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## Fermentation specialist competency profile: current trends

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## Fermentation specialist competency profile: current trends

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**Abstract.** The work presents the results of a survey of fermentation specialists in the south of Russia who expressed their opinion on the current profile of competencies that should be presented in the educational program to ensure the competitiveness of a university graduate in this area of training. We conducted a survey of scientific publications in the subject area - the competence of a modern specialist in fermentation production. As a result, relevant technological innovations of fermentation production were established, associated, firstly, with the chemical component of the production process, secondly, with the physical and technological conditions for its implementation, and thirdly, with market conditions and emerging gastronomic regional and global trends. The expert community assessed the competencies of the Federal State Educational Standard on the degree to which graduates of the training program “Food products from plant materials” are formed, which shows that the following competencies remain less formed: the ability to use information technologies to solve technological problems in the production of food products from plant materials (noted by 63, 6% of the number of respondents); the ability to use the principles of the quality management system and the organizational and legal foundations of managerial and entrepreneurial activity (noted by 54.5% of the number of respondents); the ability to search, store, process and analyze information from various sources and databases, present it in the required format using information, computer and network technologies (noted by 45.5% of the number of respondents).

### 1. Introduction

For the viticulture and wine-making industry of Stavropol Krai, as well as for the entire industry as a whole, the personnel problem is a priority. It is necessary to improve the skills of personnel, to train new specialists (winegrowers and winemakers) of top and middle, and lower level. Leading winemakers, technologists, agronomists and winegrowers of specialized farms are mainly of pre-retirement and retirement age. Specialized vineyards come with less and less winegrowers and winemakers with special education.

As a result, as of September 1, 2019, the supply of the industry in the region with specialists with higher professional education is from 50 to 90%, with secondary professional education – up to 95%. Considering the high average age of specialists in the wine-growing and wine-making industry and production growth there is a very high demand for winemaking technologists, mechanical engineers, and winegrowing agronomists for the forecast period (2015-2020).

Training of personnel for the wine industry in Stavropol Krai is carried out by Stavropol State Agrarian University and Praskoveysky Agricultural College, graduates are employed at many enterprises of the North Caucasus and Southern Federal Districts.

Currently, Stavropol State Agrarian University provides training for specialists in the following



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areas:

19.03.02 – Food products from plant raw materials, profile – Fermentation technology and winemaking, undergraduate;

19.04.02– Food products from plant raw materials, profile – Technology of alcoholic, low-alcohol and non-alcoholic drinks, master’s program.

Every year, Stavropol State Agrarian University graduates 20 engineers in the field of preparation “Food products from plant raw materials” and the training profile “Fermentation technology production and winemaking”, with 50% of the specialists working in the brewing industry.

According to graduate employment data for 2018-2019 more than 95% work within their profession. In recent years, the percentage of graduates employed in their profession has increased. This is due to the expansion of the student practice base, which currently covers enterprises not only in Stavropol Krai, but also in the neighboring regions. Students-trainees show a high level of professional skills and abilities, thanks to which the majority of students remain in enterprises with subsequent employment.

## 2. Materials and methods

The authors Hittinger C.T., Steele J.L., Ryder D.S. in the article “Diverse yeasts for diverse fermented beverages and foods” shows the role of yeast bacteria in modern food biotechnology, in particular in fermented foods. The value of the study to form the profile of the competencies of a modern specialist in fermentation production is the wider use of the possibilities of yeast fermentation in ensuring the quality and variety of fermented products in food biotechnology. It described the mechanism of interaction of yeast with other microbes and the process of encoding valuable traits in their genomes. [1] Fermentation processes and related improvement opportunities are presented in a number of publications. [2, 3, 4, 5, 6, 7]

New trends in world gastronomic preferences are considered by Bene Z., Piskóti I. in the publication “Assessment of orange wines in the light of new food consumption trends”. In particular, we are talking about orange wines, as a special phenomenon. It described the general principles of the technological process of making orange wines. The value of this publication for the formation of a competency portfolio of a fermentation specialist lies in informing students about modern world gastronomic trends and using the wishes of consumers in new technological developments of fermentation specialists. [8, 9, 10]

The development of modern brewing technology in its publication “Beer-brewing powered by controlled hydrodynamic cavitation: Theory and real-scale experiments” was reported to the scientific community by authors Albanese L., Ciriminna R., Meneguzzo F., Pagliaro M. It is noted that a relatively long period there have been few innovations in beer technology. At the same time, the modern consumer market of this particular product is constantly expanding and there is a need to improve technological processes. The authors emphasize that it is the hydrodynamic cavitations’ technologies, the use of which was proposed back in the late 20<sup>th</sup> century, that provide such advantages as acceleration of extraction processes, disinfection and energy efficiency can be used in beer production and significantly increase its efficiency. Such important technological competencies as the use of modern technologies in the organization of fermentation production will significantly increase the competitiveness of a modern specialist. [11, 12, 13, 14]. Similar technological developments related to the technical component of fermentation production are presented in a number of publications such as “Ultrasonic innovations in the food industry: From the laboratory to commercial production” Patist A., Bates D. [15, 16, 17, 18].

Thus, based on the analysis of publications, we can conclude the areas of scientific discussion in the subject area – the competence of a modern fermentation specialist. Technological innovations are relevant, related, firstly, to the chemical component of the production process, secondly, to the physical and technological conditions for its implementation, and thirdly, to the market conditions and emerging gastronomic regional and global trends.

The scientific discourse confirms the relevance of the study of the profile of competencies of a specialist in fermentation production and the orientation of educational programs to the needs of modern production.

During the preparation of the expert survey we carried out an analysis of scientific publications, which reflected current trends in the development of fermentation industries, studied the Federal State Educational Standard in the direction of preparation of “Food products from plant raw materials” undergraduate level and developed an expert questionnaire to determine the profile of the current competencies of the graduate of the educational program.

A survey of specialists in the direction of preparation “Food products from plant raw materials” was conducted in February 2019 by the individual survey method. In total, 27 specialists - engineers, chief technologists of the leading plant processing enterprises of the South of Russia took part in the survey. The data were verified as part of a discussion of the results of an expert survey by scientific and pedagogical workers implementing the educational program at Stavropol State Agrarian University.

### 3. Results

The ranking by the expert community of the competencies represented in the current FSES of the training direction “Food products from plant raw materials” in terms of importance shows that the first 3 places are occupied by the following competencies: the 1<sup>st</sup> place – the ability to organize the technological process of food production from plant materials and the work of the structural unit (noted by 63.6% of survey participants); the 2<sup>nd</sup> place – the ability to develop measures to improve technological processes for the production of food from plant materials; ability to master safety regulations, industrial sanitation, fire safety and labor protection; the ability to justify and implement technological layouts, selection of equipment for technological lines and sections for the production of food products from plant raw materials (each of the listed competencies was noted by 54.5% of the survey participants); the 3<sup>rd</sup> place – the ability to determine and analyze the properties of raw materials and semi-finished products that affect the optimization of the technological process and the quality of finished products, resource saving, efficiency and reliability of production processes; the ability to master advanced methods of selection and operation of technological equipment in the production of food products from plant materials; ability to master the methods of techno-chemical quality control of raw materials, semi-finished products and finished products; the ability to apply specialized knowledge in the field of technology for the production of food products from plant materials for the development of specialized technological disciplines; the ability to manage existing production lines (processes) and identify objects to improve the technology of food production from plant materials; the ability to master the methods of calculating technical and economic efficiency in choosing the best technical and organizational solutions; ways of organizing production and efficient work of the labor collective based on modern management methods; the ability to master the principles of choosing rational methods of protection and the order of actions of the enterprise team (workshop, department, laboratory) in emergency situations; the ability to use standard software in the development of the technological part of the projects of food enterprises, the preparation of tasks for the development of related parts of projects (each of the listed competencies was noted by 45.5% of the survey participants). The expert community assessed the competencies of the Federal State Educational Standard on the degree to which graduates of the training program “Food from plant raw materials” have graduated, which shows that the following competencies remain less formed: 1st place – the ability to use information technology to solve technological problems in the production of food from plant materials (noted 63.6% of the number of respondents); 2nd place – the ability to use the principles of a quality management system and the organizational and legal foundations of managerial and entrepreneurial activity (noted by 54.5% of the number of respondents); 3rd place – the ability to search, store, process and analyze information from various sources and databases, present it in the required format using information, computer and network technologies (noted by 45.5% of the total number of respondents).

Among the difficulties faced by experts – most of them are the graduates of last years of Stavropol State Agrarian University, mention a lack of practical skills (noted by 54.5% of the number of respondents), difficulty in getting used to working hours, working conditions, loads (noted by 27.3 % of the number of survey participants); lack of communication skills with colleagues and subordinates (noted by 9.1% of the number of survey participants). The remaining 9.1% of the survey participants did not experience difficulties. During the survey, experts explained that the allowances and bonuses that they receive at work are related to the results of the enterprise as a whole and a separate unit (noted by 72.7% of the total number of respondents), as well as overtime, weekend work and holidays (noted by 63.6% of the number of respondents). In addition, one in five of the experts surveyed said that special achievements and rationalization proposals were encouraged in the work. Thus, among the competencies of graduates, the most important for successful work in production is the focus on the employee's activities for the final result, understanding of the production need for overtime work, weekends and holidays.

The ranking of qualities that, in the opinion of the survey participants, are necessary for the successful performance of labor functions, showed that such qualities as accuracy, diligence, and learning ability are in the first place (noted by 45.5% of the survey participants); in second place – sociability, the ability to communicate, the ability to plan working hours, the ability to independently set a task and make decisions (noted by 36.4% of the respondents); in third place by the significance – the ability to work in a team (noted by 27.3% of the survey participants). According to experts, the qualities that are somewhat less significant for successful work are the ability to do analytical work, creative qualities, and the ability to solve non-standard problems.

The competitive situation in the regional labor market among technologists of food production from plant materials is quite intense. According to estimates of about a third of experts, work in the field of training is easy to find in Stavropol Krai. A third of experts say that you can find a job if you try hard and another third have chosen the option “it's almost impossible”.

The professional community of technologists of food production from plant materials is characterized by a high degree of interest in professional activities and is aimed at developing both special professional competencies and managerial qualities. Accordingly, the competitive environment for graduates of the training direction “Production of food products from plant raw materials” requires a high level of professional training.

#### 4. Conclusion

Future specialists associate their expectations with high social status in the professional and local community. And, accordingly, they claim all the attributes associated with a high status: a high salary, a real estate ownership, an intellectual work lifestyle, and leadership in the production team and the local community.

The claims of graduates of agricultural universities, justified from the point of view of high social status, should be accompanied by a meaningful context: professional competence and universal social skills that provide leadership in the production team.

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