**Description**

**USE OF 3,7-BIS(2-HYDROXYETHYL)-3,5-TRIHYDROXY-2-(4-EPOXYPHENYL)-8-(3-METHYL-2-BUTEN-1-YL)-4H-1-BENZOPYREN-4-ONE AND DERIVATIVES THEREOF FOR THE TREATMENT OF OSTEOPOROSIS**

**Technical Field**

The invention relates to a composition comprising 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one and the derivatives thereof and the use of said composition for the treatment of osteoporosis.

**State of the Art**

Osteoporosis or bone loss is a disease that occurs in the skeleton upon the impairment of the protein pattern in the bone as a result of a disorder in the bone metabolism and that causes the bones to be very easily fractured. The mineral density of the bone per unit volume is decreased. As a result, the bones become easier to fracture. Although it is observed mostly in the vertebrae and the femur and wrist bones, all the bones in the body are influenced by this condition. Although the condition is seen in both genders, 80% of the patients are women.

The organic nitrate or exogenous estrogen supplements available in the state of the art are the treatments which fail to provide effective results and which may not be continued for long times due to their metabolic cardiovascular and carcinogenic risks.

According to the state of the art, the invention no. WO 1997/019909 entitled "Novel amino alcohol derivatives, methods of producing said derivatives and pharmaceutical agents comprising the same"  relates to compounds of formula (I), in which R1 stands for hydrogen or methyl, R2 stands for lower straight-chain or branched alkyl with 1-10 carbon atoms, R3 stands for hydrogen or lower alkyl, n is 0-12, and R4 stands for alkyl, alkenyl or alkynyl with 6-24 carbon atoms; and to methods of producing said compounds and the pharmaceutical agents containing said compounds intended for use in the treatment of osteoporosis.

Further, the invention no. WO 1998/001443 entitled "Indole derivatives for the treatment of osteoporosis” provides a compound of formula (I), or a salt thereof, or a solvate thereof, wherein Ra represents a group R5 which is hydrogen, alkyl or optionally substituted aryl and Rb represents a moiety of formula (a), wherein X represents a hydroxy or an alkoxy group wherein the alkyl group may be substituted or unsubstituted or X represents a group NRsRt wherein Rs and Rt each independently represent hydrogen, alkyl, substituted alkyl, optionally substituted alkenyl, optionally substituted aryl, optionally substituted arylalkyl, an optionally substituted heterocyclic group or an optionally substituted heterocyclylalkyl group, or Rs and Rt together with the nitrogen to which they are attached form a heterocyclic group; R1 represents an alkyl or a substituted or unsubstituted aryl group; and R2, R3 and R4 each independently represent hydrogen, alkyl, aryl or substituted aryl; R6 and R7 each independently represent hydrogen, hydroxy, amino, alkoxy, optionally substituted aryloxy, optionally substituted benzyloxy, alkylamino, dialkylamino, halo, trifluoromethyl, trifluoromethoxy, nitro, alkyl, carboxy, carbalkoxy, carbamoyl, alkylcarbamoyl, or R6 and R7 together represent methylenedioxy, carbonyldioxy or carbonyldiamino; and R8 represents hydrogen, hydroxy, alkynoyl, alkyl, aminoalkyl, hydroxyalkyl, carboxyalky, carbalkoxyalkyl, carbamoyl or aminosulphonyl; a process for preparing such a compound, a pharmaceutical composition containing such a compound and the use of such a compound in medicine.

Further, the invention no. EP2046797B1 entitled "Furo[3,2-b]pyrrol-3-one derivatives and their use as cysteinyl proteinase inhibitors" relates to compounds of formula (I), and pharmaceutically acceptable salts thereof, a compound of formula (I), or a pharmaceutically acceptable salt, hydrate, complex or pro-drug thereof (I), wherein: one of R1 and R2 is H, and the other is selected from F and Cl, or R1 and R2 are both F; R3 is selected from cyclopentyl and cyclohexyl; R4 is an optionally substituted 5- or 6-membered monocyclic or an 8- to 10-membered bicyclic aryl or heteroaryl ring which includes up to four heteroatoms. The invention further relates to pharmaceutical compositions comprising compounds of formula (I), and the use of such compounds in the treatment of a disease selected from osteoporosis, Paget's disease, Chagas's disease, malaria, gingival diseases, hypercalaemia, metabolic bone disease, diseases involving matrix or cartilage degradation, and bone cancer disorders such as bone metastases and associated pain.

As a result, the presence of the need for a composition for treating the osteoporosis and the inadequacy of the existing solutions have made it necessary to perform an improvement in the relevant art.

**Object of the Invention**

In order to eliminate the disadvantages of the state of the art, an object of the invention is to support the osteoblast production.

Another object of the invention is to support the bone density owing to the ability to effectively increase fgf-2.

Another object of the invention is to prevent the mineral loss.

In order to achieve the aforesaid advantages, the invention is a composition for the treatment of osteoporosis, said composition being obtained by the components selected from the group comprising 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one, 2,7-bis(2-ketoethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one that are used individually or in combinations.

The structural and characteristic features and all the advantages of the invention will become more clearly understood from the detailed description provided below and therefore, the evaluation must be made taking this detailed description into consideration.

**Detailed Description of the Invention**

The invention is a composition comprising 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one and the derivatives thereof and the use of said composition for the treatment of osteoporosis. The composition according to the invention supports the new osteoblast production, supports the bone density owing to the ability to effectively increase fgf-2 and prevents the mineral loss.

The composition according to the invention contains 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one, 2,7-bis(2-ketoethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one.

Said composition is obtained by a mixture of the aforesaid components according to the following ratios by weight:

1-99% 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one

99-1% 2,7-bis(2-ketoethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one

The composition is obtained from the aforesaid components selected from the aforesaid group and used according to the mentioned weight ratio ranges individually or in combinations.

Said invention also encompasses the use of said composition for treating osteoporosis and the manufacture thereof for this purpose.

**CLAIMS**

1. A composition for the treatment of osteoporosis, said composition being obtained by the components selected from the group comprising 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one, 2,7-bis(2-ketoethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one that are used individually or in combinations.
2. A composition according to Claim 1 characterized in that it comprises 1-99% by weight 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one.
3. A composition according to Claim 1 characterized in that it comprises 99-1% by weight 2,7-bis(2-ketoethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one.
4. Use of the components according to Claims 1 to 3 obtained individually or in combinations from the group consisting of 3,7-bis(2-hydroxyethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one, 2,7-bis(2-ketoethyl)-3,5-trihydroxy-2-(4-epoxyphenyl)-8-(3-methyl-2-buten-1-yl)-4H-1-benzopyren-4-one **for the manufacture of a composition for treating osteoporosis.**

**ABSTRACT**

**USE OF 3,7-BIS(2-HYDROXYETHYL)-3,5-TRIHYDROXY-2-(4-EPOXYPHENYL)-8-(3-METHYL-2-BUTEN-1-YL)-4H-1-BENZOPYREN-4-ONE AND DERIVATIVES THEREOF FOR THE TREATMENT OF OSTEOPOROSIS**

The invention relates to a composition formed for the treatment of osteoporosis.

No figure.