

**TECHNOLOGICAL EVALUATION OF BREWING QUALITIES
AROMATIC AND BITTER HOPS VARIETIES AND THEIR PRODUCTS.**

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The quality and efficiency of beer brewing industry mainly depends on the quality of hops, the major and expensive raw materials for beer production, as well as the products that are obtained from it.

In the modern brewing industry in Ukraine and in most countries, a significant widespread natural products processing hop – granules, carbon dioxide and ethanol extracts. Products hop different from their biochemical composition from the native hops need to study their brewing properties with a view to rational use in brewing. Ukraine has grown aromatic and bitter hop varieties, which differ in chemical composition, affecting the final result in its content and in products hop survival, and therefore the quality of the brewery.

Considering of large variety of hops and hop's products which used in the domestic brewing industry and different composition of bitter substances, polyphenols and essential oils need individual approach to each brewing technology hop's products to get beer from a stable, balanced bitterness. Thus technological assessment brewing qualities of aromatic and bitter varieties of hops pressed cones hop and its products are urgent problem today.

The aim of research was complex technological impact assessment aromatic and bitter varieties of hops pressed cones hop and its products, both domestic and foreign production in quality beers.

Materials and methods of research. Research carried out in 2012 – 2015 in the department of technology of storing, processing and product standardization by prof. B.V. Lesik of National University of Life and Environmental Sciences of Ukraine and certified laboratories in the Department of Biochemistry of hops and beer Institute of

Agriculture Polissia NAAS (Zhitomir). Given the significant differences in the biochemical composition of aromatic and bitter varieties of hops for experiments as research objects were taken: pressed cone hops and pellets type 90 typical of these groups of aromatic varieties (Slavyanka, National, Zagrava) and bitter (Alta Hercules) types, the most common in Ukraine production conditions; pellets type 45 varieties Spalt Selekt and Tradytsion; carbon dioxide and ethanol extracts grade Hercules foreign production.

Research brewing beer of the above varieties of hops and pressed cones hop and products hop were conducted in the laboratory department of biochemistry beer hops and beer Institute of Agriculture Polissia mini-brewery with a yield of 100 liters. Boiled wort from products hop 90 minutes. In hopped wort and beer bitterness spectrophotometric method determined EBC. Total polyphenols in wort and beer were determined by spectrophotometer method Yerumanisa. Quality was assessed by organoleptically beer tasting in the tasting commission approved the above-mentioned institute according to the requirements imposed on beer by 25-point system.

Results. The results of the studies received all samples of beer produced by classical technology light unfiltered beer to meet the requirements of the current ISO 3888: 2015. Beer. General specifications. All samples received our beers were good to excellent overall assessment and the number of points obtained differed not significantly. Each of the sample of beers was different to taste, flavor or quality and completeness of bitterness. Norma of pressed cones hops (products hop) for obtain hopped wort was designed by the content of alpha acids in accordance with the branch Instruction TI 10-04-06-136-87. Hopped wort carried out at the rate of 50 mg of bitter substances in the delicately aromatic on the 1 dm³ of wort. However, the taste and quality of beer bitterness in different samples were unequal. We confirm conducted research with different content in these sorts of hops and products hop used to hopped wort, bitter substances and other components. If you make a wort boiler products hop different with the same content of alpha acids make different amounts of other ingredients for brewing hops. The quality of beer produced by the same technology, but with different breeding varieties of hops and products hop significantly different.

The results of all the tasting samples of beer had a nice fresh beer flavor. Aroma hops felt good in the first 8 variants. In samples of beer made from ethanol extract of hop varieties Hercules and carbon dioxide hop extract aroma hop varieties Hercules hardly felt. The first, second, fifth and sixth samples of beer for hop bitterness and flavor quite similar. Bitterness is very light, gentle, soft, but in the fifth and sixth samples somewhat excessive. The taste of beer is full, harmonious. The third and seventh samples also the quality and taste bitter like. Beer was linked harmonious taste and a pleasant, balanced bitterness. But the bitterness of the seventh sample more intense. In the fourth, eighth and eleventh samples bitterness rough. Do not feel full taste. The ninth sample the beer was bound, balanced bitterness with a pleasant hop aroma. The tenth sample the beer was fresh hop aroma. This sample had a harmonious taste and pleasant bound, balanced bitterness.

The twelfth and thirteenth samples to taste and bitterness hardly differ. Bitterness was rough residual. Beer was empty, not full taste.

Conclusions

1. Technological evaluation of breeding varieties of hops and pressed cones hop and products hop in the period 2012-2015 years showed that all are delicately aromatic and aromatic hop varieties Slavyanka, National, Zagrava and pellets type 90, are made of them, and the pellets type 45 Tradytsion and varieties Spalt Selekt suitable for both independent use in brewing, and for improving the taste of beer combined with other products processing.

2. Beer is made from hops pellets, especially varieties Zagrava little excessive bitterness because rationing pellets for hopped wort appropriate to mash with savings up to 10 %.

3. Self cones hop using pressed pellet hops and bitter varieties Alta and Hercules lets not bitter beer of excellent quality.

4. Carbon dioxide and ethanol extracts for independent use in brewing are not suitable. We can recommend their use in combination with aromatic varieties, while respecting the specific technology.