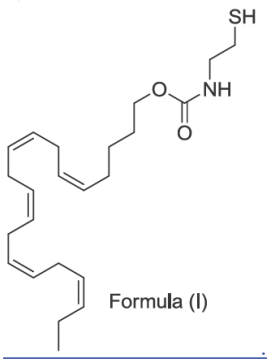
cirrhosis. It has been shown that chronic oxidative stress, generated through the oxidation of cytotoxic free fatty acids, can lead to upregulation of cytokines, induction of the liver cytochrome P450 enzyme 2E1, and depletion of hepatic antioxidant concentration.

[0005] Neurodegenerative disorders are a heterogeneous group of diseases of the nervous system, including the brain, spinal cord, and peripheral nerves that have much different aetiology. Many are hereditary; some are secondary to toxic or metabolic processes. Free radicals are highly reactive molecules or chemical species capable of independent existence. Generation of highly Reactive Oxygen Species (ROS) is an integral feature of normal cellular function like mitochondrial respiratory chain, phagocytosis and arachidonic acid metabolism. The release of oxygen free radicals has also been reported during the recovery phases from many pathological noxious stimuli to the cerebral tissues. Some of the neurodegenerative disorders include Alzheimer's disease, Huntington's disease, Parkinson's disease and Lateral sclerosis.

[0006] Managing acute pathology of often relies on the addressing underlying pathology and symptoms of the disease. There is currently a need in the art for new compositions to treatment of metabolic conditions such as cystinosis, non-alcoholic steatohepatitis and neurodegenerative disorders.

SUMMARY OF INVENTION

[0006a] A first aspect of the invention provides a compound of Formula (I) or a pharmaceutical acceptable salt thereof



Formula (I)

[0006b] A second aspect of the invention provides a method of synthesis for the compound of claim 1, the method comprising:

a) mixing lithium aluminum hydride in THF solution as a suspension of eicosapentaenoic acid in THF at 0°C;

warming the reaction mixture to room temperature;

maintaining the room temperature for overnight;

quenching the reaction mixture with saturated sodium sulfate and then extracting with ethylacetate;

separating the organic layer and washing with brine;

drying the washed layer over anhydrous Na_2SO_4 and evaporating under reduced pressure to make a first compound;

purifying the first compound by column chromatography;

b) mixing to a solution of alcohol and pyridine in DCM with 4 nitro phenyl chloroformate at room temperature;

stirring the first compound and the solution for three hours at room temperature;

monitoring the end of reaction using thin layer chromatography;

diluting the reaction mixture with DCM;

washing with water followed by washing with NAHCO3 solution;

dying the reaction mixture over anhydrous Na_2SO_4 and evaporating under reduced pressure to form a solid; purifying and eluting the solid with 8% ethylacetate to yield a second compound as a colorless liquid as eluent;

purifying the second compound in the eluent by column chromatography over 100-200 mesh silica gel by using 8% ethyl acetate-pet ether as eluent;

c) adding trityl alcohol to a solution of 2-aminoethanethiol HCI in TFA at 0℃;

stirring the reaction mixture for three hours at room temperature;

quenching the reaction mixture with saturated $NaHCO_3$ solution and extracting with EtOAC;

washing with water (2x100mL) followed by washing with brine solution;

drying over anhydrous Na_2SO_4 and evaporating under reduced pressure to get crude product as viscous oil;

purifying and eluting by using column chromatography on silica gel 60-120 mesh and 5% MeOH in $CHCI_3$ as eluent to yield a third compound as a white solid that is trityl protected;

adding the third compound to a solution of the second compound in dry DMF at room temperature;

retaining the reaction mixture for two hours at room temperature; evaporating the reaction mixture under reduced pressure;

purifying and eluting the reaction mixture by column chromatography over 60~120 mesh silica gel and adding 14% ethylacetate-pet ether to yield a fourth compound as a colorless liquid;

adding a solution of the fourth compound in 20% TFA/DCM and triethylsilane drop wise at 0°C; stirring the reaction mixture for 30 minutes at 0°C;

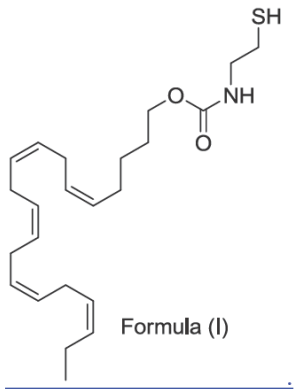
monitoring the end of reaction using thin layer chromatography;

mixing the reaction mixture and saturated $NaHCO_3$ solution and extracting with DCM;

washing the combined organic layer of the reaction mixture with brine solution;

drying the reaction mixture over anhydrous Na_2SO_4 and evaporating under reduced pressure; and purifying using column chromatography over 60-120 mesh silica gel by using 15% ethylacetate-petether as eluent to yield the compound (I) of claim1 as a colorless liquid.

[0006c] A third aspect of the invention provides a kit comprising a compound of formula (I) or a pharmaceutical acceptable salt thereof



Formula (I)

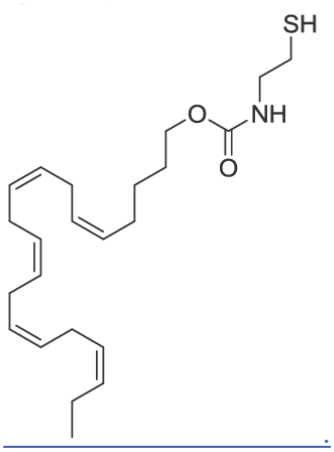
and instructions for the use of the compound in the treatment of a neuro-degenerative disorder and/or a metabolic disorder.

[0007] The present invention provides compounds, compositions containing these compounds and methods of synthesizing and for using the same to treat, prevent and/or ameliorate the effects of the conditions such as NASH, metabolic conditions and neurodegenerative diseases.

[0008] The invention herein provides composition comprising of formula I or pharmaceutical acceptable salts thereof. The invention also provides pharmaceutical compositions comprising one or more compounds of formula I or intermediates thereof and one or more of pharmaceutically acceptable carriers, vehicles or diluents. These compositions may be used in the treatment of metabolic conditions and neurodegenerative disorders and its associated complications.

CLAIMS:

1. A compound represented by following formula or a pharmaceutically acceptable salt thereof:



2. The use of compound of claim 1 for producing medicine for the treatment of a metabolic disorder.

3. The use of compound of claim 1 for producing medicine for the treatment of a neuro-degenerative disorder.

4. A method of synthesis for the compound of claim 1 comprising;

mixing lithium aluminum hydride in THF solution as a suspension of eicosapentaenoic acid in THF at 0℃;

warming the reaction mixture to room temperature;

maintaining the room temperature for overnight;

quenching the reaction mixture with saturated sodium sulfate and then extracting with ethylacetate;

separating the organic layer and washing with brine;

drying the washed layer over anhydrous Na_2SO_4 and evaporating under reduced pressure to make a first compound;

purifying the first compound by column chromatography;

mixing to a solution of alcohol and pyridine in DCM with 4 nitro phenyl chloroformate at room temperature;

stirring the first compound and the solution for three hours at room temperature; monitoring the end of reaction using thin layer chromatography;

diluting the reaction mixture with DCM;

washing with water followed by washing with NAHCO3 solution;

dying the reaction mixture over anhydrous Na_2SO_4 and evaporating under reduced pressure to form a solid; purifying and eluting the solid with 8% ethylacetate to yield a second compound as a colorless liquid as eluent;

purifying the second compound in the eluent by column chromatography over 100-200 mesh silica gel by using 8% ethyl acetate-pet ether as eluent;

adding trityl alcohol to a solution of 2-aminoethanethiol HCI in TFA at 0℃;

stirring the reaction mixture for three hours at room temperature;

quenching the reaction mixture with saturated $NaHCO_3$ solution and extracting with EtOAC; washing with water (2x100mL) followed by washing with brine solution;

drying over anhydrous Na_2SO_4 and evaporating under reduced pressure to get crude product as viscous oil;

purifying and eluting by using column chromatography on silica gel 60-120 mesh and 5% MeOH in $CHCI_3$ as eluent to yield a third compound as a white solid that is trityl protected;

adding the third compound to a solution of the second compound in dry DMF at room temperature;

retaining the reaction mixture for two hours at room temperature; evaporating the reaction mixture under reduced pressure;

purifying and eluting the reaction mixture by column chromatography over 60~120 mesh silica gel and adding 14% ethylacetate-pet ether to yield a fourth compound as a Colorless liquid;

adding a solution of the fourth compound in 20% TFA/DCM and triethylsilane drop wise at 0℃; stirring the reaction mixture for 30 minutes at 0

℃;

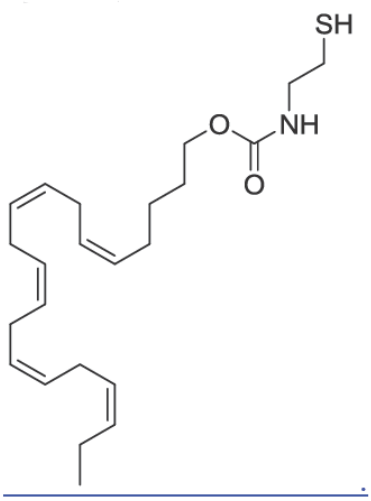
monitoring the end of reaction using thin layer chromatography;

mixing the reaction mixture and saturated $NaHCO_3$ solution and extracting with DCM;

washing the combined organic layer of the reaction mixture with brine solution;

drying the reaction mixture over anhydrous Na_2SO_4 and evaporating under reduced pressure; and purifying using column chromatography over 60-120 mesh silica gel by using 15% ethylacetate-petether as eluent to yield the compound (I) of claim1 as a colorless liquid.

5. A kit comprising a compound represented by following formula or a pharmaceutically acceptable salt there of:



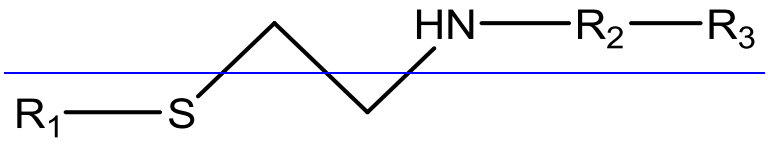
6. The kit of claim 5 further comprising in formation of instruction for use in the treatment of at least one of a neurodegenerative disorder and a metabolic.

CLAIMS:

What is claimed is:

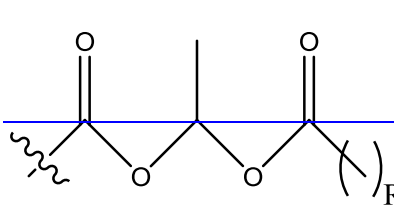
1. A pharmaceutically acceptable compound;

a of formula I:



Wherein, R^1 at least one of hydrogen, methyl, amine, cycohexyl methyl ether, butoxy, propoxy, thiol, alkyl, alkyl thiol, acetyl thiol, acyl, acylalkyl, alkenyl, alkylthioalkyl, alkynyl, alkoxyaryl, alkoxyalkyl, aryl, aralkyl, aryloxyalkyl, arylthioalkyl, cycloalkyl, ether, ester, heteroaryl, heterocyclyl, lower alkyl, or hydroxyalkyl; and

R^2 represents at least one of carboxyl, amine, -NH-CO-NH-, -NH-CO-CH_2-NH-, -NH-CO-, R-COO-R^1, thiol, disulfide, cycohexyl, methyl ether, propoxy, thiol, alkyl thiol, acetyl thiol, disulfide, acylalkyl, alkenyl, alkylthioalkyl, alkynyl, alkoxyaryl, alkoxyalkyl, aralkyl, aryloxyalkyl, arylthioalkyl, cycloalkyl, ether, ester, heterocyclyl, lower alkyl, sulfone, sulfoxide, RCOOHR1 or hydroxyalkyl



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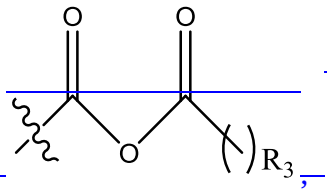

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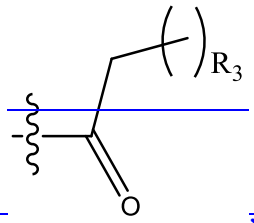

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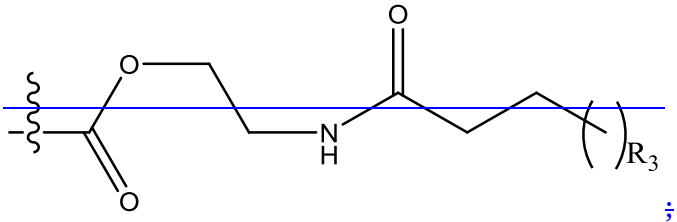

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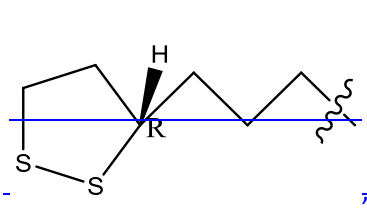
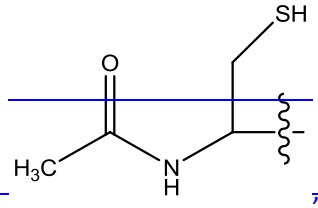
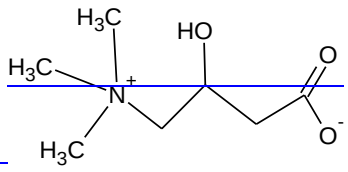
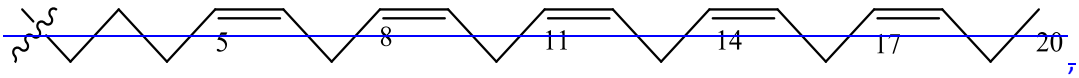
~~R^3 independently represents at least one of~~









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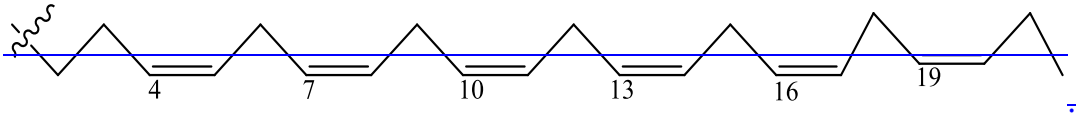
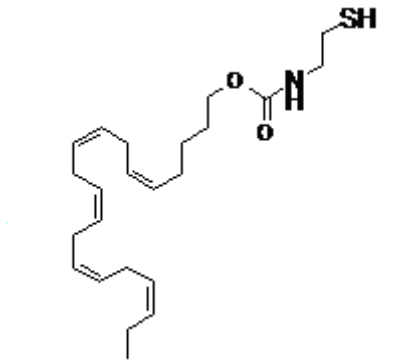


~~2. The compound of claim 1, further comprising compound of formula I;~~



~~3. The compound of claim 1 wherein, compound of the formula I is formulated for the treatment of a metabolic disorder.~~

~~4. The compound of claim 1 wherein, compound of formula I is formulated for the treatment of a neurodegenerative disorder.~~

~~5. The compound of claim 2, wherein, compound of formula I is formulated for at least one of an oral administration, parenteral administration, injection, subdermal, oral solution and transdermal administration.~~

6. The compound of claim 5, wherein the oral administration has an enteric coating containing formulation for at least one of delayed release or sustained release formulation.

7. A method of synthesis for a compound of formula I, comprising:

mixing lithium aluminum hydride in THF as solution with a suspension of eicosapentaenoic acid in THF at 0 ^{0}C;

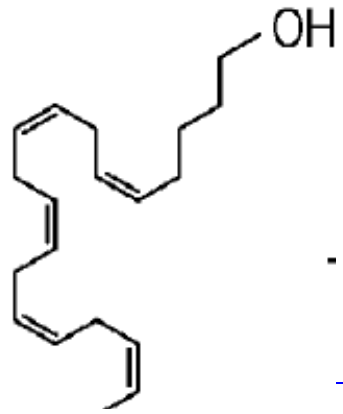
warming the reaction mixture to room temperature;

maintaining the room temperature for overnight;

quenching the reaction mixture with saturated sodium sulphate and then extracting with ethyl acetate;

separating the organic layer and washing with brine;

drying the washed layer over anhydrous Na_2SO_4 and evaporating under reduced pressure to make a first intermediate compound represented as



and

purifying the compound by column chromatography.

8. The method of claim 7, further comprising:

mixing to a solution of alcohol and pyridine in DCM with 4-nitrophenyl chloroformate at room temperature;

stirring the first intermediate compound and the solution for 3 hours at room temperature;

monitoring the end of reaction by thin layer chromatography;

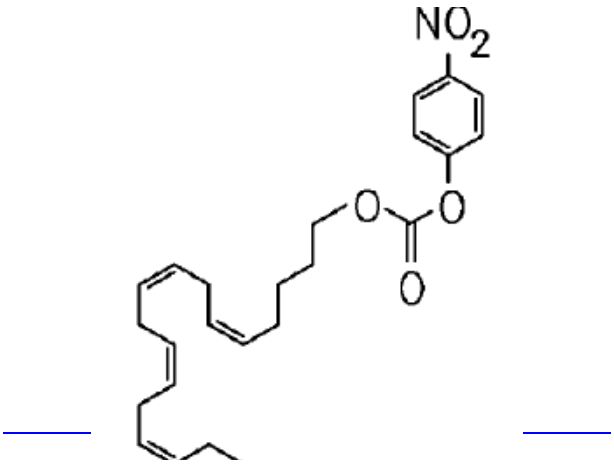
diluting the reaction mixture with DCM;

washing with water followed by washing with NAHCO3 solution;

drying reaction mixture over anhydrous Na_2SO_4 and evaporating under reduced pressure to form a solid;

purifying and eluting the solid with 8% ethyl acetate to yield a colorless liquid as second intermediate compound as an eluent; and

purifying the eluent by column chromatography over 100-200 mesh silica gel by using 8 % ethyl acetate-pet ether as eluent to yield the second intermediate compound represented as:



9. The method of claim 8, further comprising:

adding to a solution of 2-aminoethanethiol HCl in TFA and trityl alcohol at 0 ^{o}C;

stirring the reaction mixture for 3 h at room temperature;

quenching the reaction mixture with saturated NaHCO3 solution and extracting with EtOAC;

washing with water (2x100 mL) followed by brine solution;

drying over anhydrous Na_2SO_4 and evaporating under reduced pressure to get crude product as viscous oil; and

purifying and eluting by using column chromatography on silica gel 60-120 mesh and5% MeOH in CHCl3 as eluent to yield the second intermediate compound as a white solid that is trityl protected.

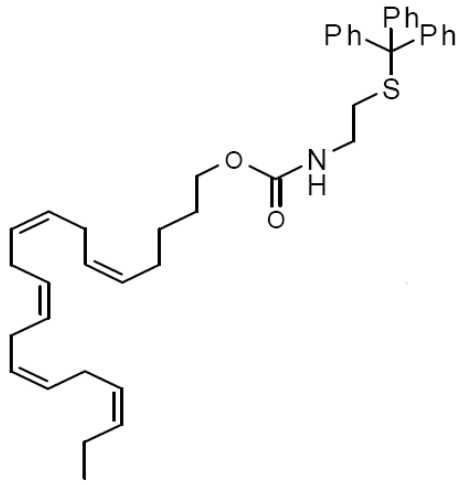
10. The method of claim 9, further comprising:

adding the second intermediate compound to a solution of carbonate in dry DMF at room temperature;

retaining the reaction mixture for two hours at room temperature;

evaporating the reaction mixture under reduced pressure; and

purifying and eluting the reaction mixture using by column chromatography over 60-120 mesh silica gel and adding 14 % ethyl acetate-pet ether to yield a colorless liquid as a third intermediate compound represented as:



11. The method of claim 10, further comprising:

adding a solution of carbomate in 20%TFA/DCM and triethylsilane dropwise at 0 °C;

stirring the reaction mixture for 30 min at 0°C;

monitoring the end of reaction using thin layer chromatography;

mixing the reaction mixture and saturated.NaHCO3 solution and extracting with DCM;

washing the combined organic layers of the reaction mixture with brine solution;

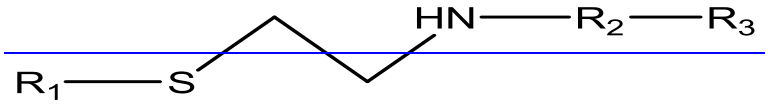
drying the reaction mixture over anhydrous Na_2SO_4 and evaporating under reduced pressure; and

purifying using column chromatography over 60-120 mesh silica gel by using 15% ethyl acetate-pet ether as eluent to yield a final compound as colorless liquid.

12. A kit; comprising:

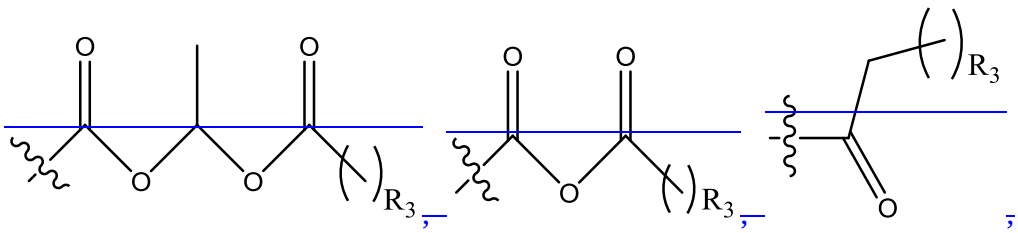
a pharmaceutically acceptable salt of compound of formula I comprising:

a pharmaceutically acceptable compound of formula I:



Wherein, R^1, R^2 each independently represents at least one of hydrogen, methyl, amine, cycohexyl methyl ether, butoxy, propoxy, thiol, alkyl, alkyl thiol, acetyl thiol, disulfide, acyl, acylalkyl, alkenyl, alkylthioalkyl, alkynyl, alkoxyaryl, alkoxyalkyl, aryl, aralkyl, aryloxyalkyl, arylthioalkyl, cycloalkyl, ether, ester, heteroaryl, heterocyclyl, lower alkyl, sulfone, sulfoxide, or hydroxyalkyl;

R^2 also independently represents at least one of hydrogen, carboxyl, amine, -NH-CO-NH-, -NH-CO-CH_2-NH-, -NH-CO-, R-COO-R^1, thiol, disulfide,



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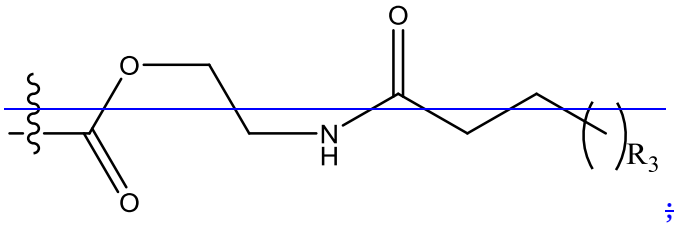

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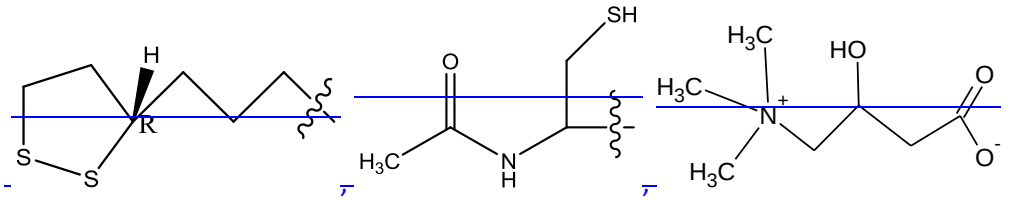
R^3 independently represents at least one of at least one of



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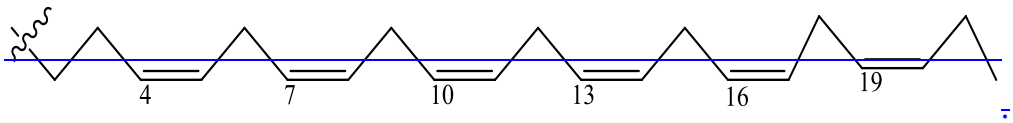

~~13. The kit of claim 12, further comprising:~~

~~a pharmaceutically acceptable salt of:~~

