

## DESCRIPTION FOR THE GENERAL PUBLIC

The aim of the research is to determine the effect of ethanol fermentation conditions on the concentration of volatile components in fermented apple musts. Basic materials for the study will be 3 national varieties of apples: Topaz, Rubin and Elise, which were chosen in a previously conducted preliminary studies. Fermentation will be carry out using different strains of wine yeast (Tipico F3, Veltliner F3, InterDry F3, Elegance), cider yeast (Cider Yeast, French Cider Gozdowa), spirit yeast (RED Ethanol, Spiriferm Arom) and selected wild yeast (Wild & Pure). The fresh feed and fermented samples will be analyzed against basic physico-chemical parameters (total extract, ammonium content, total acidity) according to methods recommended by Organisation of Vine and Wine (OIV). The content and profile of sugars will be analyzed by HPLC, the content and profile of volatile compounds by GC-FID and GC-MS methods. In addition, ethanol content will be analyzed in fermented apple mash (OIV methods). The following pretreatments will be considered: keeving (defecation), microoxidation and supplementation of musts with mineral compounds supplemented (ammonium sulfate (VI), magnesium sulfate (VI), ammonium phosphate (V)).

The main reason to take the research subject is to seek directions of utilization of apples. As a result of Russia's embargo (since autumn 2014) the situation of apples on Polish and European markets has radically changed. There are also changes in the quality requirements and methods of apples distribution. However, consistently falling consumer interest in fruit wine due to their low quality. In the face of reduced consumption of fruit wines, some manufacturers and new companies offered production of high quality wines (often referred to as organic and regional products). The quality of fermented musts largely depends on aroma profile of volatile compounds. Qualitative and quantitative composition of volatile compounds in alcoholic beverages depends mainly on the type and quality of raw materials and yeast, conditions of fermentation, wine aging and storage of the final product. Aroma compounds can give pleasant smell and taste or deteriorate the organoleptic properties in wines. The aroma profile of alcoholic beverages consists mainly of: esters, aldehydes, fusel alcohols, organic acids and poorly studied terpenes. Qualitative and quantitative composition of terpenes in fermented apple must is not examined in detail, however according to some sources eugenol (cloves, sweet and spicy aroma), chawicol and isoeugenol (cloves-cinnamon flavor) were detected.

Application various genera and species of wild, cider, wine and spirit yeast for fermentation affects quality parameters and profile of volatile compounds of fermented apple musts (e.g. higher concentration of ethyl acetate in beverages fermented spontaneously or with wild yeast). The addition of fermentation simulators (ammonium sulfate (VI), magnesium sulfate (VI), ammonium phosphate (V)) to the substrate can decrease concentration of undesirable volatile compounds (mainly aldehydes, carbonyl compounds and higher alcohols) and increase the share of valuable aroma components - esters and terpenes. It is innovative to apply microoxidation method in apple wine production and idea of using this method as a factor increasing production of terpenes (which are formed by the transfer of alcohol group and oxidation to aldehyde, ketone or carboxyl group). Microoxidation that is applied to the red wines production has not been examined in detail. Furthermore, there is a lack of references regarding the use of this method in apple wine production therefore, it seems justified to continue that research. Esters have significant influence on the flavor of final product, although they are present in low amounts in alcoholic beverages. Lowering the level of nutrients in an apple juice as the result of defecation, will cause a slowdown in fermentation processes and will lead to enhanced esters production. It is expected that decreasing nutrients in medium (mainly amino acids), reduces content of fusel alcohols (produced by decarboxylation and then deamination of essential amino acids). Fusel alcohols at concentrations above 400 mg/dm<sup>3</sup> are not desirable in alcoholic beverages.