foreign Economic Cooperation Center(FECC) of MOA, International Cooperation Department of CAAS and Institute of Food and Nutrition Development of MOA. In addition, the Sino-German Agricultural Science and Technology Cooperation Platform also gave its support.
Sino-German Workshop on
Food and Nutrition – Strategies and Research

30 November - 1 December 2017

Beijing, China

(Programme)

Organized by:
Foreign Economic Cooperation Center, MOA, P.R. CHINA
Department of International Cooperation of CAAS
Institute of Food and Nutrition Development of MOA

In cooperation with
Sino-German Agricultural Science & Technology Cooperation Platform

Sponsored by:
Dept. of International Cooperation, Chinese Ministry of Agriculture MOA
German-Chinese Agricultural Center (DCZ)

3rd Sino-German Agricultural Week, Nov. 27 - Dec. 1, 2017
Wednesday, November 29th 2017

08:00-10:00  Arrival and Check-In at the Friendship Hotel, Building no. 2 (Jingbin Lou)

09:00-17:00  “Open Day” of German-Chinese Agricultural Center (DCZ)

Venue: Zhong-Ou Hotel, Meeting Hall first floor, Maizidian Xijie, Chaoyang District, 100125 Beijing

(see separate “Open Day” programme for details)

Presentations and posters

12:30-13:30  Lunch Buffet at Zhong-Ou Hotel

Presentations and posters

15:45-16:00  Tea break and Posters

Presentations and posters

18:00-20:30  Dinner at Kunlun Hotel, Beijing (upon invitation only)
Thursday, November 30th 2017: MORNING PLENARY SESSION

Main Building Meeting Hall at the Headquarter of CAAS

08:30-09:00  Arrival and Registration

Chairperson: Wang Dongyang

09:00-09:30  Opening Statements

Prof. Dr. WU Kongming, Vice President, CAAS
Mr. LI Bo, DDG, Department of Science and Education, MOA
Mr. Friedrich WACKER, DDG, Department of International Cooperation, BMEL
Mr. HU Yan’an, DDG, Foreign Economic Cooperation Center (FECC), MOA
Dr. Dietrich GUTH, Political Director (German side), DCZ

09:30-09:50  Group photo and coffee break

Chairpersons: Wang Dongyang, Marco Roelcke

09:50-10:55  Keynote Presentations

09:50-10:25  Importance of fruits and vegetables in healthy nutrition
Dr. Daniela Graf, Dept. of Physiology and Biochemistry of Nutrition, Max Rubner-Institute (MRI), Karlsruhe

10:25-10:55  Profile of Food and Nutrition Development in China - Achievements and outlook
Prof. Wang Xiaohu, Institute of Food and Nutrition Development of MOA, Beijing

Chairpersons: Wang Dongyang, Manfred Stoyke

10:55-11:20  The German Federal Centre for Nutrition – Activities for Improved Nutrition in Germany
Dr. Anika Reinbott, German Federal Centre for Nutrition (BZfE), Bonn

11:20-11:40  Chinese Residents’ Nutritional Status and Interaction Strategy
Dr. Ding Gangqiang, National Institute for Nutrition and Health Chinese Center for Disease Control and Prevention, Beijing

11:40-12:00  Research on per capita food demand of Full-scale Well-off China
Dr. Wang Dongyang, Institute of Food and Nutrition Development of MOA, Beijing

12:00-13:30  Lunch buffet at Qinyuanfu Restaurant of CAAS
Thursday, November 30th 2017: AFTERNOON PLENARY SESSION

Main Building Meeting Hall at the Headquarter of CAAS

Chairpersons: Ma Guansheng, Fredi Schwägele

13:30-13:50 From Precision Medicine to Precision Health and Precision Nutrition
*Dr. Chen Yan, Institute for Nutrition Sciences, SIBS, Chinese Academy of Sciences*

13:50-14:20 The BVL and its laboratory coordination and NRL activities
*Dr. Manfred Stoyke, Federal Office of Consumer Protection and Food Safety (BVL)*

14:20-14:40 Application of System Nutrition in Nutrition and Health Research
*Dr. Li Dong, Beijing Research Institute for Nutritional Resources*

14:40-15:00 Hygienic Status of mixed salad
*Dr. Bernhard Trierweiler, Dept. of Safety and Quality of Fruit and Vegetables, Max Rubner-Institute (MRI), Karlsruhe*

15:00-15:15 The Evolution and Development of Chinese Food and Nutrition Outline
*Dr. Guo Yanzhi, Institute of Food and Nutrition Development of MOA, Beijing*

15:15-15:35 Application of NMR in Official Food Control in Germany
*Svenja Ackermann, Chemical and Veterinary Investigation Office CVUA, Karlsruhe*

15:35-15:50 Food loss in meat supply chain and the effective meat supply in China
*Dr. Zhou Lin, Institute of Food and Nutrition Development of MOA, Beijing*

15:50-16:05 Tea break

Chairpersons: Chen Ailiang, Bernhard Trierweiler

16:05-16:25 Nutrition Solutions through understanding food, eating behavior, and culture
*Dr. Ma Guansheng, Faculty of Public Health, Peking University*

*Dr. Klaus Vosmann, Dept. of Safety and Quality of Cereals, MRI, Detmold*

16:45-17:00 A prospective clinical study to evaluate the efficacy of nutritional intervention using dual protein for leukemia patients
*Dr. Wang Jing, Institute of Food and Nutrition Development of MOA, Beijing*

17:00-17:20 High-quality bread wheat – new insights
*Dr. Georg Langenkämper, Dept. of Safety and Quality of Cereals, MRI, Detmold*

17:20-17:40 Food authenticity identification and traceability technology research
*Dr. Chen Ailiang, Institute of Quality Standard and Testing Technology for Agro-products (IQSTAP), CAAS, Beijing*

17:40-18:00 Not labelled addition of foreign proteins and protein-hydrolysates in meat products
*Dr. Fredi Schwägele, Dept. of Safety and Quality of Meat, MRI, Kulmbach*

18:00-18:10 Closing remarks day 1, announcements
*Dr. Marco Roelcke, Dr. Wang Dongyang*

19:00-21:00 Dinner/banquet at Friendship Hotel
Friday, December 1st 2017

Institute of Food and Nutrition Development, CAAS, No. 426 meeting room, 4th floor

Participants: German and Chinese invited experts and interested workshop participants.

Chairpersons: Sun Junmao, Marco Roelcke

09:00-09:10  Short summary of day 1

09:10-10:10  Structured discussion on relevant topics from Day 1, on topics of possible funding, finding of joint bilateral partners, etc.

10:10-10:30  Coffee/Tea break

10:30-12:45  Loose meetings and discussions between German and Chinese partners and stakeholders, split up into small groups, for bilateral talks on specific topics, with the aim of preparing future research or industry collaborations.

12:45-13:00  Conclusion

13:00-14:30  Lunch buffet at Qinyuanfu Restaurant of CAAS
Saturday, December 2\textsuperscript{nd} 2017

Whole day  Visit of other institutions and/or sightseeing for German participants

Sunday, December 3\textsuperscript{rd} 2017

10:00  Check-Out at the Friendship Hotel, departure for airport (German participants)
Venues:

Main Building Meeting Hall at the Headquarter of CAAS (Nov. 30)

and

No. 426 meeting room at IFND, CAAS (Dec. 1)

Address: No. 12, Zhongguancun South Street, Haidian District, 100081 Beijing.

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