

**Introduction:** Same non-digestible oligosaccharides (NDOs) stimulates Ca and phosphorus (P) absorption and improves bone mass. The effect of NDOs appears to be more important when the diet does not meet Ca nutritional recommendations. Estrogen deficiency induces the loss of bone mass, which is greater when Ca intake is insufficient.

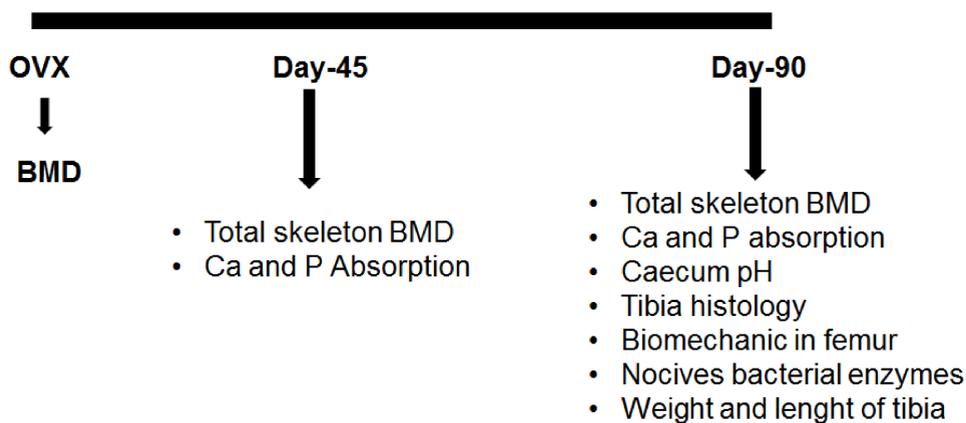
**Objective:** to evaluate the effect a mixture of GOS/FOS® (9:1) added to a low or a normal Ca diet on Ca and P absorption, bone retention, mineralization and structure, in osteopenic-estrogen deficient rats.

## Materials and methods:

### Experimental design:

#### Each 15 days:

- %H<sub>2</sub>O in feces
- Lactobacillus count



### Animals and experimental design:

Female adult Wistar rats (200-250 BW) were OVX and remained untreated for 45 days to become osteopenic (T45). At T45, they were randomly assigned to receive for an additional 45-day period (T90) one of the following treatment:

**C5:** AIN93-M containing 0.5% Ca;

**P5:** C5 +2.5% GOS/FOS®,

**C3:** AIN93-M containing 0.3% Ca;

**P3:** C3 +2.5% GOS/FOS®.

#### Determinations:

Body weight (BW): weekly.

Intestinal lactobacilli count (UFC): each 15 days

Ca and P absorptions: at baseline and at T90.

Serum Calcium (Ca), phosphorus (P), crosslaps (CTX) and bone alkaline phosphatase (BALP): throughout the study

Total skeleton BMD and BMC: at baseline, T45 and T90

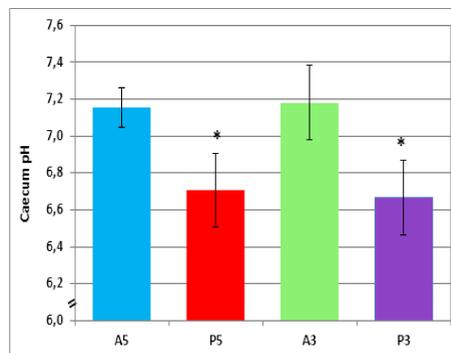
Tibia, femur, spleen and liver weight, caecum pH, bone volume

(BV/TV), bone-breaking strength, elastic modulus and stiffness: at T90

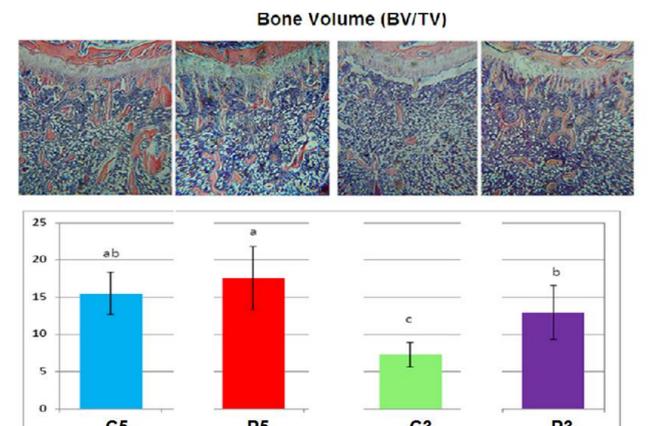
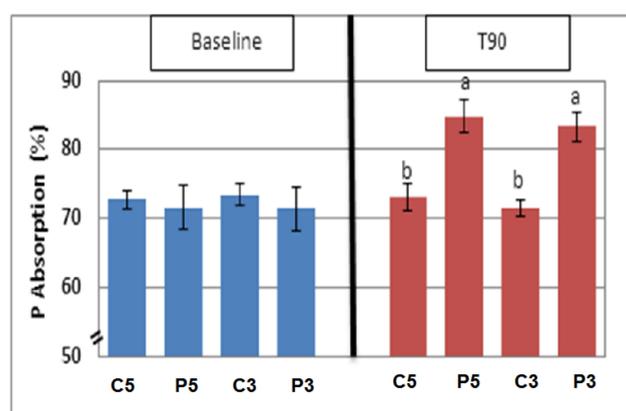
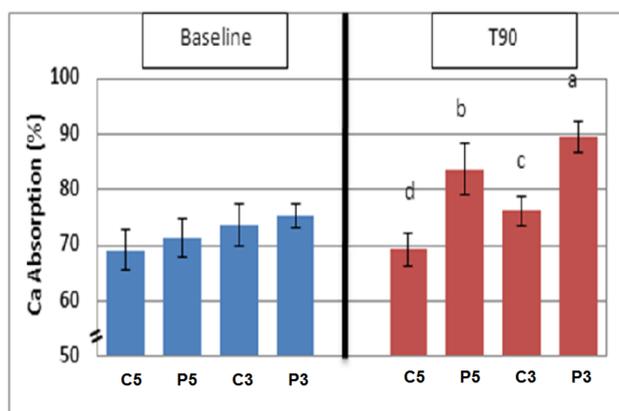
## Results:

Grupo	Food consumption (g/d)	BW (g) (Tb)	BW(g) (T90)	BW increase (g) (T90-Tb)
C5	22.6±4.9	292±46	329±41	36.7±9.5
P5	22.9±0.6	290±40	326±45	36.0±10.7
C3	19.7±3.8	293±30	327±31	34.1±10
P3	20.7±1.7	286±29	321±42	35.2±9.4

	C5	P5	C3	P3
Femur (g/100g)	0.24±0.05	0.31±0.0*	0.25±0.05	0.23±0.01
Tibia (g/100g)	0.20±0.02	0.21±0.01	0.21±0.02	0.21±0.01
Spleen (g/100g)	0.22±0.02	0.21±0.01	0.21±0.03	0.22±0.03
Liver (g/100g)	3.16±0.26	3.20±0.20	3.26±0.23	3.21±0.39



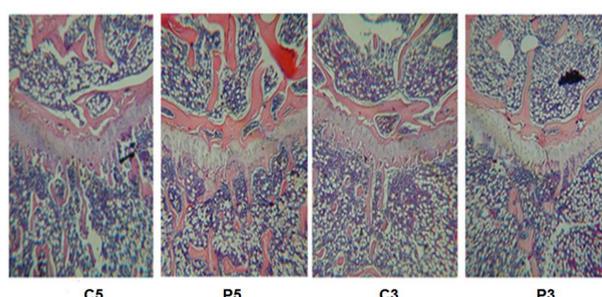
At T90	C5	P5	C3	P3
Ca (mg/dL)	9.7±0.3	10.0±0.2	9.8±0.3	10.1±0.5
P (mg/dL)	4.8±0.5	5.0±0.2	5.0±0.5	5.0±0.4
Mg (mg/dL)	2.0±0.3	2.1±0.1	2.1±0.1	2.1±0.1
BALP (IU/L)	50±4	50±7	49±6	49±6
CTX (ng/mL)	38.7±5.4 <sup>a</sup>	30.0±11 <sup>a</sup>	52.2±5.6 <sup>b</sup>	41.1±8.8 <sup>b</sup>



Different letters indicates a p<0.01

	C5	P5	C3	P3
Total skeleton BMC (g/100g BW)	2.01±0.13 <sup>a</sup>	2.45±0.10 <sup>b</sup>	1.78±0.14 <sup>c</sup>	2.06±0.24 <sup>a</sup>
Total skeleton BMD (mg/cm <sup>2</sup> )	294±7	295±2	286±6	289±2
Lumbar spine BMD (mg/cm <sup>2</sup> )	229±13 <sup>b</sup>	241±14 <sup>a</sup>	219±12 <sup>c</sup>	228±14 <sup>a</sup>
Femur BMD (mg/cm <sup>2</sup> )	285±16	295±10	281±16	287±10
Proximal tibia BMD (mg/cm <sup>2</sup> )	247±10 <sup>b</sup>	256±7 <sup>a</sup>	231±10 <sup>c</sup>	241±10 <sup>a</sup>

### Growth plate cartilage



	C5	P5	C3	P3
Bone breaking strength (N)	117.9±7.3 <sup>a</sup>	145.5±17.0 <sup>b</sup>	80.2±9.1 <sup>c</sup>	101.8±15.6 <sup>b</sup>
Stiffness (N/mm)	254±24 <sup>a</sup>	299±19 <sup>b</sup>	147±14 <sup>c</sup>	234±13 <sup>b</sup>
Elastic modulus (Mpa)	1132±178 <sup>a</sup>	1508±146 <sup>b</sup>	844±85 <sup>c</sup>	1082±137 <sup>b</sup>

**Conclusion:** In osteopenic OVX rats fed a low Ca diet, the used GOS/FOS® mixture increased Ca and P bioavailability that improved bone health.