

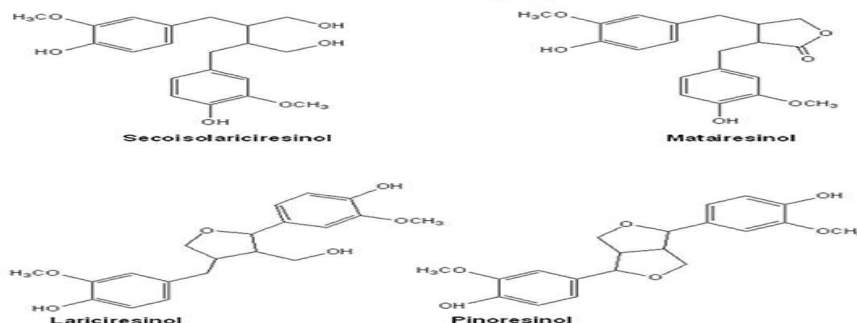
**REVIEW ON DIETARY SOURCES OF NON FLAVONOID PHYTOESTROGEN:  
SPECIAL REFERENCE TO CHHATTISGARH REGION****CHAITALI Y. MATHEW<sup>a</sup> AND BHAWANA PANDEY<sup>b1</sup>**<sup>a</sup>Ph. D. Scholar, Mats University, Raipur, Chhattisgarh, India<sup>b</sup>Department of Biotechnology and Microbiology, Bhilai Mahila Mahavidyalaya, Hospital Sector, Bhilai, Chhattisgarh, India**ABSTRACT**

Phytoestrogen are natural compound that elicit estrogen like properties. These are polyphenols and majority of them are flavanoids. Phytoestrogens from dietary source are synthesised in animal gut to form enterodiol and enterolignol with help of microorganism. Dietary source best source for phytoestrogen compounds as they found in most common food sources. These compound are easily metabolised in animal body and absorbed by blood. Many of these compound shows exceptionally novel bioactive properties like anti oxidant, antitumor, chemoprotective, antidiabetic, hepatoprotective, anti-inflammatory and many more .This review will discuss bioactivity of non flavinoid phytoestrogen which are commonly available in dietary sources of Chhattisgarh region.

**KEYWORDS:** Phytoestrogen, Dietary Sources, Antitumor, Lignans, Enterodiol

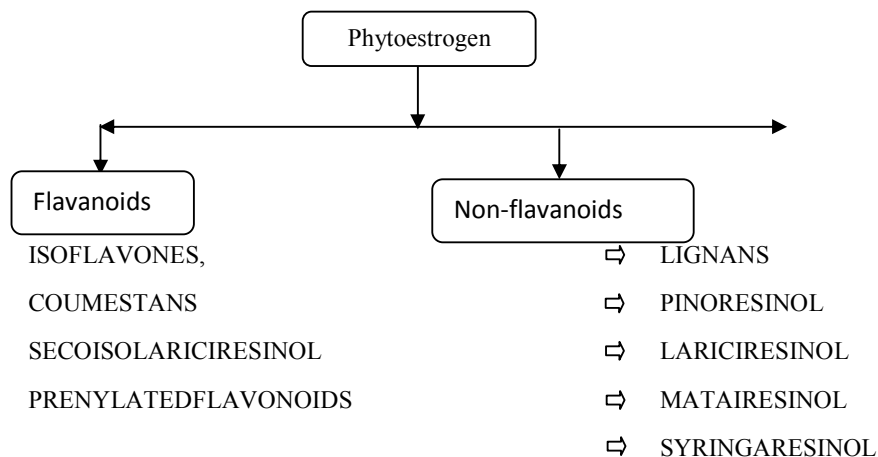
Liberman 1996 had defined phytoestrogen as compounds that exhibit estrogenic effect on Central nervous system and induce estruses Phytoestrogen are secondary metabolites that are estrogen like property and binds to estrogen receptor. (Bradbury & White 1954) published list of 53 plants showing estrogenic activity, later expanded to 300 plants by (Farnsworth *et al.*1975). Recent epidemiological studies reveal that bioactive compounds rich fruits, vegetables,

grains and seeds decreased risk of chronic diseases (Doll & Peto 1981; Trowell & Burkitt 1981; Steinmetz & Potter 1991a; Steinmetz & Potter 1991b; Dragsted *et al.* 1993; World Cancer Research Fund & Research 1997). ). Lignans that can be metabolized to mammalian lignans are pinoresinol, lariciresinol, secoisolariciresinol, matairesinol, syringaresinol. Plant lignans are metabolized by intestinal bacteria to mammalian lignans enterodiol and enterolactone.

**Figure 1: Naturally occurring dietary lignans**

Current study emphasized on non flavanoid phytoestrogen present in dietary foods of Chhattisgarh region. Plant lignans are weak estrogen (Welshons *et.al* 1987). They exhibit

structural similarities to natural and synthetic estrogens or estrogen antagonists (Adlercreutz, 1988.)



**Figure 2: Phytoestrogen and their classification**

Chhattisgarh has cropping intensity 119 % with total food grains production of 5 million tonnes. The food crops are rice, wheat, millets, pulses and oilseeds, brinjal, cauliflower, tomato,

okra, onion, cucurbits(agri dept of cg state & icar documents). Phytoestrogen are polyphenolic compounds and were classified into Flavanoids and Non-flavanoids.

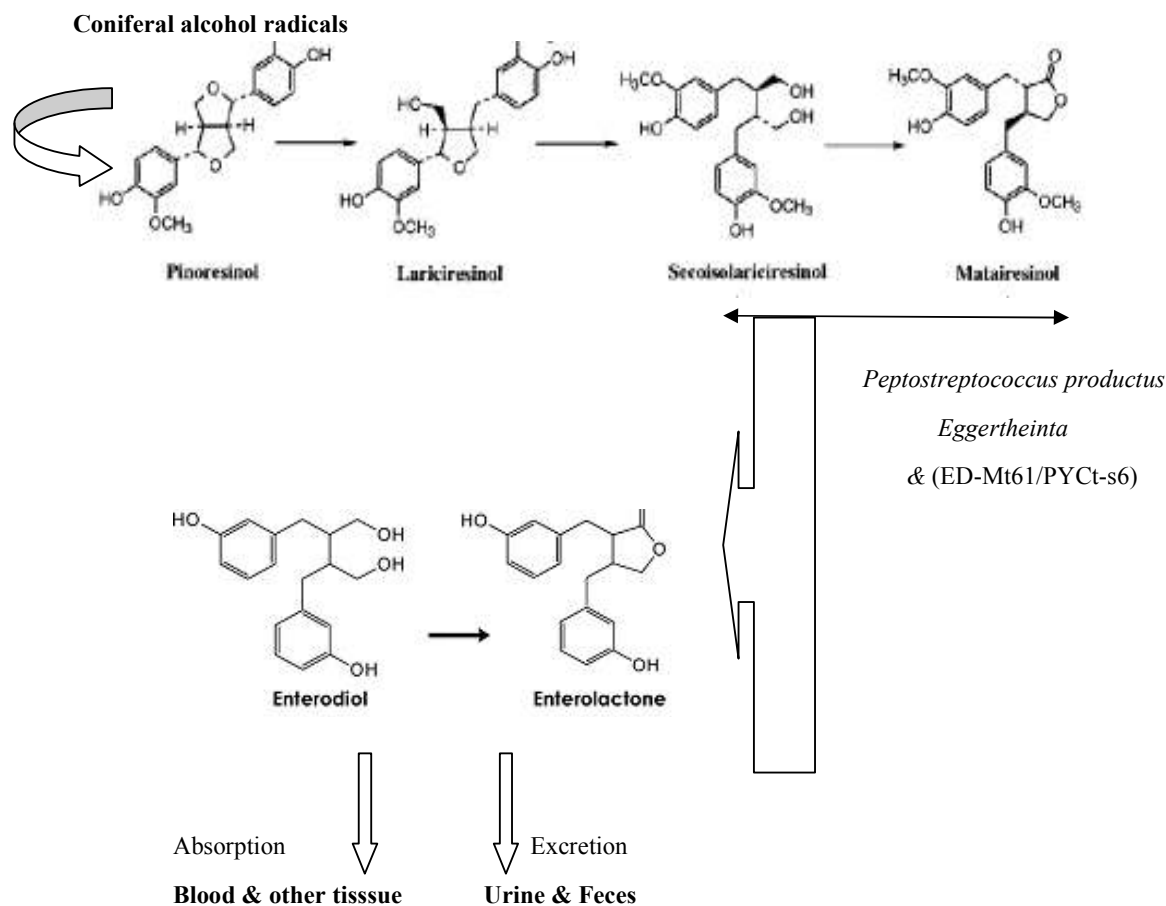
**Table 1: Food crop list and nonflavanoids present in dietary foods**

Food source	PINO	SECO	LARI	MAT	SYR
<b>CEREALS</b>					
Wheat	12	20	0	25	372
Rice	2	26.4	1	1	
Millet *	100	15	50	0	62
<b>OILSEEDS</b>					
Flax	2460	3699	2960	5202	01
Sesame	47136	3	5	0	-
Sunflower	8	6.1	581	0	0
<b>VEGETABLES</b>					
Cucumber	1	10	30	0	0
Eggplant	28	0	68	0	2
Radish	2	14	1	2	2
Tomato	5	11	5	2	2
Cabbage	0.2	30.3	0	0	0

PINO: Pinoresinol, SECO: Seco isolariciresinol, MAT : Matairesinol, LARI: Lariciresinol, SYR: Syringaresinol, SYR: Data compiled from Adlercreutz & Mazur (1997),Kunle *et al.* (2009), Mazur *et al.* (1996), Mazur (1998), Mazur *et al.* (1998), Milder *et al.* (2005), Penalvo *et al.* (2005), Penalvo *et al.* (2008), Smeds *et al.* (2007), Thompson *et al.* (1996), Thompson, L.U.Boucher, Liu. Z. Cotterchio, M and kreiger, N.*Nutr Cancer*; 54,184,2006.

**Metabolism and Bioavailability of Lignans:** lignans are derived from precursor Coniferal alcohol radicals from pathway which produce pinoresinol and other lignans are formed through succession in this pathway .Secoisolaricireinol and

matairesinol lead to the formation of enterodiols in colon with help of microorganism . These enterodiol and enterolactone are absorbed by blood and other tissue and were excreted outside the through urine or excreta.



**Figure 3: Possible mechanism of biotransformation of plant lignan into mammalian lignans (Arindam Paul *et al.*, 2012.) with modification.**

**BIOLOGICAL ACTIVITIES**

**Antioxidant activity:** The plant lignans demonstrated extreme radical scavenging activity. In both lipid and aqueous, *in-vitro* model systems SDG and its metabolites appeared as antioxidant (Arindam Paul *et al.* 2012).

**Antiatherosclerotic effect:** lignans prevent the development of hypercholesterolemic atherosclerosis and aortic atherosclerosis by 46% markedly without lowering serum cholesterol. (Ogborn *et al.*).

**Preventive against colon cancer:**Enterolignans also affect to beta glucouronidase activity, which may be the cause of protective effect against colon cancer. It has been observed that pretreatment of flaxseed decrease the risk of colon carcinogenesis,

**Anti-diabetic activity:** It has been demonstrated that SDG prevented development of diabetes mellitus by 75%. The reactive oxygen species play an important role in development of diabetes

mellitus (DM) therefore it was suggested that the antioxidant activity may be playing role for its antidiabetic activity. Prasad 2000; Prasad *et al.*, 2000).

**Effect on Cardiovascular system:** There are several mechanisms by which SDG protect against cardiovascular diseases. It appeared beneficial role in endotoxic shock (Prasad and Pattanik and Prasad ;1998; Prasad K2000)

**FUTURE PROSPECTS:** This review covers lignans from edible plants also present in Chhattisgarh region and biological activities of lignans. Antioxidant activity of lignans seems to depend on the number or position of hydroxyl group in the structure of lignans; hydroxypinoresinol displays more powerful antioxidant activity than pinoresinol glucoside or pinoresinol. Recent studies indicate that compositions can be in any form suitable for use in supplementing the diet as a functional food. Diseases caused by insufficiency of any of these

can easily be cured by regular and sufficient intake of phytoestrogens from edible food source.

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Web links:

[http://agridept.cg.gov.in/agriculture/rabi\\_cereal.htm](http://agridept.cg.gov.in/agriculture/rabi_cereal.htm)

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