INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: **Design, Installation and Assessment of a Novel Variable Compression Ratio Mechanism for Multifuel Spark Ignition Engine**

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SHORT ABSTRACT

The spark ignition engines are the most versatile in the arena of internal combustion engines. Petrol fuel based spark igniton(SI) engines are designed for the cylinder bore to stroke ratio(compression ratio), spark plug location which will initiate combustion faster with faster flame speed and develops flame kernel with minimum time during combustion. As per engine manufacturers catalogue, the specified octane petrol is the best for the particular engine. In this regards, if the octane rating of the fuel changed, then the engine will not perform with the maximum efficiency. However, if there are some structural alterations are carried out as per fuel, load and speed, then the higher octane fuel can be utilized to its maximum performance. In order to achieve this objective, the novel variable compression ratio (VCR) mechanism accompanied with novel variable spark plug location (VSPL) is designed and developed which could be installed further on SI engines for online variation of VCR and VSPL. Gaseous fuels are high octane ratings and could be a good source of alternative energy source. Knowing this, the non renewable gas LPG and renewable raw biogas (52% CH_4+46% CO_2) are being tested in engine for VCR, VSPL and in combination with EGR. The results recommend for continuous variation of CR accompanied with VSPL as per speed, load and EGR level could certainly achieve best performance in case of both fuels.