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The Development of probable process technology to produce methanol, ethanol, propanol and butanol and lower alkanes from kitchen garbage via glucose and subsequent conversion of produced alcohol's and lower alkanes in to LPG (Butane and Propane), petrol (pentane, hexane, heptane and octane).

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Abstract:

In the present paper the development of probable new process technology to produce glucose through kitchen and agricultural waste with the starch and carbohydrate present in the kitchen and agricultural waste have been presented. From this glucose the new probable production of alcohols (methanol, ethanol, propanol, butanol) and lower alkanes have been presented. Subsequently the probable chemical reaction to produce petrol (pentane, hexane, heptane, octane) from these alcohols and from lower alkanes have been presented. This process technology needs focus and research and development work through trial and error.

Keywords: Glucose; Alcohols; Alkanes; LPG; Petrol

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I. Introduction:

Production of glucose from the fermentation of kitchen and agricultural waste which in turn contains starch and carbohydrate has attracted much attention over the decades. Conversion of this glucose in to the alcohols like methanol, ethanol, propanol, butanol have also been studied [1-4]. Conversion of methanol, ethanol, propanol and butanol to petrol from kitchen garbage has received wide attention due to the global energy demand. The conversion of these alcohols in to petrol (pentane, hexane, heptanes and octane) needs attention to meet the global demand of petrol and LPG through new probable technologies. In the present paper the development of probable new process technology to produce methanol, ethanol, propanol and butanol and lower alkanes from kitchen garbage via glucose and subsequent conversion of produced alcohol's and lower alkanes in to LPG (Butane and Propane), petrol (pentane, hexane, heptanes and octane) has been presented and this needs focus and needs verification through research and development work.

II. Probable chemical reactions from process I-V to produce petrol from kitchen and agricultural waste

Process I: Preparation of glucose from kitchen and agricultural waste through fermentation.

Probable equation of producing electricity from starch and carbohydrate present in potato when exposed to sunlight which needed to be verified; potatoes do usually produces electricity under sunlight.

Probably from the kitchen and agricultural garbage (grass) which also contains starch and carbohydrate glucose can also be prepared using the equations as given below.

10(C6H10O5)-H2O+C5H10O4 →9C6H12O6+5O2+22H++11C+22e- (balanced)

(C6H10O5)-H2O+C5H10O4+CO2+11H2→C6H12O6+6H2O++6C+20H++22e- (balanced)

(C6H10O5)-H2O+C5H10O4+CO2+11H2+Na+K+Mg+2Cl2→
C6H12O6+6H2O++6C+20H++22e- +NaCl+KCl+MgCl2(balanced)

Process II: Preparation of alcohols (methanol, ethanol, propanol and butanol) from glucose

$C_6H_{12}O_6 + 5H_2 + 2HCl \rightarrow 6\ CH_3OH + Cl_2$
$C_6H_{12}O_6 + 5H_2 + 2HCl \rightarrow 3C_2H_5OH + Cl_2 + 3H_2O$
$C_6H_{12}O_6 + H_2 + 2HCl \rightarrow 2C_3H_7OH + Cl_2 + 2O_2$
$4C_6H_{12}O_6 + 5H_2 + 2HCl \rightarrow 6C_4H_9OH + Cl_2 + 9O_2$

Process III: Production of propane, butane, pentane, hexane, heptane, octane from glucose which is byproduct of agricultural and kitchen waste

$C_6H_{12}O_6 + H_2O + 2NaOH \rightarrow C_3H_8 + 3CO_2 + Na_2O + 4H_2 + O_2$

$C_6H_{12}O_6 + H_2O + 2NaOH \rightarrow C_4H_{10} + 2CO_2 + Na_2O + 3H_2 + 2O_2$

$C_6H_{12}O_6 + H_2O + 2NaOH \rightarrow C_5H_{12} + CO_2 + Na_2O + 2H_2 + 3O_2$

$C_6H_{12}O_6 + H_2O + 2NaOH \rightarrow C_6H_{14} + CO_2 + Na_2O + H_2 + 3O_2$

$C_6H_{12}O_6 + CO_2 + H_2O + 2NaOH \rightarrow C_7H_{16} + Na_2O + H_2 + 5O_2$

$C_6H_{12}O_6 + 2CO_2 + H_2O + 2NaOH + H_2 \rightarrow C_8H_{18} + Na_2O + 6O_2$

$C_6H_{12}O_6 + H_2O + 2HCl \rightarrow C_3H_8 + 3CO_2 + 4H_2 + Cl_2 + 0.5O_2$

$C_6H_{12}O_6 + H_2O + 2HCl \rightarrow C_4H_{10} + 2CO_2 + 3H_2 + Cl_2 + 1.5O_2$

$C_6H_{12}O_6 + H_2O + 2HCl \rightarrow C_5H_{12} + CO_2 + 2H_2 + Cl_2 + 2.5O_2$

$C_6H_{12}O_6 + H_2O + 2HCl \rightarrow C_6H_{14} + H_2 + Cl_2 + 3.5O_2$

$C_6H_{12}O_6 + CO_2 + H_2O + 2HCl \rightarrow C_7H_{16} + Cl_2 + 4.5O_2$

$C_6H_{12}O_6 + 2CO_2 + H_2O + 2HCl + H_2 \rightarrow C_8H_{18} + Cl_2 + 5.5O_2$

Process IV:
Preparation of propane, butane, pentane, hexane, heptane and octane from methyl alcohols

$2CH_3OH + CO_2 + 2HCl \rightarrow C_3H_8 + 2O_2 + Cl_2 + H_2$
$2CH_3OH + CO_2 + 2NaOH \rightarrow C_3H_8 + 2O_2 + Na_2O + H_2O$

$2CH_3OH + 2CO_2 + 2HCl \rightarrow C_4H_{10} + 3O_2 + Cl_2$
$2CH_3OH + 2CO_2 + 2NaOH \rightarrow C_4H_{10} + 3.5O_2 + Na_2O$

$2CH_3OH + 3CO_2 + 2HCl + H_2 \rightarrow C_5H_{12} + 4O_2 + Cl_2$
$2CH_3OH + 3CO_2 + 2NaOH + H_2 \rightarrow C_5H_{12} + 4.5O_2 + Na_2O$

$2CH_3OH + 4CO_2 + 2HCl + 2H_2 \rightarrow C_6H_{14} + 5O_2 + Cl_2$
$2CH_3OH + 4CO_2 + 2NaOH + 2H_2 \rightarrow C_6H_{14} + 5.5O_2 + Na_2O$

$2CH_3OH + 5CO_2 + 2HCl + 3H_2 \rightarrow C_7H_{16} + 6O_2 + Cl_2$
$2CH_3OH + 5CO_2 + 2NaOH + 3H_2 \rightarrow C_7H_{16} + 6.5O_2 + Na_2O$

$2CH_3OH + 6CO_2 + 2HCl + 4H_2 \rightarrow C_8H_{18} + 7O_2 + Cl_2$
$2CH_3OH + 6CO_2 + 2NaOH + 4H_2 \rightarrow C_8H_{18} + 7.5O_2 + Na_2O$

Preparation of propane, butane, pentane, hexane, heptane and octane from ethyl alcohols

$C_2H_5OH + CO_2 + 2HCl \rightarrow C_3H_8 + 1.5O_2 + Cl_2$
$C_2H_5OH + CO_2 + 2HCl + H_2 \rightarrow C_3H_8 + O_2 + H_2O + Cl_2$
$C_2H_5OH + CO_2 + 2NaOH \rightarrow C_3H_8 + 2O_2 + Na_2O$
$C_2H_5OH + CO_2 + 2NaOH + 2H_2 \rightarrow C_3H_8 + O_2 + Na_2O + 2H_2O$

$C_2H_5OH + 2CO_2 + 2HCl + H_2 \rightarrow C_4H_{10} + 2.5O_2 + Cl_2$
$C_2H_5OH + 2CO_2 + 2NaOH + H_2 \rightarrow C_4H_{10} + 3O_2 + Na_2O$

$C_2H_5OH + 3CO_2 + 2HCl + 2H_2 \rightarrow C_5H_{12} + 3.5O_2 + Cl_2$
$C_2H_5OH + 3CO_2 + 2NaOH + 2H_2 \rightarrow C_5H_{12} + 4O_2 + Na_2O$

$C_2H_5OH + 4CO_2 + 2HCl + 3H_2 \rightarrow C_6H_{14} + 4.5O_2 + Cl_2$
$C_2H_5OH + 4CO_2 + 2NaOH + 3H_2 \rightarrow C_6H_{14} + 5O_2 + Na_2O$

$C_2H_5OH + 5CO_2 + 2HCl + 4H_2 \rightarrow C_7H_{16} + 5.5O_2 + Cl_2$
$C_2H_5OH + 5CO_2 + 2NaOH + 4H_2 \rightarrow C_7H_{16} + 6O_2 + Na_2O$

$C_2H_5OH + 6CO_2 + 2HCl + 5H_2 \rightarrow C_8H_{18} + 6.5O_2 + Cl_2$
$C_2H_5OH + 6CO_2 + 2NaOH + 5H_2 \rightarrow C_8H_{18} + 7O_2 + Na_2O$

Preparation of propane, butane, pentane, hexane, heptane and octane from propyl alcohols

$C_3H_7OH + 2HCl \rightarrow C_3H_8 + H_2O + Cl_2$
$C_3H_7OH + 3CO_2 + 2HCl + 3H_2 \rightarrow 2\,C_3H_8 + 3.5O_2 + Cl_2$
$C_3H_7OH + 3CO_2 + 2HCl + 4H_2 \rightarrow 2\,C_3H_8 + 3O_2 + H_2O + Cl_2$
$C_3H_7OH + 3CO_2 + 2NaOH + 3H_2 \rightarrow 2\,C_3H_8 + 4O_2 + Na_2O$
$C_3H_7OH + 3CO_2 + 2NaOH + 4H_2 \rightarrow 2\,C_3H_8 + 3.5\,O_2 + H_2O + Na_2O$

$C_3H_7OH + CO_2 + 2HCl \rightarrow C_4H_{10} + 1.5O_2 + Cl_2$
$C_3H_7OH + CO_2 + 2NaOH \rightarrow C_4H_{10} + 2O_2 + Na_2O$

$C_3H_7OH + 2CO_2 + 2HCl + H_2 \rightarrow C_5H_{12} + 2.5O_2 + Cl_2$
$C_3H_7OH + 2CO_2 + 2NaOH + H_2 \rightarrow C_5H_{12} + 3O_2 + Na_2O$

$C_3H_7OH + 3CO_2 + 2HCl + 2H_2 \rightarrow C_6H_{14} + 3.5O_2 + Cl_2$
$C_3H_7OH + 3CO_2 + 2NaOH + 2H_2 \rightarrow C_6H_{14} + 4O_2 + Na_2O$

$C_3H_7OH + 4CO_2 + 2HCl + 3H_2 \rightarrow C_7H_{16} + 4.5O_2 + Cl_2$
$C_3H_7OH + 4CO_2 + 2NaOH + 3H_2 \rightarrow C_7H_{16} + 5O_2 + Na_2O$

$C_3H_7OH + 5CO_2 + 2HCl + 4H_2 \rightarrow C_8H_{18} + 5.5O_2 + Cl_2$
$C_3H_7OH + 5CO_2 + 2NaOH + 4H_2 \rightarrow C_8H_{18} + 6O_2 + Na_2O$

Preparation of propane, butane, pentane, hexane, heptane and octane from butyl alcohols

$3C_4H_9OH + 2HCl \rightarrow 4\,C_3H_8 + Cl_2 + 1.5\,O_2$
$3C_4H_9OH + 2HCl + H_2 \rightarrow 4\,C_3H_8 + Cl_2 + O_2 + H_2O$
$C_4H_9OH + 2\,CO_2 + 2HCl + 2H_2 \rightarrow 2\,C_3H_8 + 2.5O_2 + Cl_2$
$C_4H_9OH + 2\,CO_2 + 2HCl + 3H_2 \rightarrow 2\,C_3H_8 + 2\,O_2 + H_2O + Cl_2$
$C_4H_9OH + 2CO_2 + 2NaOH + 2H_2 \rightarrow 2\,C_3H_8 + 3O_2 + Na_2O$
$C_4H_9OH + 2CO_2 + 2NaOH + 3H_2 \rightarrow 2\,C_3H_8 + 2.5\,O_2 + H_2O + Na_2O$

$C_4H_9OH + 2HCl \rightarrow C_4H_{10} + 0.5O_2 + Cl_2 + H_2$
$C_4H_9OH + 2NaOH \rightarrow C_4H_{10} + 1.5O_2 + Na_2O + H_2$

$C_4H_9OH + CO_2 + 2HCl \rightarrow C_5H_{12} + 1.5O_2 + Cl_2$
$C_4H_9OH + CO_2 + 2NaOH \rightarrow C_5H_{12} + 2O_2 + Na_2O$

$C_4H_9OH + 2CO_2 + 2HCl + H_2 \rightarrow C_6H_{14} + 2.5O_2 + Cl_2$
$C_4H_9OH + 2CO_2 + 2NaOH + H_2 \rightarrow C_6H_{14} + 3O_2 + Na_2O$

$C_4H_9OH + 3CO_2 + 2HCl + 2H_2 \rightarrow C_7H_{16} + 3.5O_2 + Cl_2$
$C_4H_9OH + 3CO_2 + 2NaOH + 2H_2 \rightarrow C_7H_{16} + 4O_2 + Na_2O$

$C_4H_9OH + 4CO_2 + 2HCl + 3H_2 \rightarrow C_8H_{18} + 4.5O_2 + Cl_2$
$C_4H_9OH + 4CO_2 + 2NaOH + 3H_2 \rightarrow C_8H_{18} + 5O_2 + Na_2O$

Process V:-
Production of higher alkanes (i.e. petroleum liquids) from lower alkanes (i.e. propane and butane)

[1] $C_3H_8 + CO_2 + 2NaOH + H_2 \rightarrow C_4H_{10} + Na_2O + O_2 + H_2O$
$C_3H_8 + 2CO_2 + 4NaOH \rightarrow C_5H_{12} + 2Na_2O + 3O_2$
$C_3H_8 + 3CO_2 + 4NaOH + H_2 \rightarrow C_6H_{14} + 2Na_2O + 4O_2$
$C_3H_8 + 4CO_2 + 4NaOH + 2H_2 \rightarrow C_7H_{16} + 2Na_2O + 5O_2$
$C_3H_8 + 5CO_2 + 4NaOH + 3H_2 \rightarrow C_8H_{18} + 2Na_2O + 6O_2$

[2] $C_4H_{10} + CO_2 + 2NaOH + H_2 \rightarrow C_5H_{12} + Na_2O + O_2 + H_2O$
$C_4H_{10} + 2CO_2 + 2NaOH + H_2 \rightarrow C_6H_{14} + Na_2O + 2O_2$
$C_4H_{10} + 3CO_2 + 2NaOH + 2H_2 \rightarrow C_7H_{16} + Na_2O + 3.5O_2$
$C_4H_{10} + 4CO_2 + 2NaOH + 3H_2 \rightarrow C_8H_{18} + Na_2O + 4.5O_2$

[3] $C_3H_8 + C_4H_{10} + 2NaOH \rightarrow C_7H_{16} + Na_2O + H_2O + H_2$
$C_3H_8 + C_4H_{10} + 2NaOH + CO_2 \rightarrow C_8H_{18} + Na_2O + 1.5O_2 + H_2$

Note: It should be noted here that the reaction equation given above have been balanced on both sides and this makes these equation to work well and for this to occur these needs to be done on trial and error basis. It should also to be noted that the above reactions would occur if parameters like temperature, pressure and catalyst are optimized.

III. Conclusions:

The development of probable new process technology to produce glucose through kitchen and agricultural waste which in turn contains starch and carbohydrate is presented. Subsequently the production of alcohols (methanol, ethanol, propanol, butanol) and lower alkanes from the glucose have been presented through new chemical reactions. Again subsequently from these alcohols and lower alkanes the probable chemical reaction to produce petrol (pentane, hexane, heptanes, octane) have been presented which needs focus and research.

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Conflict of interest: The authors declare that they have no conflict of interest.

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