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Impact of posture and upper–limb muscle activity on grip strength

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SHORT TITLE: "Grip strength in manual working"

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Abstract:

Purpose: The current research was carried out to determine the grip strength (GS) with change in posture and upper–limb muscle activity of manual workers and find out the impacts of these changes.

Methods: For the current research, 120 male and 80 female participants were selected and GS was assessed using digital hand grip dynamometer in various conditions.

Results: The outcomes showed that male participants had higher GS as compared to female participants. Maximum GS was found in standing posture with the fixed forward shoulder in 45°, elbow at 90° and neutral position of wrist and forearm for all participants.

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Pulling force prediction using neural networks

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Pulling force prediction using neural networks

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SHORT TITLE: "Pull force prediction using ANNs"

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Research Article

Combustion Characteristics of Methanol Blended Diesel Fuel in CI Engine

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ABSTRACT

The consumption of diesel fuel is increasing day by day due to its wide application in agriculture and transportation sectors which is also responsible for deteriorating condition of environment due to emissions i.e., smoke, CO, HC, NOx, etc. These emissions may be reduced by adding methanol in diesel fuel. As compared to diesel, lower value of viscosity and density of methanol-diesel blends helps in easy pumping. The lower boiling point of methanol helps in reducing the ignition delay and thereby avoiding knocking. Methanol with higher oxygen content also helps in easy availability of more oxygen in the vicinity of the diesel for its quick and better combustion. To improve the working of diesel engine and control its emission level, blend diesel version definitely plays a very important role.

Keywords: Methanol, Diesel, Combustion properties.

INTRODUCTION

For the improvement in engine efficiency and reduction of environment exhaust emissions, considerable research has been carried out to improve the combustion characteristics of fuels in recent years[1]. The use of additives with diesel fuel is a potential method for improving the combustion characteristic of the diesel-additives blend. It may improve engine performance and reduce the emissions simultaneously without any structural changes[2-4].

Among all available additives, oxygenated additives have strained more attention due to better combustion properties and rich oxygen content in their molecular structure[5,6]. Oxygenated additives are renewable in character and their oxygen content support in reaction for better combustion[7-9]. Alcohols are bio-oxygenated compounds with low viscosity and high volatile characteristics which make them appropriate fuel additives for CI engines[10-12]. Alcohol compound additives (i.e., methanol, ethanol, n–butanol etc.) are fuels infused with rich oxygen content and used to improve the combustion characteristic when blended with diesel[13, 14]. The advantages of alcohols as an additives include[15]

- It can be easily injected, atomized and mixed with air due to its Low viscosity as compared to diesel fuel.
- It improves the volumetric efficiency of the engine due to its high latent heat of evaporation which results in cooler intake process.
- It may improve the thermal efficiency of engine due to its high laminar flame propagation speed which helps in completing the combustion process earlier.
- It may reduce the emissions due to its high oxygen and low sulfur content.

Among alcohols, methanol is an alternative, renewable, economic, environment friendly and one of the most promising additives for conventional fossil base fuels. The main raw material available for the production of methanol is coal. In recent years, several researchers have been used the methanol as an alternative to conventional fuels for CI engine[16-18]. Though there are so many methods to solve the difficulty of direct application of methanol in diesel engine, the fumigation of methanol seems to be a promising method that could flexibly switch from pure diesel mode to relatively high methanol substitution mode[19].

The aim of current study is to investigate the effect of methanol blended diesel fuel on combustion characteristics of diesel engine.

Preparation of Methanol-Diesel Blends

Different methanol-diesel blends on volume basis were prepared using a magnetic stirrer and glassware for blending and storage as shown in Figure 1. The methanol used was of 99.0% purity.

Figure 1: Diesel-methanol blend preparation

A comparative study of oxygenated additives for diesel in compression ignition engine

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Abstract: Performance improvement and emissions control are quite difficult to handle simultaneously in diesel engines. These two tasks can be achieved by one of the methods such as: engine design improvement, engine exhaust treatment and modification in fuel. The modification of fuel using additives is most feasible approach to control the high emissions without deteriorating the engine performance. The aim of this paper is to present the comprehensive review and comparative study of oxygenated additives with respect to engine performance and emission characteristics. It is concluded from literature review that oxygenated compounds are the most suitable and economical among all additives available for this purpose.

Keywords: C.I. engine; diesel; additive; emission; performance.

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REVIEW ARTICLE

Properties and effects of organic additives on performance and emission characteristics of diesel engine: a comprehensive review

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Abstract
Fast depletion of conventional automobile fuels and environmental pollution due to exhaust emission are the issues of great importance. Improvement in engine performance and emission control is quite difficult to handle simultaneously. The fuel properties can be improved substantially by incorporation of additives in different proportions to get better emission standard without deteriorating the engine performance. The aim of current study is to review/summarize the effects of various organic additives on the engine performance (i.e., brake thermal efficiency, brake specific fuel consumption, volumetric efficiency, etc.) and emissions (i.e., carbon dioxide, carbon monoxide, nitrogen oxides, hydrocarbons, particulate matter, and other harmful compounds). The physico-chemical and combustion properties (i.e., density, latent heat, dynamic viscosity, flash point, boiling point, cetane number, oxygen content, lower heating value, auto-ignition temperature, etc.) of various additives were also discussed to check the suitability of additives with diesel. Finally, limitations and opportunities using organic additives with respect to engine performance and combustion were discussed to guide future research and improvement in this field.

Keywords Combustion properties · Diesel engine · Emission · Organic additives · Performance · Physico-chemical properties

Nomenclature

ATDC	After top dead center
BP	Brake power
BMEP	Brake mean effective pressure
BSEC	Brake specific energy consumption
BSFC	Brake specific fuel consumption
BTDC	Before top dead center
BTE	Brake thermal efficiency
°C	Degree centigrade
CA	Crank angle
CI	Compression ignition
CO	Carbon monoxide
CO_2	Carbon dioxide
CR	Compression ratio
CRDI	Common rail direct injection
cSt	Centistokes
DI	Direct injection
DME	Dimethyl ether
DMF	Dimethyl furan
DNBE	Di-*n*-buthyl ether
EEA	2-Ethoxy ethyl acetate
EGM	Ethylene glycol monoacetate
EGR	Exhaust gas recirculation
ETBE	Ethyl ter-butyl ether
EXEE	2-Ethoxy ethyl ether
EIA	Energy Information Administration
HC	Hydrocarbon
HCCI	Homogeneous charge compression ignition
IMEP	Indicated mean effective pressure
ITE	Indicated thermal efficiency
kg	Kilogram
kJ	Kilojoules
l	Liter
m	Meter
MEA	2-Methoxy ethyl acetate
MJ	Mega joule
MPa	Mega Pascal
MT	Metric tons

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