44.38% - 47.87%, 21.04 – 26.29% and 8.26 – 11.38% and highest value was observed in Moringa respectively.

The variation among the browse forages in NDF, ADF and ADL may be attributed to planting location as observed by (37) that browse plant in arid and Semi arid zones have higher N than plants in humid zones.

The variation in gas production and potential of gas production between the browse species may be attributed to compositional differences of the browse forages especially CP, Fibre and other anti-nutritional components as reported by (12).

Also high crude protein in feed enhances microbial multiplication in the rumen, which in turn determines the extent of fermentation.

There are many factors that may determine the amount of gas to be produced during fermentation, depending on the nature and level of fibre, the presence of secondary metabolites (11) and potency of the rumen liquor for incubation. It is possible to attain potential gas production of a feedstuff if the donor animal from which rumen liquor for incubation was collected got the nutrient requirement met. Generally, gas production is a function and a mirror of degradable carbohydrate and therefore, the amount depends on the nature of the carbohydrates (16; 19). (22) observed that a decrease in rate and extent of gas production of some shrubs is due to their high contents of lignin and tannins through increasing adverse environmental conditions as incubation time progress. (18) also observed that higher NDF, ADF proportion and condensed tannins (CT) contents can reduce attachment of ruminant animal microbes to feed particles and hence leads to lower gas production.

The result showed that the highest volume of gas produced was observed in *Moringa oleifera* which also had the highest methane production. In most cases, feedstuffs that show high capacity for gas production are also observed to be synonymous for high methane production. Methane production in the rumen is an energetically wasteful process, since the portion of the animal's feed, which is converted to CH4, is eructated as gas.

The *b* fraction represents the diet that potentially may escape rumen degradation but absorbed in the rumen (40). The low *b* value obtained is an indication of the fibrous nature of the feedstuffs incubated.

The differences in effect of in-vitro fermentation on metabolizable energy (ME), organic matter digestibility (OMD) and short chain fatty acid (SCFA) of the browse forages could be as a result of morphological fraction, environmental factor or maturity stage as also observed by (12).

5. Conclusion

According to the result obtained from this study, it was concluded that browse plant are high in protein content and other nutrient which can be used as feed supplement to shortage of protein and low quality forage grazed by ruminant animals during the driest part of the year. Therefore, supplementation of browse plant can be used as a major feed resource for ruminant during the dry season to reduce the effect of feed shortage and enhance the poor quality of available grasses and crop residues.

The utilization of browse plants in animal feeding should be encouraged as this will help to reduce the effect of feed shortage and cyclic animal weight changes most especially during the off seasons. It will also help to reduce the effect of climatic changes when more browse plants are being planted.

Table 1: Proximate Composition of *Blighia sapida, Moringa oleifera* and *Gliricidia sepium*

Parameters	Crude Protein	Crude Fiber	Ether Extract	Ash
Blighia sapida	19.36^{a}	16.78^{b}	6.28^{a}	11.32^{a}
Moringa oleifera	14.89^{c}	18.21^{a}	4.27^{c}	8.94^{c}
Gliricidia sepium	17.79^{b}	15.96^{b}	5.44^{b}	10.88^{b}
SEM	0.45	0.37	0.19	0.06

abc= Means on the same row with different superscript are significantly different P<0.05

Table 2: Fiber fractions composition of *Blighia sapida, Moringa oleifera* and *Gliricidia sepium*

Parameters	*Neutral Detergent Fiber*	*Acid Detergent Fibre*	*Acid Detergent Lignin*	*Hemi-cellulose*	*Cellulose*
Blighia sapida	45.55	21.57^{c}	8.43^{b}	23.98^{a}	13.14^{b}
Moringa oleifera	46.97	26.85^{a}	11.76^{a}	20.12^{b}	15.10^{a}
Gliricidia sepium	45.19	23.33^{b}	9.20^{b}	21.87^{b}	14.13^{ab}
SEM	0.58	0.20	0.31	0.54	0.29

abc= Means on the same row with similar superscript are not significantly different P>0.0

Table 3: Gas production characteristics of *Moringa oleifera*, *Gliricidia sepium* and *Blighia sapida* incubated for 24hrs.

Treatment	*Fermentation characteristics*					
	A	*a+b*	*B*	*C*	*T*	*Y*
Blighia sapida	3.67^{a}	21.33^{ab}	17.67	0.058	10.00^{a}	10.67
Moringa oleifera	4.33^{a}	25.67^{a}	21.33	0.068	7.00^{b}	12.33
Gliricidia sepium	1.33^{b}	18.33^{b}	17.00	0.056	10.50^{a}	8.67
SEM	0.63	2.16	1.96	0.01	0.9	1.26

abc= Means on the same column with similar superscript are not significantly (P > 0.05)

a=intercept (gas produced from the soluble fraction; b=Potential gas production (ml/g DM) from the insoluble fraction; a+b= potentially degradable fractions; c= Rate of fermentation; t= time of fermentation; $Y= a + b (1 - e^{-ct})$; Volume of gas produced at time't'.

Table 4: Metabolizable Energy, Organic Matter Digestibility, Short Chain Fatty Acid of *Moringa oleifera*, *Gliricidia sepium* and *Blighia sapida*.

Treatment	**ME**	**OMD**	**SCFA**
Blighia sapida	6.25	49.93	0.57^{ab}
Moringa oleifera	6.59	50.22	0.67^{a}
Gliricidia sepium	5.75	46.27	0.50^{b}
SEM	**0.29**	1.93	0.05

abc= mean on the same column with similar superscript are not significantly (P>0.05) different

ME= Metabolizable energy; OMD=Organic matter digestibility; SCFA=Short chain fatty acids.

Figure 1 show the gas produced at different incubation period. The volume of gas produced was plotted against the time of incubation. This graph shows that the highest volume of gas produced for 24hrs was observed in *Moringa oleifera* and was followed by *Blighia sapida* while the least volume of gas produced was obtained in *Gliricidia sepium***.**

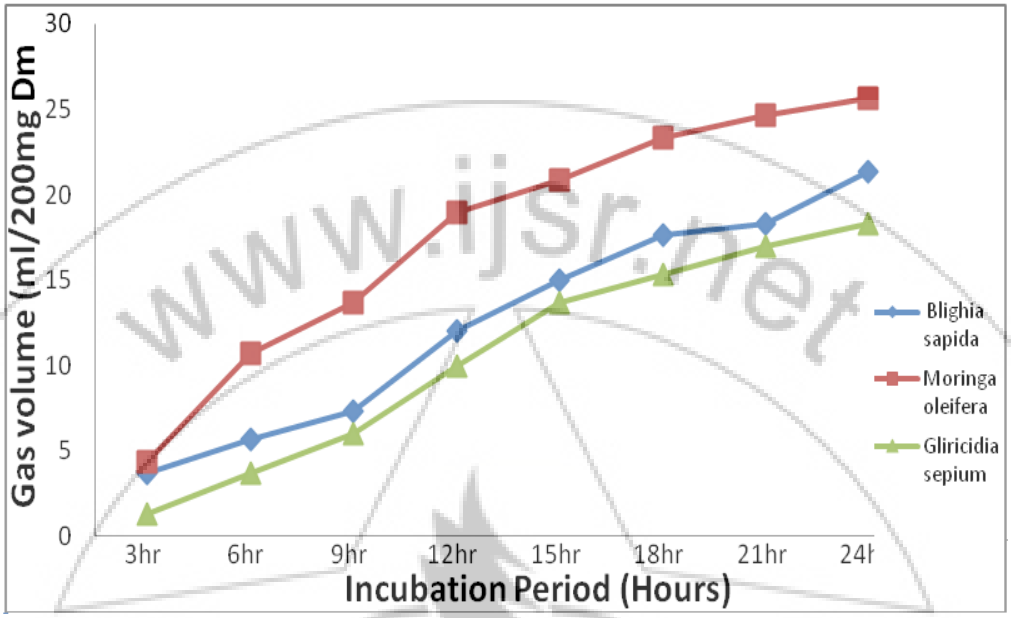

Figure 1: In vitro gas Production of Blighia sapid, Moringa olefera and Gliricidia sepium incubated for 24 hours

Figure 2 shows the methane production of *Blighia sapida, Moringa oleifera* **and** *Gliricidia sepium*

The highest observed in *Moringa oleifera* and was followed by *Gliricidia sepium* while the least was obtained in *Blighia sapida***.**

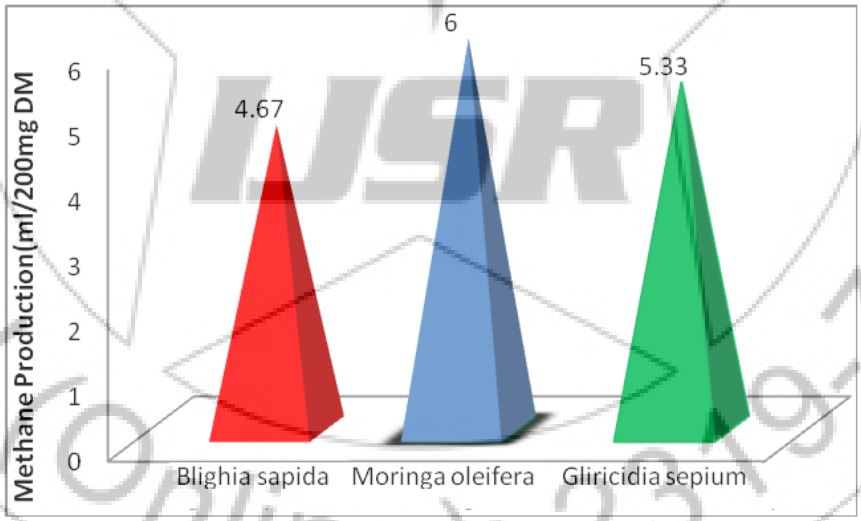

Figure 2: Methne Production of *Blighia sapida, Moringo oleifera* and *Gliricidia sepium* incubated for 24 hours

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