

Usage of Wood Vinegar as New Organic Substance

Jahangir Payamara

Shahed University science faculty. Physics Deptment, Tehran – IRAN

Corres.author: jahangirpayamara@yahoo.com

Abstract: The alternative technique for utilization of wood is carbonization product, which are charcoal and wood vinegar. The major component of wood vinegar products are acetic acid, methanol, propanoic acid, phenolic and carbonyl compounds. The wood vinegar improves soil quantity eliminates pests, accelerating plant growth, plant growth regulator or growth inhabiting. The bio-test of wood vinegar to inhibit the growth of xanthomonas comprestris pv. The wood vinegar was applied on maize with spraying on leaf compare with spraying on soils every 6 days after planting. The acidity range 1.95 to 2.14 the major component in wood vinegar was observed to be acetic acid.

Key words: deodorizer medicine, charcoal, carbonization, wood vinegar, pests.

Introduction

Wood waste with less than 10 inches in diameter for coarse goods such as different types of dolls, decorative, with diameter less than 4 inches are conveyed to make compost and a large amount of wood with diameter large than 4 inches are transported to landfills. Wood vinegar has been used for ages as a sterilizing agent. It can inhibit cancer diseases, deodorizer medicine¹. Pyroligneous acid is obtained by the dry distillation of wood. This is a development of traditional process of charcoal burning or the burning of wood in an airless condition reducing it to a charcoal rather than a carbon dioxide, water vapor of firebricks is substituted for the mound of earth, and a

device is added to collect and cool the vapors released to condense them. Charcoal can be used as firewood for cooking and warming in household, wood vinegar can be used as a biocide for agriculture, livestock etc. The condensate consists of pyroligneous cooling wood vinegar is slightly toxic to fish and very toxic to plants if too is applied^{2,3}.

Instrumentations

The systematic diagram of carbonization kiln is shown in figure 1. The system contains of dryness and carbonization part, hot blast stove, discharge conveyer, burner, dryness, carbonization screw exhaust fan and furnace.

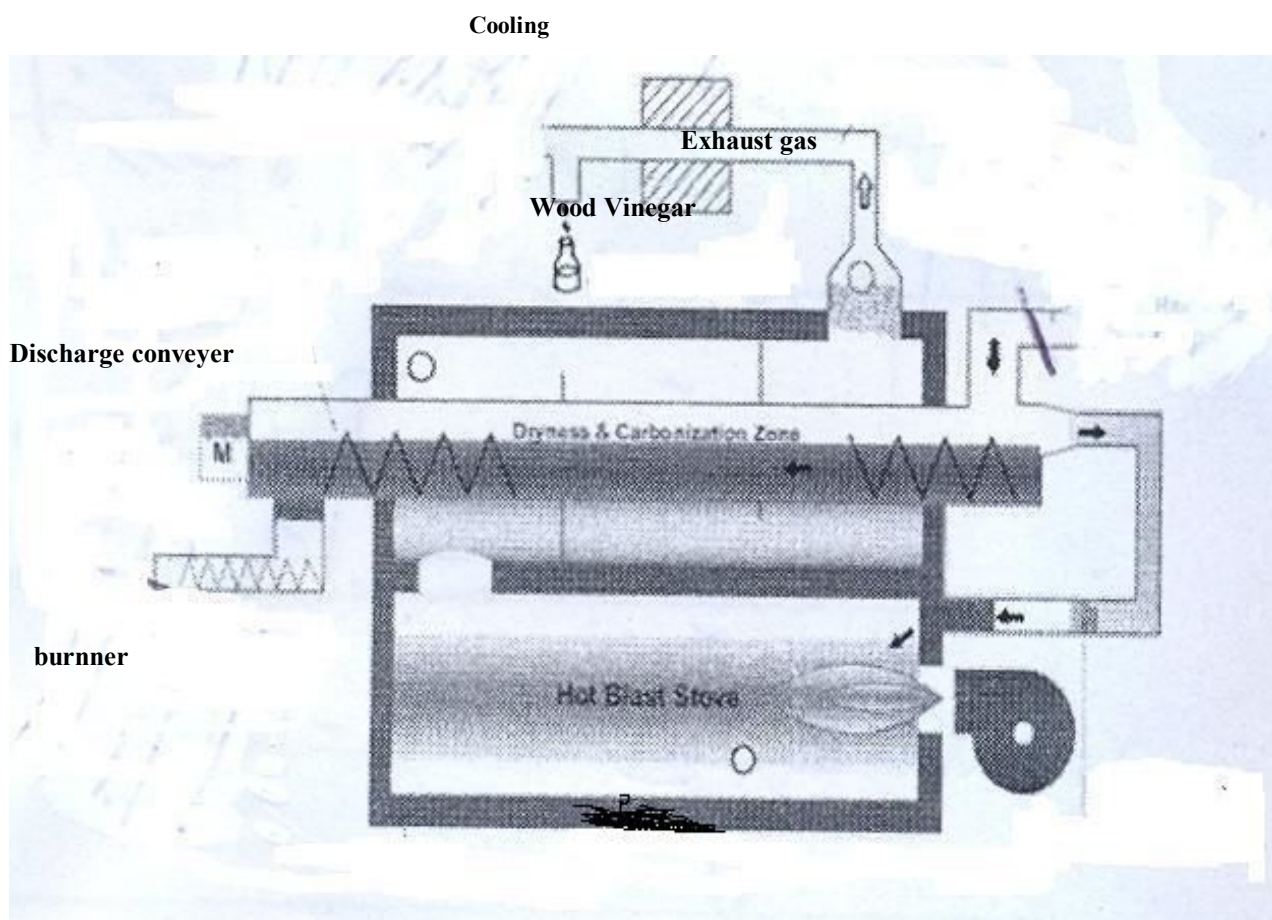


Fig.1.Schematic diagram of the carbonization process.

Measurements

The charcoal and wood vinegar were collected at the end of reaction. The wood vinegar is kept for three months in dark room before testing. The testing of the wet and dry samples accomplished according to⁴. The average amount of wood waste generated in Lahejan area can be measured about 40000 tons/year.

The products of from the carbonization process with the combustion temperature of 440°C for 100 minutes were as follows, gas 42.2%; wood vinegar 24.86%; tar 0.78% and charcoal 29.50%. The productions of charcoal at the average percentage ash, carbon, sulfur, heat content (kcal/kg), moisture content and volatile matter for wet sample obtained 14.9, 62.0,

0.21, 5772, 4.2 and 14.1 respectively and for dry sample obtained 16.2, 66.0, 0.20, 5900, zero and 15.7 respectively. The higher heat content can be obtained at temperature more than 500°C which it is accompany with decreasing in wood vinegar content. Wood vinegar obtained is viscous liquid, and with low pH. Wood vinegar contains acetic acid, methanol and propanoic acid⁵, the average percentage 34.40, 5.20 and 2.00 respectively⁶ which results agree with that of Hata, T.. The higher concentration of wood vinegar contains phenolic compound from lignin degradation which attributed to enhance the inhibition of bacteria growth.

Table 1: The Production of Caronization of wood waste.

Products	Average (%)
Charcoal	30.1
Wood vinegar	25.1
Tar	0.85
Gas	44.9

Table 2: Production of Charcoal from the Caronization of wood waste.

Characterization	Wet weight(%)	Dry weight (%)
Moisture content	4.2	0.001
Volatile matter	14.1	15.8
Fixed Carbon	62.0	66.0
Ash	14.9	16.2
Sulphur	0.21	0.20
Heatcontent kcal/Kg	5,772	5,900

Table 3: The main chemical components of Wood vinegar.

Chemical components	Contents(%)
Acetic acid	34.40
Propanoic acid	2.00
Methanol	5.20

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Figure2.Pilot of coal kiln in north .

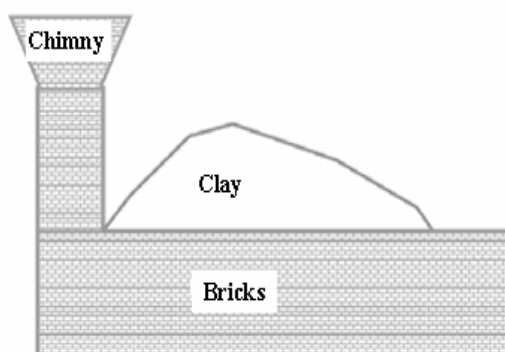


Figure 3.Structure of coal kiln.



Figure4.a) Damaged leaf of maize cause by insect pests. (b) Normal leaf with treatment of wood vinegar.

The charcoal & wood vinegar were collected at the end of reaction Good wood for vinegar must have heartwood. Wood is burn at 120 - 300°C. the smoke from carbonization is cooled by the outside air when passing through the chimney occurs to produce pyroligneous liquor the hot steams condensed into liquid were collected, it is called raw pyroligneous liquor or raw wood vinegar¹¹. Wood vinegar were blend with water in ration of 1: 50; 1:400; 1:300; 1:200; 1:100 and control(water) and were applied on maize of 6 days old by spraying on leafs & soils. The experimental design was randomized complete block with 6 treatments and 10 replications, fig.4(a) shows damaged leaf of corn caused by insect pests and (b) normal leaf after treatment with wood vinegar. Wood vinegar can be used in several purposes including pest control, improving soil fertility, plant growth accelerating substances, plant growth regulator, or growth inhibiting^{12,13}.

Conclusions

The carbonized product of the wood waste, which is charcoal for cooking and wood vinegar, is dark brown, viscous liquid and acidity being. Wood vinegar is byproduct from wood burning in airless condition namely charcoal kiln. Its application are for several purposes including pest control, improving soil fertility, plant growth acceleration substances, plant growth regulator, or growth inhibiting. The bio-test of wood vinegar to inhibit the growth of *Xanthomonas compestris* pv. It can be used for organic agriculture. However, the wood vinegar must be purified process and diluted water before use, therefore, the volumes is very important for considering, also appropriate plants are determined. However, the wood vinegar is new organic agriculture, also need to do much more research in the future.

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